Pre-Conference Workshops [Workshops 1, 2 and 3]

08:30 - 17:00 Tuesday, 6th February, 2024
Location Crawford School of Public Policy, ANU

WORKSHOP 1: Australia's net zero trajectory – exploring the economic implications.
Conveners: Stuart Whitten, CSIRO; Rebecca Cassells, The Treasury, Australian Government; and Professor Frank Jotzo, The Australian National University
Time: 8:30am welcome tea and coffee, workshop: 9:00am - 5:00pm

WORKSHOP 2: Natural Capital: State of Play and Future Challenges
Convenor: Grant Leslie, Balmoral Group, Sydney, Australia
Time: 8:30am welcome tea and coffee; workshop 9:00am- 4:00pm

WORKSHOP 3: Real Options for Adaptation and Resilience (ROAR): New software for real options analysis
Convenors: Tim Capon and Greg Hertzler, CSIRO, Canberra, Australia
Time: 8:30am welcome tea and coffee, workshop: 9:00am – 3:30pm

More information: on the Pre-Conference Workshops can be access here: https://www.aares.org.au/Events/AARES-2024/preconference-workshops/

Location: Crawford School of Public Policy, ANU https://maps.app.goo.gl/Ap44184ZqDuvL1998

AARES Conference Registration Desk Open [5:00PM to 7:30PM]

17:00 - 17:30 Tuesday, 6th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Conference Welcome Reception

17:30 - 19:30 Tuesday, 6th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

The Conference Welcome Reception will be held in the Lobby and Northern Courtyard, Kambri Cultural Centre (https://maps.app.goo.gl/M3NjjGxQotGtsgAbA). Canapes, alcoholic and non-alcoholic drinks will be served.

At the Welcome Reception, conference delegates will have an opportunity to meet with colleagues and make new connections. There will also be an opportunity to connect with representatives from the Australian and international AARES branches.

AARES has branches in the Australian Capital Territory, East Asia, New England (NSW), New Zealand, New South Wales, North America, Queensland, South Australia, Victoria, and Western Australia. Name badges will identify representatives from the AARES branches. Please say hello to them and ask them about the various activities hosted by their branches:

- Peter Tozer, New Zealand Branch
- Ali Hill, North American Branch
- Shengyu (Eric), East Asian Branch
- Christian Creed, Australian Capital Territory Branch
- Nick Tsaktsiras, Victorian Branch
- Alaya Spencer-Cotton, Western Australian Branch
- Claire Doll, Western Australian Branch
- Jeremy De Valck, Queensland Branch
- Germán Puga, South Australian Branch
- Derek Baker, New England Branch
- Michael Harris, New South Wales Branch

AARES Conference Registration Desk Open [7:30AM to 4:30PM]

07:30 - 08:00 Wednesday, 7th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Tea and Coffee on arrival

08:00 - 08:15 Wednesday, 7th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Opening Session and Address by Guest of Honour, Hon Dr Andrew Leigh MP

08:15 - 09:00 Wednesday, 7th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Sorada Tapsuwan

8:15 Guests and delegates take their seats

8:20 Start of Opening Session [M.C., Dr Sorada Tapsuwan, AARES President-Elect]

8:20 – 8:25 Welcome to Country [Paul Girrawah House, Ngambri-Kamberri, Ngunnawal, Wiradyuri custodian]

8:25 – 8:35 Address by Guest of Honour [Hon Dr Andrew Leigh MP]

8:35 – 8:50 AARES President's welcome and ceremonial ringing of the Cow Bell [Dr Thilak Mallawaarachchi]

8:50 – 8:55 Remarks from Local Organising Committee Chair [Dr Todd Sanderson].

8:55am End of Opening Session [M.C., Dr Sorada Tapsuwan, AARES President-Elect]

Keynote: "Energy decarbonization: irresistible force meets immovable object"

09:00 - 10:00 Wednesday, 7th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre

John Quiggin

Abstract: The phrase ‘immovable object’ has been used to describe the resistance to action to decarbonize the global energy system, reflected in the production plans of oil, gas and coal producers and the reluctance of governments to take effective action. Against this seemingly immovable resistance, is the force of massive reductions in the cost of solar photovoltaics and, to a lesser extent, wind. The result has been a massive expansion in production capacity for renewable generation, approaching one terawatt (1 TW) annual. If production on such a scale takes place and results in installations of comparable quantities of solar and wind energy, the resulting adjustment will imply large-scale closure of existing coal and gas generation, as well as a rapid shift to electrification of transport and industry. I will consider how this collision is likely to unfold.

John Quiggin is a Professor of Economics at the University of Queensland. He is a prominent research economist and commentator on Australian and international economic policy. He is a Distinguished Fellow and past President of the Australasian Agricultural and Resource Economics Society. He has written extensively on agricultural and environmental economics, among other topics. He has published over 300 journal articles, including 30 in the Australian Journal of Agricultural and Resource Economics.

Chair: Dr Sorada Tapsuwan

Morning Tea [including viewing of Contributed Posters]

10:00 - 10:30 Wednesday, 7th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

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29 Assessing the value of urban green space: a hedonic analysis in Shenzhen, China

Xun Li, Qingyu He

Beijing Normal University-Hong Kong Baptist University United International College, Zhuhai, China

Presentation Type:

4. Poster

Keywords:

9. Consumer Choice

29. Valuation

Paper/Poster Abstract:

Urban green space is crucial in the practice of building sustainable cities and plays a significant role in improving the urban environment and livability and enhancing the well-being of residents. However, due to the lack of an obvious market price, the value of urban green space is often ignored by urban planners and consumers, resulting in a large amount of urban green space being eroded by urban development such as real estate development, large shopping mall construction, cultural and entertainment construction. Based on the hedonic pricing model (HPM), this study takes Shenzhen, China as an example to construct and assess the value (revealed in terms of housing price) of the characteristics of green space in Shenzhen. Geographic Information System (GIS) and urban landscape metrics are used to determine hedonic price model variables. Our analytical results indicate that national forest parks contain higher ecological and economic value (national forest parks can increase the price of apartments by more than 40%, while city parks can increase the value of apartment prices by more than 10%). After interaction analysis with visibility and 300-m walking distance, the value gain of national forest parks and urban parks shows a hierarchical distribution that reflects the ecological economic value of different park types. The findings have important reference value for guiding the planning and construction of sustainable cities, optimizing the spatial allocation of public green resources, and improving the overall welfare of society.

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33 The Effectiveness of China’s Water Tax Reform on Groundwater Abstraction

Shujie Liang, Tiho Ancev, Maruge Zhao

University of Sydney, Sydney, Australia

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

31. Water

Paper/Poster Abstract:

Groundwater is a critical natural resource that supports human life, sustains ecosystems, and plays a crucial role in economic and environmental sustainability. In recent decades, China has experienced a rapid depletion of its groundwater reserves. In 2016, a pilot program to introduce a water resource taxation mechanism replacing the existing water resource fee system was implemented in Hebei province. The new taxation mechanism was subsequently extended to nine additional provinces/ administrative division, namely Beijing, Tianjin, Shanxi, Inner Mongolia, Shandong, Henan, Sichuan, Shaanxi and Ningxia, in 2017. The other provinces/administrative divisions in China have not yet implemented the new taxation mechanism. In this paper, we employ the heterogeneity of implementation of the new tax mechanism across provinces to test its effectiveness in conserving groundwater resources. We employ the Difference-in-Differences approach to assess the impact of the water tax reform on groundwater usage, utilizing panel data on 169 sub-provincial administrative divisions (so called ‘cities’) from 2012 to 2021. The data come from cities within provinces where the new taxation mechanism was implemented, and from cities within provinces where the new tax was not implemented. The findings reveal that the tax policy has had a significant reduction effect on the groundwater abstraction volume, indicating its effectiveness to decrease groundwater consumption. The paper sheds light on the efficacy of the tax policy in addressing China's groundwater challenges and underscores the importance of sustainable water resource governance.

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59 Expanding beyond case studies in postgraduate agribusiness teaching to enhance experiential benefits and student/teacher outcomes.

Alexandra Peralta, Craig Johns, Adam Loch

University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

Experiential teaching in postgraduate agribusiness education is crucial for bridging the gap between theoretical knowledge and practical application. While traditional methods often rely on case studies, this paper explores the potential benefits of expanding the range of industry experiences available to students. We present two examples of broader industry engagement: field trips to local agribusiness firms and industry internship opportunities. These approaches aim to provide students with a deeper understanding of how agribusinesses innovate, navigate industry challenges, and capitalize on opportunities.

Field trips offer students the chance to interact with senior managers from agribusiness firms who share their strategies, challenges, and opportunities, fostering interactive discussions. Meanwhile, industry internships provide direct interaction with various levels of agribusiness organizations and allow students to research relevant industry topics. These expanded materials have been integrated into the Master of Global Food and Agricultural Business (MGFAB) and Master of Agribusiness (MAB) programs.

This paper assesses how these enhanced teaching methods add value to agribusiness education using the Bell and Bell (2020) framework for experiential learning assessment. We also provide insights for educators and program managers interested in incorporating similar approaches into their agribusiness teaching. By diversifying the educational experience and emphasizing practical engagement, we aim to equip students with the skills and knowledge needed to excel in the ever-evolving agribusiness sector.

Experiential learning is a well-established pedagogical approach in business and entrepreneurial programs, with case studies being a prominent tool. However, the modern agribusiness sector demands socially responsible managers who can navigate ethical and practical challenges. This necessitates a broader range of teaching materials and experiential opportunities. This paper explores the effectiveness of two such approaches: field trips to local agribusiness firms and industry internships.

We introduce the Bell and Bell (2020) framework, which guides our analysis. This framework draws from experiential pedagogy theories and serves as a foundation for evaluating the impact of expanded teaching materials in agribusiness education.

We present two key experiential learning activities:

a) Field Trips: These trips allow students to engage with senior managers who share insights into their business strategies, challenges, and opportunities. Interactive discussions enrich the learning experience.

b) Industry Internships: Students participate in internships with partner agribusiness firms, offering direct interaction across various organizational levels and the opportunity to conduct research on relevant industry topics.

We assess the impact of these expanded teaching methods using the Bell and Bell (2020) framework, focusing on key aspects such as student engagement, reflection, and the application of knowledge.

We discuss the insights gained from our assessment and their implications for agribusiness education. Our findings emphasize the value of diversifying teaching materials and incorporating practical engagement to better prepare students for the dynamic agribusiness landscape.

This paper advocates for the integration of field trips and industry internships in postgraduate agribusiness education to enhance experiential learning. By applying the Bell and Bell (2020) framework, we provide evidence of the benefits of these approaches and offer guidance for course coordinators, undergraduate and postgraduate program managers seeking to enrich their agribusiness teaching methodologies.

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69 Restoring wetlands on private lands: farm context, aspirations, incentives, and transaction costs

Geoff Kaine, Maksym Polyakov

Manaaki Whenua - Landcare Research, Hamilton, New Zealand

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

The aim of the project was to identify the costs associated with wetland restoration and conservation using farm context analysis and explore the landholder's potential interest and implications for the design of incentives. We conducted farmers' interviews to identify the key factors in the farm system that influence the costs of establishing wetlands and a survey to quantify and statistically test the findings from the interviews. The survey included a choice experiment to investigate farmers' willingness to enrol in programmes offering incentives for establishing wetlands. We found that while landowners may aspire to attract native birds to their properties and improve biodiversity and aesthetics, their interest in restoring and protecting wet areas depended primarily on their farm context, the biophysical characteristics of their properties and the wet areas. There was substantial diversity in farm contexts, meaning landholders will differ substantially in their interest in retiring wet areas and in seeking assistance to do so, irrespective of their aspirations. This diversity, through its effects on the feasibility and costs of retiring wet areas, means that landholders are likely to be quite sensitive to variations in the features of assistance programs. Consequently, while we found a high level of interest in programmes offering incentives for establishing wetlands among the respondents to the survey, these programmes would need to be customised to suit specific farm contexts and expectations about the success of assistance programmes tempered accordingly, for example, in terms of the number of properties with a specific farm context and difference in the sensitivity of landowners in that context to the features of programmes. Our statistical results are derived from a small sample of landowners who probably have a greater-than-average interest in wetlands. Consequently, our findings should be treated cautiously. Repeating the

survey with a much larger, more heterogeneous sample would be valuable in building greater confidence in our findings.

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81 Farmers' pro-commons awareness, non-farm activities and effects on groundwater conservation: Experiences from India's wheat belt

Ranjan Ghosh, Ankit Saha, Vidya Vemireddy

Indian Institute of Management, Ahmedabad, Ahmedabad, India

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

31. Water

Paper/Poster Abstract:

Water conservation is key to future sustainability of smallholder farming systems. However, there is a grim trade-off between private use decisions such as groundwater extraction for irrigation and the common impacts such as depletion of basin level groundwater levels. This leads to an impending global 'tragedy of the water commons' which is more severe where crops are high value and commercial interests dominate the farmer's mind. Pricing water or quantity restrictions are the most discussed solutions without much attention given to farmers' own behaviour with respect to conservation. In this context, we tried to understand what drives farmers' preference for communal benefits from water conservation We conducted choice experiments with over 300 farmers in the dryland wheat belt in central India by offering variations to the following attributes of water saving options: visibility of water, installation and maintenance costs, self-use, and common use. Results revealed that despite sensitivity towards cost and visibility, farmers have a high preference for common use. However, it is the larger farmers with higher non-farm income sources who tend to value common use more than farmers who are smaller and with lower non-farm income sources. The valuation for communal benefits of water conservation decreases as farmers become more educated, are older or have larger families. We conclude that commons awareness strategies and inducements for rural non-farm economy can be very effective in water conservation without having to exclusively rely on usage taxation or quantity rationing.

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83 Valuing Attributes of Forest Restoration Using a Choice Experiment

Yohan Lee[1], Jae Bong Chang[2]

[1]Seoul National University, Seoul, Korea, Republic of. [2]Konkuk University, Seoul, Korea, Republic of

Presentation Type:

4. Poster

Keywords:

5. Biodiversity

29. Valuation

Paper/Poster Abstract:

This choice experiment study investigates residents' preferences toward restoring forest ecosystem services and estimates willingness to pay for multiple attributes of forest ecosystems by function in the Republic of Korea. In 2021, we conducted face-to-face interviews with 500 respondents in the Republic of Korea. The attributes of forest ecosystem services in the Republic of Korea including biodiversity, prevention of natural disasters, carbon sequestration, and household tax have significant influences on individuals' preferences with regard to forest restoration. Among the four functional attributes of forest restoration, the prevention of natural disasters such as landslides and floods was the most crucial role of forest restoration in their choice of forest ecosystem services. In addition, we found that the preferences of functional attributes of forest ecosystem services can be significantly different depending on the location of forest restoration. The willingness-to-pay(WTP) of the biodiversity in forested areas is higher than in wetlands or residential areas, whereas the WTP for the prevention of natural disasters in residential areas is higher than that of other areas. To make forest restoration projects successful, we need to take not just the attributes of forest ecosystem services but also the regional characteristics of those restoration sites into account to improve the social welfare of residents.

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87 The importance of farmers' markets in the modern world: A bibliometric review

Áron Török[1], Zalán Márk Maró[1], Gréta Maró[1], Sándor Kovács[2]

[1]Corvinus University of Budapest, Budapest, Hungary. [2]University of Debrecen, Debrecen, Hungary

Presentation Type:

4. Poster

Keywords:

23. Market Design and Policy

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

With the appearance of modern food supply chains, there has been a clear decrease in consumer trust and an increase in information asymmetry. Short food supply chains, including farmers' markets, can represent a solution to such problems. Today, modern farmers' markets mainly exist in the United States and the European Union, and their impact on sustainability has been the focus of attention; however, the relevance of this traditional approach among modern supply chains is relatively unexplored. Therefore, this study reviews the current state of the literature on

farmers' markets using bibliometric techniques applied to 1,765 documents from Scopus and Web of Science databases from 1955-2022. The paper tracks the research dynamics associated with farmers' markets by identifying the stages of evolution of major topics, articles, journals, author citations, and co-citation networks. The results illustrate the upward trend in publishing papers on the topic, identify five areas of related market research, and pave the way for further work by researchers and politicians by describing the main and specific research avenues.

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88 The taxonomy of Global Value Chains

Áron Török[1], Attila Jámbor[1], Zalán Márk Maró[1], Sándor Kovács[2]

[1]Corvinus University of Budapest, Budapest, Hungary. [2]University of Debrecen, Debrecen, Hungary

Presentation Type:

4. Poster

Keywords:

12. Econometric Modelling

20. International Trade

Paper/Poster Abstract:

Since the WWII, the role of global value chains (GVCs) has been continuously increasing as the main driver of global production and trade patterns. With the continuous rise of globalisation, at least until 2008, GVCs have brought increasing specialisation and vertical integration to the global economy, thereby connecting different parts of the world. Unbundling of tasks and business activities as well as functions has provided new opportunities for developing countries to continuously increase their participation in global production and trade flows without having to develop a completely new product or value chain.

GVC participation plays a crucial role in economic development as the ability of countries to prosper highly depends on their level of participation in the global economy. Even small countries with limited resources can benefit from global trade through GVC participation with significant variation across countries and sectors. As evident from the majority of the existing literature in the field, GVC participation represent a perfect opportunity for supporting local agri-food markets to become more commercialised and productive, thereby increasing local incomes as well as their stability together with food security. It is also evident that agricultural sectors participate in value chains predominantly as suppliers of raw materials, whereas food sectors participate mainly in terms of sourcing inputs from global markets.

At the same time, many poorer countries faced serious challenges in integrating to these GVCs for a number of reasons, including low educated human capital, poor infrastructures, low capital endowments, versatile political and business climates or poor institutions. For local and regional as well as global policymakers, the question is therefore what the key determinants of developing countries in GVC participation are and how can targeted policies help fostering better integration.

This research provides an empirical analysis of the determinants of agri-food GVC participation of countries standing at different levels of economic development, especially focusing on developing countries. This analysis is particularly relevant for developing countries helping them to better understand the overall context and the key determinants of success and thereby increasing their involvement in global agri-food GVCs. The research starts with identifying the determinants of participation by descriptive statistics and economic models, followed by the analysis of how different kinds of shocks can affect the resilience of agriculture. The research then provides a taxonomy of global agri-food value chains, followed by policy recommendations to increase participation.

97 Assessing Financial Inclusion of Digital Financial Services among Cambodian Farmers

Rida Akzar, Alexandra Peralta, Adam Loch

University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

2. Agricultural Finance

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

Cambodia has demonstrated remarkable economic growth, boasting an average annual growth rate of 7.7% over the period spanning from 1998 to 2019, positioning itself as one of the world's fastest-growing economies (ADB, 2021). One of the significant driving forces behind this economic surge is the agricultural sector, which, in 2019, contributed a substantial 22.1% to the country's total GDP, marking the highest value-added share among lower-middle-income countries (ADB, 2021). However, despite these economic achievements, Cambodian farmers continue to grapple with substantial challenges when it comes to accessing crucial financial resources. Factors contributing to their limited financial access include stringent collateral requirements, high-interest rates on short-term loans, the absence of established credit histories, and a notable lack of financial literacy among farmers (ADB, 2021).

The introduction of digital financial services emerges as a promising avenue to alleviate these financial access limitations for farmers in Cambodia. To successfully adopt and utilise these digital financial services, several critical prerequisites must be in place. These prerequisites encompass the availability of essential infrastructure components, such as widespread mobile phone coverage, robust network connectivity, and readily accessible internet connections (Ambler et al., 2022; Caron, 2022). Other important factors include financial and technological literacy levels of potential users, the affordability of these services, user preferences, and the relevance of such services in meeting the specific needs of the target users (Caron, 2022).

The overarching goal of this study is to provide a comprehensive and descriptive analysis of the financial inclusion landscape among agricultural households in Cambodia, taking into account the availability of essential infrastructure and the socioeconomic characteristics of these households. This analysis will offer valuable insights into both digital and non-digital dimensions of financial inclusion within this context. This study draws upon a diverse set of secondary datasets for Cambodia sourced from World Bank, including data from the 2021 Global Findex which features 1,000 individuals and one round of the High-frequency phone survey of the Living Standards Measurement Survey encompassing 1,666 households (Round 3). Various infrastructure-related datasets, such as those detailing cell phone tower availability, internet speed, and the presence of financial agents, are utilised in this research.

References

ADB 2021, Cambodia agricultural natural resources, and rural development sector assessment, strategassessmentmap Asian Development Bank, Manila, Philippines.

Ambler, K, de Brauw, A, Herskowitz, S and Pulido, C 2022, Finance needs of the agricultural midstream and the prospects for digital financial services, International Food Policy Research Institute, Washington, DC

Caron, L 2022, 'Empty digital wallets: new technologies and old inequalities in digital financial services among women', Oxford Open Economics, vol. 1, 2022/03/01/, p. odac001.

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99 Assessing ‘value for money’ for environmental project funding: An application to riverine recovery funding in Queensland Australia.

Amar Doshi[1], Steve Charlton-Henderson[1], Jim Binney[1], Paul Maxwell[2], Misko Ivezich[3]

[1]Natural Capital Economics, Brisbane, Australia. [2]EcoFutures, Brisbane, Australia. [3]Alluvium Consulting Australia, Brisbane, Australia

Presentation Type:

4. Poster

Keywords:

19. Impact Assessment

21. Land and Natural Resource Management

Paper/Poster Abstract:

Federal and State government agencies provide public funding for various environmental recovery and management projects. Assessing applications have typically focused on single benefit streams (e.g., water quality) using a cost-effectiveness approach. However, improvements to the biophysical condition of a natural asset can provide multiple benefits across a range of ecosystem services. Only considering single benefit streams can result in sub-optimal outcomes for public funding. Prevailing approaches to assess multiple benefits, such as cost-benefit and multi-criteria analyses, are time, data and cost intensive. Agencies require a simple tool for considering the total benefits across broader ecosystem services that is also, evidence-based, transparent, repeatable, and efficient. This project, funded by the Queensland Reconstruction Authority, is purposed with developing a framework and tool to facilitate Queensland’s Department of Environment and Science in assessing applications for the Disaster Recovery Funding Arrangements Riverine Recovery Program. The proposed framework prioritises projects based on the cost-effectiveness of delivering benefits to provisioning, regulating, supporting and social-cultural ecosystem services by utilising data that is either publicly available, applicants can readily provide, or already collected by the Department. Critically, the framework can be updated and refined over time based on new data and information, and different objectives of future funding programs.

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101 A conic version of a dairy sector model for New Zealand

Mario Fernandez

DairyNZ, Hamiton, New Zealand

Presentation Type:

4. Poster

Keywords:

24. Mathematical Programming

25. Policy Analysis

Paper/Poster Abstract:

There is a growing need for a model suitable to assess the economic impacts and the adaptations of dairy farmers in response to policies or environmental changes. In this regard, programming models have proven relevant to represent resource-constrained inputs contractions and substitutions, which could be more challenging to capture in an econometric approach. Farmers' adaptation responses to policies involve a complex decision-making process that depends on various criteria, including profits, availability of mitigation options, and risks, which are also dependent on wider-scale processes.

Considering the significant contribution of the dairy sector to the economy of New Zealand, and the pipeline of agri-environmental policies coming into force in the next five years (e.g. He Waka Eke Noa -HWEN and other freshwater regulations), it is expected that dairy farms will go through dramatic changes on their economic and environmental context. Dairy farming has to meet water quality and emissions targets while remaining competitive in the international market, to plant-based alternatives and the potential introduction of synthetic milk. HWEN introduces prices on methane emissions and long-lived gases, while freshwater regulations limit N leaching. The combined operation of policies puts pressure on farming profitability, mainly when technology or advanced mitigation options are not readily available or at least not to scale up for a significant share of farms.

We propose a model based on conic programming to accommodate a PMP calibrated dairy-specific cost function that relate inputs (e.g. stocking rate, nitrogen fertilizer, feed) to milk production. This setup ensures obtaining a detailed understanding of the effects of policies or scenarios simulated (e.g. changing constraints, costs or even climate information) and avoiding inefficient adaptation measures, misinterpretation of climate signals or minimal adoption of technologies.

This note describes a dairy sector model prototype based on mathematical programming. We take the pricing of methane emissions as a case study to exemplify its performance and research potential.

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121 Balancing Conventional and Agro-Ecological Farming for Sustainable Agriculture and Food Security: Empirical Insights from Tanzania

Haji Msangi[1,2,3], Ntengua Mdoe[1], Katharina Löhr[2], Betty Waized[1], Stefan Sieber[2,4], Daniel Ndyetabula[1]

[1]Sokoine University of Agriculture, Morogoro, Tanzania, United Republic of. [2]Leibniz Centre for Agricultural Landscape Research (ZALF), Muncheberg, Germany. [3]College of Business Education, Dar es salaam, Tanzania, United Republic of. [4]Humboldt-Universität zu Berlin, Berlin, Germany

Presentation Type:

4. Poster

Keywords:

8. Climate Change

11. Ecological Economics

Paper/Poster Abstract:

Climate change is one of the greatest global challenges of the 21st century, and it has adversely affected global agricultural production and food systems. As the global population continues to rapidly increase, agricultural production systems must produce sufficient food to meet the demands of an expanding global population projected to reach 9 billion by 2050. In Sub-Saharan Africa, the region faces significant challenges such as rapid population growth, poverty, and food insecurity. Conventional strategies to strengthen agricultural production systems face serious trade-offs, where efforts to increase food production generate significant amounts of greenhouse gases (GHG) that contribute to climate change. Adopting agro-ecological farming practices is widely accepted as a strategy to address climate change issues and ensure sustainability in agri-food systems. However, an emerging concern with agro-ecological farming is its ability to substitute conventional external input farming to meet productivity and food security objectives, especially in countries such as many Sub-Saharan African nations where agricultural productivity remains persistently low and food systems are unstable. This study aims to investigate the synergies between conventional and agro-ecological farming practices in Tanzania and how their joint adoption could improve farm productivity and resilient food systems in a more sustainable manner compared to their implementation separately. The study uses the Living Standard Measurement Study-Integrated Survey in Agriculture (LSMS-ISA) data for Tanzania's national panel survey (NPS) for the 2020/2021 cross-section. The study employs Multinomial Endogenous Treatment Effect (METE) regression to model the joint and exclusive effect of conventional and agro-ecological farming on farm productivity and food security in Tanzania. The study reveals that gender, farm size, access to extension services, credit, and social protection programs are important drivers of the adoption of conventional and agro-ecological farming practices. Furthermore, the study shows that combining conventional farming practices (inorganic fertilizer and agro-chemicals) with agro-ecological farming practices (organic manure and agro-forestry) can significantly enhance farm productivity and food security, indicating that the two approaches have a strong synergy. Interestingly, the study also finds that while exclusive adoption of conventional farming can improve farm productivity and food security, the magnitude of this effect is almost the same as that of the joint adoption of both approaches. In contrast, exclusive adoption of agroecological farming has a positive but insignificant effect on farm productivity and food security. These findings highlight the potential benefits of balancing the trade-offs of conventional high external input farming by adopting agroecological farming, which can help achieve both productivity and food security objectives while protecting the natural agroecology. Therefore, the study emphasizes the need for promoting policies and initiatives that encourage the joint adoption of conventional and agro-ecological farming practices to achieve sustainable and resilient agricultural production and food systems in Tanzania. However, such policies and initiatives must be complemented by other measures like credit access, extension, and social protection to enhance their adoption and impacts.

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124 Political Economy of Environmental Policy under Trade

Sherzod Akhundjanov[1], Stephen Devadoss[2]

[1]Utah State University, Logan, USA. [2]Texas Tech University, Lubbock, USA

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

20. International Trade

Paper/Poster Abstract:

Concerns about global environment and more effective environmental stewardship have dominated policy arenas in the past three decades. In an increasingly interconnected and entangled world, the design of national and international environmental policies requires compromises among the conflicting interests of countries, politicians, producers, and consumers. The primary dilemma for any country is whether or not to cooperate with other countries in environmental policy arenas, such as limiting carbon dioxide (CO2) emissions, which to a large extent is determined by direct and indirect ecological-economic effects of a given environmental policy. Politicians, on the other hand, face a trade-off between enhancing social welfare and serving the interests of lobby groups in exchange for (prospective) campaign contributions. The link between environment and trade has also long been the subject of intense policy debate.

In this study, we first examine the state of the literature and then fill important gaps in this area. We develop a unified framework that embodies environmental externalities (local versus global), abatement, political competition, and trade. Our model illuminates how the incentives of producer and consumer/environmentalist lobby groups to influence the stringency of pollution control collide in environmental policy-making; how these incentives change with the nature and size of environmental externalities, environmental agreements (unilateral versus multilateral), and trade regimes; and the role of abatement and terms-of-trade effect in the equilibrium outcomes. In a large open economy, when countries cooperatively formulate their policies, the environmental regulation internalizes the costs of emission leakages resulting from lobbying activities, thus making cooperative policy more appealing than noncooperative one from the welfare standpoint. Producer and consumer lobbying generally have a counteracting effect, with the government's weight assigned to each group determining the influence of the groups on the policy. However, in a unilateral policy setting with emission leakages, producer and consumer interests may coincide in supporting lower pollution tax.

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144 Evaluating Farmers' Perspective and Economic Viability in Environmentally Sustainable Vegetable Cultivation: An Investigation in Bangladesh

Jasim Uddin Ahmed[1], Md. Monirul Islam[2]

[1]Sylhet Agricultural University, Sylhet, Bangladesh. [2]Bangladesh Agricultural University, Mymensingh, Bangladesh

Presentation Type:

4. Poster

Keywords:

3. Agricultural Production

14. Environmental Economics

Paper/Poster Abstract:

To assess the perspectives of farmers and the economic viability of sustainable vegetable farming in Bangladesh, this study investigates the attitudes and economic sustainability of eco-friendly vegetable farming practices among 600 randomly selected farmers. The study utilized a pre-tested structured questionnaire, employing a five-point Likert Scale to assess farmers' attitudes toward eco-friendly vegetable farming, particularly focusing on profitability, and

conducted profitability analysis to evaluate the economic viability of cultivating major vegetable crops. To determine the factors influencing farmers' attitudes toward eco-friendly vegetable farming, a Logit model was employed. Furthermore, a Problem Confrontation Index was used to identify and rank the key challenges associated with eco-friendly vegetable production. The study found that an overwhelming majority of farmers (81.43 percent) held favorable attitudes toward eco-friendly vegetable farming, while a minority (18.57 percent) expressed unfavorable sentiments. Significantly, the cultivation of major vegetables such as tomato, gourd, cauliflower, and cabbage was economically sustainable and profitable. Further analysis using a Logit model revealed that the respondent's age, years of formal schooling, livestock ownership, and prior training in eco-friendly vegetable farming significantly influenced farmers' receptivity to eco-friendly practices. Challenges faced by eco-friendly farmers, identified and ranked using the Problem Confrontation Index, including natural disasters, an increased incidence of insect pests and diseases in eco-friendly crops, and rising labor costs, were considered the most severe and thus required targeted interventions. Based on the study's findings, several policy recommendations are proposed, encompassing the implementation of regular motivation and training programs tailored to eco-friendly vegetable production, frequent on-site support visits by extension officers during production, and the provision of government-backed credit facilities with reduced interest rates to promote the widespread adoption of eco-friendly practices among farmers. This research provides valuable insights into the attitudes and economic viability of sustainable vegetable farming practices in Bangladesh, while also highlighting the challenges faced by eco-friendly farmers and proposing actionable policy measures to advance environmentally sustainable agriculture in the region.

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166 Timber and trails: the economic and well-being impacts of recreational mountain biking in New Zealand

Richard Yao[1], Julio Botero[2], Lena Mkwara[3], Saeed Solaymani[4], Simon Wegner[4]

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

19. Impact Assessment

21. Land and Natural Resource Management

29. Valuation

Paper/Poster Abstract:

Poster Abstract

New Zealand's planted forests have emerged as critical contributors to the global wood supply chain, offering substantial economic and environmental benefits, including carbon sequestration and water flow regulation. They also serve as hubs for recreational activities, with mountain biking experiencing a remarkable surge in popularity over the past two decades. Despite their significant contributions, the full extent of planted forests' value to New Zealand's economy and society remains underappreciated in decision-making processes.

This study builds upon previous research that focused on specific regions, aiming to comprehensively evaluate the economic and non-market values of mountain biking at both regional and national scales. To our knowledge, this study represents the first attempt in New Zealand to assess both market and non-market impacts of mountain biking.

Leveraging survey data from 2,073 New Zealand mountain bikers, we employed two established economic modelling approaches. We used an input-output model to assess economic impacts in key regions, subsequently extending our analysis to cover the entire country. Furthermore, a travel cost analysis was conducted to evaluate the welfare impacts of local and distant mountain biking visits, categorizing 'local' as travel within 120 minutes each way, and 'distant' as travel exceeding 120 minutes each way.

Our findings underscore the robust economic and social contributions of mountain biking in New Zealand. Planted forests emerge as pivotal locations for this activity, with over half of the economic benefits distributed across sectors including transport, accommodation, rental and hiring, food and beverage, and retail trade. Surprisingly, the forestry sector receives less than 1% of these benefits.

Moreover, our study reveals that mountain bikers derive substantial well-being benefits from planted forests, surpassing those from other ecosystems such as native forests, grasslands, and pastoral farms. Sites in distant planted forests provide notably higher well-being value compared to locations in native forests and tussock grasslands.

Considering the results highlighted above, there is a compelling case for exploring mechanisms to reallocate economic benefits towards enhancing planted forests with mountain biking sites. Collaboration between government agencies, businesses, mountain bikers, clubs, investors, and other stakeholders could yield mutually beneficial outcomes. Alternatively, managers of planted forests offering mountain biking amenities may explore joint ventures with key businesses that benefit from mountain biking visits.

By shedding light on the economic and well-being values associated with mountain biking, this study provides valuable insights for forest owners, government agencies, businesses, and users. These findings can inform policies and investment decision-making processes, advocating for an inclusive approach to resource allocation and conservation efforts.

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181 Coastal Hazard Adaptation Strategies: a multi-disciplinary approach to addressing coastal climate risks

Boris Lam, Steve Charlton-Henderson

Natural Capital Economics, Melbourne, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

28. Uncertainty and Risk

Paper/Poster Abstract:

Coastal hazards like erosion, storm tide inundation and sea level rise, pose significant threats to adjacent communities, including loss of infrastructure, agriculture, natural environments, and local industries such as tourism and recreation. Local and regional councils have increasingly invested in developing a Coastal Hazard Adaptation Strategy (CHAS) to manage and proactively respond to the risks from these hazards. However, developing a CHAS is complex as it requires a multi-disciplinary approach that traverses a diverse range of information and data. Over the past five years, Alluvium Consulting Australia and NCEconomics developed and refined an approach to CHAS for councils affected by these hazards. The approach leverages expertise in climate modelling, biophysical sciences, hydrology, engineering, and economics to produce a science-based CHAS that is tailored to individual coastal hazard

risks. Using a cost-benefit analysis framework, this CHAS approach involves developing a base case—illustrating long-term outcomes without adaptation—and assesses various options against this baseline, allowing councils to accurately assess risks, consider the potential return on investment of different options, and outline a plan for improving the region's resilience to coastal hazards.

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211 Barriers to the circular economy are diverse and business model-specific: evidence from the Australian cheese manufacturing sector

Jack Hetherington[1,2,3], Adam Loch[1], Pablo Juliano[2], Wendy Umberger[4,5]

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Presentation Type:

4. Poster

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

The pursuit of Sustainable Development Goal 12.3, aimed at halving food waste by 2030, relies on a concerted effort from various stakeholders to engage in different practices that improve the utilisation of resources throughout the life cycle of a product. Circular business models (CBMs) have emerged as a promising avenue for achieving this goal by acknowledging there are multiple pathways that can contribute to the same outcome. CBMs can reduce the inputs into and/or waste and emissions from supply chains via a range of management practices, organisational configurations and part of broader value networks.

This study seeks to contribute to the growing body of literature on CBMs by examining the diverse barriers across different types of business models. To explore these barriers in-depth, we thematically analysed semi-structured interview data from the Australian cheese manufacturing sector. Our research reveals that adopting various types of circular business models have, and can mitigate to an extent, different types of barriers. We find that when firms consider in-house management practices, they predominantly faced internal barriers. These internal hurdles include technological constraints; financial viability concerns; and organisational challenges, such as competing priorities and timing issues with the business cycle. The exploration of alternative business models, such as selling to or forming partnerships with other firms, offers a contrasting picture. In these scenarios, firms tend to report predominantly external barriers that are closely tied to supply chain dynamics. These external barriers include geographical remoteness, a lack of industry coordination, and ambiguity surrounding the distribution of costs, benefits, and responsibilities.

These findings have the potential to assist with decision-making within the cheese manufacturing sector and other industries facing similar issues. By highlighting the differences in barriers faced across various circular business models, our study underscores the importance of exploring multiple pathways to achieve the same goal, while also identifying residual issues that will need to be addressed – e.g., industry coordination, clear business plans, etc.

212 The Effect of Farmer Discussion Groups on the Adoption of Technology by Dairy Farmers in West Java, Indonesia

Rio Maligalig

University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

10. Development Economics

26. Practice Change and Adoption

Paper/Poster Abstract:

Agricultural extension plays an important role in enhancing the adoption of improved technologies and practices by acting as a bridge between scientists or researchers and farmers. In recent years, participatory approaches to extension have emerged as an alternative to the conventional top-down transfer of technology, where farmers actively engage in the acquisition of knowledge and the implementation of new practices. However, there is a dearth of studies investigating the impact of such participatory extension initiatives on dairy farming in Indonesia. This paper aims to assess whether participation in a farmer discussion group influenced change in the adoption of better dairy farming practices. These discussion groups were established as a component of a dairy project with the aim of promoting the uptake of improved dairy farming techniques in West Java, Indonesia. To analyse the influence, a two-period panel dataset encompassing 160 farmer-participants was used, and a combination of multinomial logit and ordered logit models was applied. The findings of the multinomial logit regression indicate that attendance at these discussion groups did not have a significant effect on the change in the number of practices adopted by the farmers. Instead, factors such as education, dairy-related assets, and milk prices emerged as significant influencers. On the other hand, the results of the ordered logit regression reveal that participation in a farmer discussion group during the COVID-19 restrictions, coupled with dairy assets, played a role in determining the intensity with which dairy practices were utilized. While it may be observed that the discussion groups established within the project did not directly lead to changes in adoption practices, it is worth noting that the long-term benefits to farmers may still materialize if such participatory extension activities continue beyond the project's duration.

228 Farmland Transaction under the Policy Change in Direct Payment Scheme for Collective Stewardship of Common Property Resources

Takeru Kusudo[1], Yuya Katafuchi[2]

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Presentation Type:

4. Poster

Keywords:

21. Land and Natural Resource Management

25. Policy Analysis

Paper/Poster Abstract:

This study examines the association of farmland transactions and a Japanese policy change from “Farmland, Water, and Environmental Conservation Improvement Scheme to “Payments for the Enhancement of Agricultural Multi-functionality” in 2014.

To examine this research objective, we used the micro-level data on farmland transactions from 2012 to 2016. Using this micro-level data, we constructed aggregated panel data at the municipality level, as well as panel data at the transaction level.

On the other hand, we construct the policy implementation status based on the statistics of policy implementations at the prefecture level after the recent policy change in 2014. According to this policy change, the levels of efforts in some prefectures have changed significantly. We categorized the prefectures as being in the “responder group” if the increase in the area of farmland covered by the policy payment from 2014 to 2016 surpasses the median for all of the prefectures or otherwise, the “non-responder group.”

Using this dataset, we estimate the association of farmland transactions and a Japanese policy change in 2014 on both the total area and the overall value of farmland transactions.

The result from municipality level analysis shows a significant negative association between the policy change and total transaction area at the municipality level. This suggests that transactions slowed down after the policy change in the municipalities of the responder group, which changed the level of effort on this policy. At the transaction level, however, there was a significant positive relationship between the policy change and the hectares of farmland per transaction. This indicates that farmers in the responder group were more likely to trade larger plots. These results imply that the municipalities in the prefectures that have increased their efforts by the policy change in 2014 are more likely to trade larger plots. On the other hand, the total hectare of the transacted, when aggregated at the municipality level, rather decreased. It can be pointed out that farmers may have increased the transactions before the policy change. The other interpretation is that after the policy change, the accumulation of better farmland has been promoted in the form of transactions with relatively larger plot units.

For further research, it is an issue that needs to be examined whether this phenomenon was a short-term shock or the result of a time-series structural change. Additionally, an analysis including leased land would be expected since the farmland consolidation is largely due to the leased farmland. Another perspective is the decomposition of the policy implementation status at the municipality level.

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229 Farmland Transaction under COVID-19-Related Non-Pharmaceutical Policy Intervention

Yuya Katafuchi[1], Takeru Kusudo[2]

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Presentation Type:

4. Poster

Keywords:

21. Land and Natural Resource Management

28. Uncertainty and Risk

Paper/Poster Abstract:

The COVID-19 pandemic ushered in an era of unprecedented public health challenges, prompting the implementation of non-pharmaceutical policy interventions globally. In Japan, we experienced 27 years of declining farmland prices, and enforcing these policies brought additional complexities, affecting various economic facets, particularly agriculture. The focal point of this study is how Japan's policies, the State Of Emergency (SOE), interplayed with the ongoing trend of declining farmland prices and transactions.

A previous study suggested that SOE enacted under COVID-19 to prevent infection spread might have lowered Japan's residential and commercial land prices. However, existing studies do not cover agricultural farmland. This study analyzes whether the potential decline in demand for farmland in areas where the additional SOE interventions related to COVID-19 were implemented manifested in the data as a decline in real estate transactions and farmland prices.

Japan's reliance on voluntary public cooperation rather than enforced mandates provided a nuanced landscape for evaluating additional SOE's efficacy. The inherent flexibility and reliance on public cooperation in Japan's approach added complexity to assessing its economic repercussions, particularly in the sensitive agricultural sector marked by a prolonged decline in farmland prices.

Using real estate transaction data in farmland with policy intervention data, we constituted a comprehensive dataset that facilitated an analysis at both aggregate and individual transaction levels. Our dataset, drawing from the resources of the Ministry of Land, Infrastructure, Transport, and Tourism, Japan, encapsulates the years 2018-2020, allowing us to evaluate the pre- and post-COVID-19 policy intervention and their effects on farmland transactions.

Our analysis employed a two-way error component model to discern associations between additional SOE and farmland transactions. We categorized prefectures into treatment and control groups based on the cumulative number of days the SOE - policies aimed at inducing behavioral change to mitigate COVID-19 spread - were implemented.

The data showed no significant association between the total area of farmland transactions and the additional SOE interventions. However, a stark contrast emerges when evaluating the transaction values. A statistically significant negative association between total transaction values and additional policy interventions was uncovered. This result indicates a deceleration in transaction values in areas where COVID-19 policies were additionally implemented.

This result suggests that the demand for farmland may have declined in the areas that received this treatment, which may have been directly related to the decline in farmland prices due to constraints in transaction opportunities for contact avoidance. Other possible explanations could be due to the decline in the demand for food triggered by policy interventions or labor shortages due to immigration restrictions. Whether this phenomenon was a short-term shock or

a time-series structural change is an issue that needs to be examined to investigate the impact of policies that tackle the pandemic, taking food security into account.

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230 Uncovering Complex Technology Adoption Pathways for Smallholder Dairy Farmers in Indonesia

Rida Akzar, Jack Hetherington, Vyta W. Hanifah

University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Many empirical studies commonly define adoption as a binary process, focusing solely on adoption and non-adoption. However, this simplistic approach fails to capture the intricate nature of adoption decisions, leading to potentially misleading conclusions and recommendations for increasing adoption rates. Intervention program is designed to boost adoption rates among farmers involves technology dissemination, providing information on technology usage and its benefits. Extensive resources have been invested in extension programs, particularly in developing countries, aimed at increasing adoption rates among smallholder farmers. However, little is known about farmers' decisions following the conclusion of these interventions—whether they continue to adopt or dis-adopt the introduced technologies.

This study investigates the adoption pathways of dairy farming technologies among smallholder dairy farmers in Indonesia. We adapt the adoption pathways framework developed by de Oca Munguia et al. (2021) to conceptualise adoption as a complex process. Leveraging a panel dataset comprising 480 dairy farm households in West Java, Indonesia, spanning from 2017 to 2021, our research tracks adoption decisions from the baseline (2017-2019) to the endline (2021). This approach encompasses farmers' awareness, initial adoption (trial), and continued adoption statuses, resulting in diverse adoption status in the endline, including never aware, aware but never tried, dis-adoption after tryout, never re-adopt, dis-adopt, new adopters (continued adoption after tryout), re-adopt, and always adopt.

Between the baseline and endline, 38.3% of the sample participated in an intervention (beneficiaries) consisting of farmers' discussion groups aimed at increasing technology awareness and disseminating knowledge about technology benefits. This study examines how the adoption pathways of the beneficiaries differ from those who did not participate (non-beneficiaries) and compares the reasons for adoption and non-adoption. Additionally, we investigate the socio-economic characteristics of farmers in both sub-groups since these factors may also be associated with farmers' decisions. This study focuses on three dairy farming technologies that aims to increase milk production and hygiene including teat dipping after milking, high protein concentrates (16% protein content or higher), and forage conservation.

Preliminary results reveal that among beneficiaries, a higher proportion (46.2%) adopted the teat dipping technology after the intervention, compared to high-protein concentrates (17.4%) and forage conservation (13.6%). Interestingly, by the end of the study, 50-60% of beneficiaries who tried teat dipping and high-protein concentrates discontinued these practices, while the rest became new adopters. Conversely, for forage conservation, only 15% of those who tried the technology became new adopters. We explore the primary reasons for dis-adoption post-trial, identifying

cost as a barrier for high-protein concentrates and forage conservation, while the complexity of teat dipping after milking deterred adoption.

This study provides valuable insights for promoting technology adoption by tailoring interventions based on the unique characteristics of each technology, whether in terms of information dissemination, capital provision, or input accessibility. The findings will offer practical implications for enhancing sustainable dairy farming practices among smallholder farmers in Indonesia and other developing economies seeking to increase the adoption of dairy farming technologies and practices among their smallholder dairy farmers.

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268 Climate econometrics

German Puga, Kym Anderson

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Presentation Type:

4. Poster

Keywords:

8. Climate Change

19. Impact Assessment

Paper/Poster Abstract:

Climate change adaptation strategies rely on assessments of expected climate impacts and risks. Therefore, it is important to use suitable methodological approaches when analysing the potential impact of climate change projections. This paper aims to provide recommendations on how best to use econometric methods to quantify climate impacts.

We first compare what can be done with three types of data: cross-sectional, time series, and panel data. Panel data methods are usually preferred due to their strong identification properties. They allow one to estimate the impact of weather on an economic output, and in a subsequent step, to use these estimates to quantify the potential impact of climate change projections. We explain the advantages and potential use of this framework, as well as its challenges. These challenges include possible model specification issues and the way of dealing with the limitation of using short-run estimates of weather shocks (the model's estimates) to quantify long-run impacts of changes in climates.

Then, we compare the strengths and weaknesses of econometric methods to those of other methods, such as modern machine learning models, methods based on expert opinion, and biophysical models. We argue that it is usually possible to get a better understanding of climate risks when combining studies that use a variety of these methods.

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280 Well-being and life satisfaction in New Zealand's primary industry

Pike Stahlmann-Brown

Manaaki Whenua - Landcare Research, Wellington, New Zealand

Presentation Type:

4. Poster

Keywords:

11. Ecological Economics

14. Environmental Economics

Paper/Poster Abstract:

During winter 2023, the representative Survey of Rural Decision Makers collected information on well-being (via the widely used WHO-5 wellbeing index) and life satisfaction (via Cantril's Ladder) for approximately 5,000 New Zealanders engaged in primary industry. In this paper/poster, I describe well-being and life satisfaction by industry, highlighting the deleterious effects of dairy farming these outcomes. I then use the 2021 wave of the same survey to show that rural well-being has deteriorated somewhat over these two years. Next, I used a representative survey of 2,000 urban residents (also collected during winter 2023) to show that well-being and life satisfaction are higher in rural areas than in urban areas.

The 2023 Survey of Rural Decision Makers also recorded measures of self-efficacy and connectedness to nature using standard psychological inventories. I show that farmers, foresters, and growers with higher self-efficacy and connectedness to nature report both higher well-being and higher life satisfaction. Moreover, whereas most survey participants project higher life satisfaction five years into the future, survey respondents with higher self-efficacy and connectedness to nature anticipate disproportionately higher life satisfaction in the future. All of these results are robust to controls for age, gender, ethnicity, education, location, and profitability as well as industry.

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291 Economic Impact of Climate Change Adaptation Strategies in Australian Agriculture

Abdulrasheed Zakari

University of Wollongong, Wollongong, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

12. Econometric Modelling

14. Environmental Economics

Paper/Poster Abstract:

Climate change is reshaping the agricultural landscape, posing substantial challenges to farmers worldwide. In the context of Australian agriculture, a sector particularly vulnerable to climate variability, this empirical study aims to

comprehensively investigate the economic impact of various climate change adaptation strategies. Grounded in real-world data and employing rigorous econometric methods, the research provides valuable insights into the effectiveness of adaptation measures, their economic viability, and the factors influencing their adoption.

The study leverages a robust dataset encompassing diverse agricultural regions across Australia, spanning multiple years. Using advanced statistical models, including regression analysis and econometric simulations, the research evaluates the economic performance of farmers implementing different adaptation strategies. These strategies range from precision agriculture technologies, drought-resistant crop varieties, and improved water management practices to altered planting schedules and diversified cropping systems.

Key indicators such as crop yield, production costs, farm revenue, and overall profitability serve as metrics to assess the economic impact. By comparing these parameters between farms employing climate change adaptation strategies and those following conventional practices, the research quantifies the financial benefits and risks associated with adaptation. Additionally, the study delves into the socio-economic factors influencing the adoption of these strategies, exploring the role of government policies, access to financial resources, and farmers' perceptions of climate change.

Furthermore, the research scrutinizes the long-term economic sustainability of these adaptation strategies. By incorporating climate projections and economic forecasts, the study models future scenarios to predict the financial resilience of farms under changing climate conditions. This forward-looking approach provides valuable insights for policymakers, enabling them to formulate adaptive agricultural policies that are not only effective in the present but also resilient to future climate challenges.

The findings of this empirical study hold significant implications for both farmers and policymakers. For farmers, the research offers evidence-based guidance on choosing adaptation strategies that align with their specific contexts, optimizing their economic outcomes while mitigating climate risks. Policymakers can utilize the results to design targeted support programs, subsidies, and incentives, fostering the widespread adoption of climate-smart agricultural practices. Ultimately, this study contributes to the empirical understanding of climate change adaptation in agriculture, serving as a foundation for evidence-based decision-making and sustainable agricultural development in the face of a changing climate.

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329 Climate Change, Agricultural Prices and Civil Conflict: Evidence from Cloud Cover

Hemant Pullabhotla, Prasad Sankar Bhattacharya

Department of Economics, Deakin University, Melbourne, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

10. Development Economics

Paper/Poster Abstract:

In this paper, we investigate how climate change events could incite civil strife through abrupt changes in agricultural prices across a number of countries in the world. To measure the climate change, we exploit a novel geo-referenced dataset on the magnitude of cloud cover which provides very detailed (every hour each day) information of cloud cover and other relevant temperature gauge data at the observation station level spanning over 15000 weather stations across the world. The cloud cover data is sourced from the Integrated Surface Dataset of the National Oceanic and Atmospheric Administration, USA. The conflict event data is also geo-referenced from the well-respected Armed Conflict Location & Event Data (ACLED) Project. The agricultural prices data are downloaded from the FAO Food and Agriculture Statistics.

Our paper complements extant studies like Hsiang, Burke and Miguel (2013) which establishes that a standard deviation increase in temperature towards warmer weather or more extreme rainfall leads to the rise of frequency of civil conflict by 14% (median value). The magnitude of cloud cover has been employed by Cortes, Duchin and Sosyura (2016) and Chhaochharia, Kim, Corniotis and Kumar (2019), amongst others, to discern behavioural pattern in financial decision making. However, we are the first in analysing how changes in cloud cover could be linked to changes of temperature or rainfall, thus providing a more nuanced measure of climate change events.

In another strand of literature, papers such as Bazzi and Blattman (2014) finds that export price shocks have no statistically significant bearing on conflict onset in developing countries but argues that rising prices could explain the continuation of conflict. In individual country setting, Dube and Vargas (2013) and Angrist and Kugler (2009) finds that fluctuations in prices of coffee and cocoa, have causal impact on civil violence in Colombia. In these studies, the price fluctuations were exogenous. We provide evidence that the agricultural price fluctuations are linked to changes in cloud cover. Thus, focusing on the cloud cover helps us to pinpoint one casual mechanism.

In Africa and Iraq, the extant research also shows that extreme weather events increased the likelihood of joining rebel forces due to decline in economic productivity (Hsiang, Burke and Miguel, 2013). Our study explicitly links how changes in cloud cover is exacerbating such extreme weather events.

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338 The assessment of climate change policies through a general equilibrium model: An application to Uruguay

Francisco Rosas

Universidad ORT Uruguay, Montevideo, Uruguay

Presentation Type:

4. Poster

Keywords:

7. Carbon and Nature Markets

8. Climate Change

25. Policy Analysis

Paper/Poster Abstract:

Countries present their Climate Change Long Term Strategies (LTS) before the United Nations Framework Convention on Climate Change (UNFCCC), which consist of projecting a set of long-term scenarios of CO2 emissions mitigation aligned with global and domestic targets, in particular, those stated in their Nationally Determined Contributions (NDC). Uruguay submitted its 2050 LTS including a CO2-neutral scenario, which involves

the objective of achieving a CO2 net-zero emissions by 2050, requiring a significant mitigation and sink effort in different areas of the economy. It requires a sharp reduction in fossil fuels demand, an increase of electricity demand, a moderate increase in forestry area driving CO2 sinks, and a moderate increase in livestock productivity reducing the CO2 emissions per unit of output.

The objective of this study is to analyze the impacts of this scenario on some key macroeconomic variables. We use a general equilibrium model including agriculture and energy which are the most relevant sectors for the LTS. We follow the model by Fullerton and Ta (2019) who show that this model generates comparable results to those yielded by a large computable general equilibrium model. Importantly, we propose some extensions relevant for climate policy analysis, i.e., the specification of an additional sector (timber production) and input (agricultural land). We solve the model analytically and compute the impact on GDP, prices and quantities of inputs and outputs by sector, quantities and prices in the labor market, welfare, and CO2 emissions by sector.

Our model has five sectors (households, electricity, fossil fuels, timber, and a composite good representing the remaining goods and services of the economy). Inputs are the factors capital, labor and agricultural land, as well as outputs from the electricity, fossil fuels and timber sectors that are used as inputs in the remaining sectors. Households maximize a Cobb-Douglas utility function subject to a budget restriction. Electricity, fossil fuels, timber and the composite good sector maximize profits given a Cobb-Douglas production function and taking output and inputs prices as exogenous. Government net revenues come from taxes or subsidies on labor, fossil fuels, electricity purchases and forestry land purchases in the timber sector. Except from labor, all these taxes or subsidies are linked to the CO2 emissions from the corresponding activity.

We calibrate the model to the Uruguayan economy in 2019. We implement the LTS CO2 neutral scenario by specifying a carbon tax on fossil fuel purchases, a subsidy on electricity purchases, a subsidy on land purchases for the timber sector, and a positive shock in the total factor productivity of the composite good sector to replicate the livestock productivity increase. Results show that the LTS CO2 neutral scenario implies a cumulative impact on GDP level though 2050 of -0.01%. If we assume it is equally distributed over time, it implies that the GDP growth rate remains almost the same than in the business-as-usual the scenario. Therefore, this LTS, which implies drastic changes in the energy supply composition, implies mild changes in GDP but strong reductions on CO2 emissions.

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350 Comparing Climate Pledges and Eco-Taxation in a Networked Agricultural Supply Chain Organization

Arnaud Dragicevic[1,2], Jean-Christophe Pereau[3]

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

24. Mathematical Programming

Paper/Poster Abstract:

This paper examines the effectiveness of climate pledges and eco-taxation as strategies for mitigating climate change within a networked agricultural supply chain organization. We utilize variational inequality techniques within a multicriteria decision-making framework and validate our theoretical findings through numerical simulations using a machine learning augmented algorithm. By employing this approach, we are able to situate a climate pledge initiative, such as the Agricultural Sector Roadmap to limit global warming to 1.5 degrees Celsius, within the broader context of the entire agricultural sector. Our results demonstrate that environmental taxation emerges as the most effective approach for addressing climate change. Eco-taxation leads to a 57.87% reduction in global emissions, whereas climate pledges only account for a 20.59% reduction at the same level of production. Furthermore, eco-taxation results in a 45.68% greater reduction in emission intensity compared to climate pledges. In contrast to climate commitments, an eco-fiscal policy is capable of achieving the objectives established by the European Union.

Parallel 1A. Special Session - "Synthetic Biology for the environment and agriculture: an introduction with a focus on climate change"

10:30 - 12:10 Wednesday, 7th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

Anthony Wiskich

Theme: Synthetic Biology (SynBio) could be a powerful instrument to help decarbonise the economy and boost agriculture productivity. Potential opportunities include biobased sequestration, enhancing photosynthesis and crop growth, the capture of industrial emissions and meat alternatives. However, SynBio's potential is not fully appreciated by economists and policymakers. This session will introduce SynBio and discuss potential applications to climate change and agriculture.

Format: As the field will be new to many economists, we will first introduce SynBio and then give four presentations from both physical and social science researchers. Then we will have time for Q&A involving all speakers.

Presenters (alphabetical):

- Professor Colin Jackson is the academic lead of the SynBio Initiative at ANU. He will introduce synthetic biology and provide a broad perspective of existing and potential applications.

- Sacha Pulsford is a biochemist PhD candidate at ANU and Westpac Future Leaders Scholar. She will discuss her research into improving biological processes that could enhance plant growth and carbon capture.

- Dr Jonathan Symons is a Senior Lecturer in Politics and International Relations at Macquarie Uni. He will provide an overview of potential applications for climate change mitigation and an international policy agenda.

- Dr Anthony Wiskich is a Postdoctoral Fellow Economist at CSIRO. He will present research on the potential global carbon mitigation and negative emissions from SynBio technologies, and the dependence on different technology pathways.

204 Synthetic Biology for the environment and agriculture: an introduction with a focus on climate change

Anthony Wiskich[1], Jonathan Symons[2], Colin Jackson[3], Sacha Pulsford[3]

[1]CSIRO, Brisbane, Australia. [2]Macquarie Uni, Sydney, Australia. [3]ANU, Canberra, Australia

Presentation Type:

2. Special Session

Keywords:

4. Agricultural Technology and Innovation

8. Climate Change

Parallel 1B. Special Session - "Valuation of ecosystem services provided by trees and forests"

10:30 - 12:10 Wednesday, 7th February, 2024
Location Cinema, Kambri Cultural Centre
Richard Yao

Format: Programme (1.5 hours) Introduction (5 minutes) Opening remarks and brief overview by session chair: Richard Yao, Scion Case Studies (60 minutes) (Each case presentation will have a 15-minute talk and a 5-minute Q&A)

Case 1: Eco-tax or Green Hours as Conservation Currency? Exploring New Zealanders' preferences for native forest biosecurity Presented by: Jeremy DeValck, CQU

Case 2: Using ecosystem services framework to assess the benefits of establishing trees on farms Presented by: Maksym Polyakov, Manaaki Whenua Landcare Research

Case 3: Valuing ecosystem services provided by urban trees: A case study from Darwin, Australia Presented by: Natthanij Soonsawad, CSIRO Synthesis and Discussion (10 minutes)

Session discussant: Sorada Tapsuwan, CSIRO Open Forum and Q&A (15 minutes)

Moderated by: Richard Yao, Scion

189 Valuation of ecosystem services provided by trees and forests

Richard Yao

Scion, Rotorua, New Zealand

Presentation Type:

2. Special Session

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

29. Valuation

Parallel 1C. Contributed Paper Session - Energy and Utilities 1

10:30 - 12:10 Wednesday, 7th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre
Peter Tozer

231 Green versus blue hydrogen – An evaluation of the risks impacting Australia's production and utilisation of hydrogen for export and domestic decarbonisation

Mark Tocock[1,2], Darla Hatton MacDonald[2]

[1]CSIRO Energy, Kensington, Australia. [2]University of Tasmania, Hobart, Australia

Presentation Type:

3. Contributed Paper

Keywords:

13. Energy and Utilities

25. Policy Analysis

Paper/Poster Abstract:

Globally there has been increased efforts to utilise renewable energy to transition towards net zero. Although electrification is often the preferred method to decarbonise in the short-term, this option may not be sufficient for countries to achieve their nationally determined contributions as pledged under the Paris Agreement. One solution is to utilise hydrogen, or one of its derivatives, as a potential longer-term substitute for fossil fuels. In 2019 Australia developed a National Hydrogen Strategy outlining several future scenarios whereby domestic production could be scaled up for export and domestic utilisation. Two production methods are often discussed as being relevant for Australia. The first method, often termed 'blue hydrogen', refers to production that involves splitting methane into hydrogen and carbon dioxide, the latter being captured and stored underground. The second method termed 'green hydrogen' refers to renewable energy being utilised to power electrolysers that split water into hydrogen and oxygen. Both methods have their relative merits in being able to support sufficient production for both export and domestic utilisation. What is not clear is the relative risks applicable to the Australian economy. In this study the Institutional Analysis and Development framework was employed to identify the risks specific to each production method as well as risks preventing the utilisation of hydrogen for decarbonisation. The analysis so far has highlighted there is a trade-off between the rapid upscaling of hydrogen production and the goal of minimising the emissions associated with production. Developing hydrogen hubs in the north and south-east of the country would support large quantities of hydrogen being produced, however there are risks relating to production costs being tied to fossil fuels, a reliance on developing carbon capture infrastructure and storage, as well obtaining social licence to operate with the continual use of fossil fuels. Green hydrogen in contrast is relatively more expensive to produce and requires significantly larger quantities of renewable energy and water. Current policies, aimed at preventing carbon leakage, have created a disincentive for Australia's largest emitters to employ hydrogen as a substitute fuel. In addition, the ongoing transition to electrification creates a tension between renewable hydrogen production, which benefits from lower electricity prices, and future investments in renewable energy benefiting from higher prices. Overcoming these risks would require a collection of policies focused on addressing supply-side constraints as well as creating sufficient demand incentives for utilisation.

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118 Electricity long-distance transmission, misallocation reduction and pollution transfer in China

Ruipeng Tan

Hefei University of Technology, Hefei, China

Presentation Type:

3. Contributed Paper

Keywords:

13. Energy and Utilities

14. Environmental Economics

Paper/Poster Abstract:

This paper examines the effects of interregional electricity transmission—the world's largest electricity spatial reallocation—on electricity misallocation and pollutions. Using data collected at both the firm and city levels in China, we demonstrate that although the interregional power transmission decreases electricity misallocation, it causes pollution transfer and environmental injustice. Those cities which are connected by the transmission lines experienced an additional 27.3% decrease in the misallocation degree relative to their counterparts. By reducing this misallocation, the interregional electricity misallocation can bring about 826.20 billion yuan of economic benefit in the research period. However, along with the reduction of electricity misallocation, interregional electricity transmission also causes transfer of pollution from the eastern region to other regions. We also explore the heterogeneous impact

of the electricity interregional transmission. The impact of direct current is larger than alternating current and it can reduce more misallocation in exporting cities than importing cities. Our findings thus highlight the important role of resource spatial reallocation to reducing resource misallocation. However, because the electricity generation structure is still dominated by coal, the phenomenon of pollution transference is also unavoidable in the current stage.

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282 Public preferences and social licence to operate for offshore wind energy in Australia

Alaya Spencer-Cotton

University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

13. Energy and Utilities

14. Environmental Economics

Paper/Poster Abstract:

Offshore wind energy is potentially going to play a key role in Australia’s transition to a low carbon future. One area of research that is currently being neglected in the discussion is the Australian public's appetite for, understanding of, and the general social licence to operate offshore wind farms. In other countries, ignoring public perceptions and the social licence has been perilous to the development of offshore wind. Perceived issues such as impacts on visual amenity, marine access, and environmental impacts have dominated public discourse around offshore wind farms. We take an Australian national snapshot of the social licence for offshore wind energy. Using established social survey and economic non-market valuation methods to understand values and preferences, this snapshot captures the current social licence of offshore wind renewables, detect sticking points, and identifies optimal pathways forward for a transition to renewables in Australia.

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11 Are the Benefits of Electrification Realized Only in the Long Run? Evidence from Rural India

David Stern[1], Suryadeepto Nag[2]

[1]Australian National University, Canberra, Australia. [2]IISER, Pune, India

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

13. Energy and Utilities

Paper/Poster Abstract:

Experimental studies find smaller benefits of electrification than observational studies. Is this because the latter typically observe benefits after a longer period of time? Using three waves of data from the Human Development Profile of India and the Indian Household Development Survey of Indian rural households, we quantify the impacts of short-term (0-7 years) and long-term (7-17 years) electricity access on household well-being. We use a propensity-score-weighted-difference-in-differences design that controls for spillover effects and find that electricity access increases consumption and education in the long term, and reduces the time spent by women on fuel collection, although we do not find significant effects on agricultural income, agricultural land holding, and kerosene consumption. Per capita consumption grows by 18 percentage points more over seven years in the long-term connected group than in the control group. Short-term effects are smaller and not statistically significant for any outcome variable.

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193 Evaluating the Viability of Agrivoltaics in New Zealand: A System Dynamics Approach to Sustainable Farming and Renewable Energy Integration

Peter Tozer[1], Ramilan Thiagarajah[1], Shannon Page[2], Wim de Koning[2]

[1]Massey University, Palmerston North, New Zealand. [2]Lincoln University, Lincoln, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

3. Agricultural Production

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

Agrivoltaics represents a novel agricultural and photovoltaic power generation concept in New Zealand. Agrivoltaics (AV) system technology integrates agricultural biomass and solar power production within the same location. While the potential for enhanced land use efficiency and the prospect of synergies between agriculture and power generation make a compelling case for agrivoltaics, the higher initial investment cost of photovoltaics and its potential impact on farm systems pose notable challenges.

Our research endeavours to establish an economic investment model framework aimed at evaluating the economic viability of farmers' investments in on-farm photovoltaic arrays, concurrently generating electricity and agricultural or horticultural output. We explore a diverse range of designs and solar panel types within this investigation. This study employs the system dynamics approach to create a simulation that assesses these agrivoltaic configurations. This simulation system is useful for conducting cost/benefit analyses for agricultural systems that are amenable to co-production/co-location.

Parallel 1D. Contributed Paper Session - Development Economics 1

10:30 - 12:10 Wednesday, 7th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre Risti Permani

48 A direct measure of vulnerability

Grace Munthali, Paulo Santos

Monash University, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

17. Food, Health and Nutrition

Paper/Poster Abstract:

Measuring latent variables such as vulnerability is challenging as, by definition, they cannot be directly observed. We compare direct measures of vulnerability, that reflect the subjective probability of future deprivation, with statistical estimates of vulnerability, derived from past experience of actual food insecurity. The two measures are weakly correlated and direct measures of vulnerability are better predictors of future deprivation.

178 Income and employment effects of a transition towards healthier diets

Adam M. Komarek[1], Dirk Willenbockel[2], Shahnila Dunston[3], Nicola Cenacchi[3], H. Charles J. Godfray[4,5], Daniel Mason-D'Croz[6,7], Timothy B. Sulser[3], Keith Wiebe[3]

[1]University of Queensland, School of Agriculture and Food Sustainability, Gatton, Australia. [2]Institute of Development Studies, University of Sussex, Brighton, United Kingdom. [3]International Food Policy Research Institute, Washington, DC, USA. [4]Oxford Martin Programme on the Future of Food, Oxford Martin School, University of Oxford, Oxford, United Kingdom. [5]Department of Biology, University of Oxford, Oxford, United Kingdom. [6]Department of Global Development, College of Agriculture and Life Sciences, Cornell University, Ithaca, USA. [7]Agricultural Economics and Rural Policy Group, Wageningen University & Research, Wageningen, Netherlands

Presentation Type:

3. Contributed Paper

Keywords:

17. Food, Health and Nutrition

24. Mathematical Programming

Paper/Poster Abstract:

Interest in human diets that are healthy, sustainable, and affordable has grown rapidly in recent years. The potential income and employment effects of a transition towards healthier diets have received much less attention. We use scenario-based modelling to simulate aggregate and sectoral income and employment for “business-as-usual” diets and healthier diets for all geographic regions of the globe out to 2050. The healthier diets contain fewer livestock products, more fruits and vegetables, less refined sugar, and fewer vegetable oils compared to business-as-usual diets. Our results suggest that a global shift towards healthier diets would require a reallocation of resources, especially low-skilled labour, from non-agriculture sectors to the agriculture sector in several regions. The reallocation of resources would lead to higher wages for low-skilled workers in parts of sub-Saharan Africa and South Asia compared to business-as-usual. However, this reallocation would also reduce GDP growth in several lower-income regions, with the slowdown being quite pronounced in parts of sub-Saharan Africa and South Asia. Sustained investment that generates growth in agricultural total factor productivity appears crucial to facilitate a transition towards healthier diets at the global scale while limiting adverse repercussions on GDP growth, especially in low-and-middle income countries.

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190 Machine learning-based prediction of household-level food security

Kanchana Wickramasinghe[1], Athula Naranpanawa[1], Kithsiri Perera[2]

[1]Griffith University, Brisbane, Australia. [2]University of Southern Queensland, Toowoomba, Australia

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

17. Food, Health and Nutrition

Paper/Poster Abstract:

Food security is a critical issue in many regions of the world, and its prediction plays a pivotal role in the design of effective interventions. Accurate predictions are crucial in proactively addressing the risks of food insecurity, mitigating potential food crises, and allocating resources efficiently. However, due to its complex and multidimensional nature, accurate prediction of food security is often challenging and requires comprehensive data and advanced analytical approaches. Econometric approaches have been widely used in understanding the determinants of food insecurity, but they come with limitations. These models often rely on specific assumptions regarding the relationships between variables, which may not hold in complex and multifaceted issues such as food security. In contrast to econometric approaches, machine learning approaches offer several advantages. Machine learning models mitigate the possible multicollinearity issues and can learn complex patterns and relationships within data. This facilitates a higher level of accuracy in predicting the risks of food insecurity. Though machine learning techniques are increasingly being used in agriculture, there are limited empirical applications in addressing food

security issues. The overall objective of this paper is to develop a machine-learning model with a high level of accuracy for predicting food insecurity risks using household-level data.

The study makes use of a comprehensive household survey dataset from Sri Lanka, with a sample size of over 20,000 households. The survey covers a wide range of socio-economic and demographic aspects of households. The survey questions relevant to food insecurity aim to capture the level of household food insecurity, as perceived by the household heads under the four major pillars of food security namely, availability, access, utilization, and stability. The survey also covers a range of other variables including food consumption levels, food variety, subsistence food production, and household economic conditions that allow us to check the robustness of perceived levels of food security within the households.

The analytical process involves a few steps. The first step of the analysis involves developing an index to denote the level of food security at the household level. We then employ several supervised machine learning algorithms to classify the households based on food insecurity risk levels. The models are trained to deliver an accurate prediction of food security based on several variables that represent various facets of food security. These aspects cover household economic conditions, food system characteristics, demographics, access to resources and services, vulnerability to natural disasters, and various community characteristics. The best-fit model can be used to understand the target households that are at risk of falling into food insecurity. While the model improves the accuracy of predicting household-level food security, it offers the potential for replication in different regions and scenarios. As the global challenge of food security persists, this empirical approach paves the way for more effective interventions in addressing the issue of food security.

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44 Self-control and Vulnerability to Food Insecurity

Paulo Santos[1], Stefan Meyer[2]

[1]Caulfield East, Caulfield East, Australia. [2]World Food Program, Rome, Italy

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

17. Food, Health and Nutrition

Paper/Poster Abstract:

Risk has long been perceived as an important cause of poverty (see, for example, Dercon (2005)). The World Development Report 2000-01 crystalized the importance of risk to poverty under the idea of vulnerability, defined as "the likelihood that a shock will result in a decline in well-being" (World Bank, 2001, p.139), making explicit its future-orientated and probabilistic nature. Similar concerns about the temporal dimension of deprivation were also present, in an even more explicit way, in the definition of food security (World Food Summit, 1996).

Among the variables used to explain vulnerability, most attention has been devoted to asset ownership and management in times of distress (Moser, 1998) or, more generally, access to different coping mechanisms (Maxwell et al., 1999). However, little attention has been paid to the potential importance of lack of self-control, i.e, the difficulties of sticking to plans. This is surprising when considering the institutional context in which households in developing countries make their decisions. As producers, agricultural households are generally self-employed and consequently unconstrained by the disciplining devices that may reduce procrastination in other industries. As

consumers, many households rely on one major source of income, received at one time, which is then consumed throughout the year while formal savings opportunities are, in many circumstances, limited. The existence of ample opportunities to deviate from predefined plans is clear.

Self-control problems arise due to a conflict between problematic desires (temptation), which are visceral (Loewenstein, 1996), and goals that are pursued intentionally and associated with expectations of longer-term benets. In economics, self-control problems have been used as an explanation for low savings (Ashraf, Karlan, and Yin, 2006), the lack of adoption of potentially profitable technologies (Duflo, Kremer, and Robinson, 2011) and low productivity (Kaur, Kremer, and Mullainathan, 2015) or the excessive consumption of alcohol (Schilbach, 2019).

We use data on both vulnerability to food insecurity and inhibitory control (measured using the numeric Stroop task (Stroop, 1935)), collected among a sample of 650 smallholder rice producers in northern Laos, to show that low levels of self-control drive vulnerability to food insecurity. Our identification strategy relies on a growing literature that relates environmental conditions with psychological characteristics and economic preferences. For example, Talhelm et al. (2014) show that the historical experience of growing rice shapes cultural distinctions between individualistic and collectivistic mindsets, a result that they attribute to the importance of local cooperation, associated with irrigation, and speculate that similar differences may be found when considering rainfed versus irrigated rice.

We use suitability for paddy cultivation at the local level as instrumental variables for inhibitory control. Our results, estimated using LIML, show that farmers in areas less suitable for paddy exhibit lower inhibitory control and are more vulnerable to food insecurity. A mediation analysis with IV suggests that this causal relation is mediated via the production of the main staple food (rice), a conclusion that raises obvious questions regarding the possibility of overcoming temptations in the context of self-employment.

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154 Gender, smartphone applications and impacts on e-commerce income and food security: The Indonesian experience

Risti Permani

The University of Queensland, Gatton, Australia. The Center for Indonesian Policy Studies (CIPS), Jakarta, Indonesia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

17. Food, Health and Nutrition

Paper/Poster Abstract:

Globally, the e-commerce market sales reached $5.2 trillion in 2021 and will grow by more than half the subsequent years, amounting to over $8 trillion by 2026, making up nearly a quarter of all retail sales. However, concerns about gender inclusiveness remain. An IFC report suggests that the Southeast Asian e-commerce market would benefit an additional $280 billion if gender gaps were closed. Addressing gender disparities in e-commerce is also justified, given e-commerce's potential contribution to food security (Permani, 2023). One potential strategy to increase women's participation in e-commerce is through the adoption of smartphone applications. Despite the vast literature on gender dimensions of technology adoption, most previous studies focus on farmers' smartphone application adoption on farm income and productivity. Little is known about women's decisions in smartphone application adoption, including its determinants and impacts within the e-commerce context. Therefore, this study aims to assess factors affecting women's adoption of smartphone applications and the impacts of smartphone application adoption on their e-commerce income and food security contribution. First, it develops a conceptual framework for the

empirical work adapting from the gendered food system framework, the four quadrants of changes towards gender equality framework and the technology adoption framework. Then, it applies the framework to empirical contexts by using data from a survey of more than 200 online agri-food sellers in Indonesia to investigate gender dimensions of smartphone application adoption determinants. Finally, econometric techniques are employed to assess the association between smartphone application adoption and two dependent variables, namely e-commerce income and the e-commerce food security contribution index (EFSCI) proposed by Permani (2023). The Indonesian e-commerce market presents a unique case study. It became the ninth largest in the world with a value of US$45 billion in 2022, a more than five-fold increase from US$7 billion in 2017, with the number of e-commerce users expected to increase to 245 million by 2024. Results from this study inform strategies to promote inclusive e-commerce market development and gender-friendly programs and policies to enhance women's e-commerce participation and contribution to food security.

Parallel 1E. Contributed Paper Session - Econometric Modelling

10:30 - 12:10 Wednesday, 7th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre Brian Wright

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77 Assessing the Impacts of International Food Prices on Supply Chain Prices and Consumer Confidence: Empirical Evidence from Indonesia

Wiji Tri Wilujeng, Risti Permani

The University of Queensland, Gatton, Australia

Presentation Type:

3. Contributed Paper

Keywords:

12. Econometric Modelling

20. International Trade

Paper/Poster Abstract:

Globally, price stability continues to be a major issue, with developing countries experiencing an inflation rate of more than 5% on average in late 2022. The literature suggests that many factors influencing global prices are then transmitted to domestic markets and interact with policy interventions and market integration mechanisms. The importance of price stability becomes even more evident given its potential association with consumer confidence, which has predictive power for future movements in consumption. Despite the voluminous literature on international price transmissions, our understanding of how international prices are transmitted to domestic markets throughout different supply chain segments, from producers to consumers, remains lacking. This whole-of-chain investigation is important given that prices at different levels of the supply chain are linked but tend to differ by policy, governance, and market forces. The literature search also suggests the need for studies examining the impacts of global factors

such as international food prices, oil prices, and the exchange rate on inflation and consumer confidence, which is particularly important amidst the growing global geopolitical tension. This study focuses on agri-food commodity prices, which continue to be an important metric to inform economic policy. The objectives of this study are twofold. First, it examines the impacts of international food prices and other factors, such as crude oil prices and exchange rates, on consumer prices and consumer confidence. Secondly, the study evaluates price transmissions from international to domestic food chains, particularly in producer, wholesaler, and consumer segments across rice, beef, and sugar supply chains. Using monthly data in the period January 2018–August 2023 from international databases, including FAO, the World Bank, and Indonesian national statistics from Statistics Indonesia (BPS) and the Indonesian Central Bank (BI), the Vector Error Correction Model (VECM) is employed to evaluate short-run and long-run transmission mechanisms and interconnection between variables. Then, the impulse response function is utilized to analyze the impact of exogenous stimuli on endogenous variables. Stationarity and cointegration tests are conducted prior to the analysis. Indonesia presents a fitting case study given the continued concerns over food insecurity and price stability. The country experienced increased inflation in 2022, reaching a 5.95% inflation rate in September 2022. It is predicted that inflationary pressures will escalate due to increased demand for agri-food commodities and the volatile global food markets. Results from this study provide insights into policies to manage inflation, including at the commodity and chain segments, that can consequently contribute to improving food security and livelihoods in Indonesia.

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153 Investigating county level mobility and human encounters during COVID-19 Times

James Sears[1], Linlin Fan[2], Andrew Stevens[3], Sofia Villas-Boas[4], Molly Sears[1], Carly Trachtman[5]

[1]Michigan State University, East Lansing, USA. [2]Pennsylvania State University, State College, USA. [3]University of Wisconsin–Madison, Madison, USA. [4]University of California, Berkeley, Berkeley, USA. [5]International Food Policy Research Institute, Washington, D.C., USA

Presentation Type:

3. Contributed Paper

Keywords:

12. Econometric Modelling

25. Policy Analysis

Paper/Poster Abstract:

We investigate county-level dynamic changes in mobility and encounter behavior due to the adoption of county level stay at home mandates during the COVID-19 pandemic in the United States. We combine data on changes in travel activity and human encounters with county policy adoption and health care availability, rural, socioeconomic and political characteristics data by county. Using weighted event studies we isolate the dynamic portion attributable to county stay at home policies over time, and link the heterogeneity of behavioral changes to characteristics of the U.S. counties using a random forests method. We find a drop in average distance travelled that rebounded to pre-pandemic levels even during the mandate periods, while travel to non essential businesses and human encounter rates significantly dropped and remained consistently below pre pandemic levels during our entire sample period that covers the implementation and also lift of the mandate periods. We estimate county level heterogeneity in the responses to the stay at home mandate for all three measures in our analysis, but individual variables are unable to predict meaningful variation in county-level responses. Hence, no county level characteristic jumps out as having a high importance in explaining the heterogeneous responses.

160 Cattle Prices Under Arid Conditions - South Texas Lessons

Yuri Calil

Texas A&M University, College Station, USA

Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

22. Livestock Systems

Paper/Poster Abstract:

Texas has the largest cattle herd in the United States. South Texas's arid climate sets the region apart from other prominent regions. The literature presents several studies about cattle prices in Oklahoma, Kansas, and other regions. However, the South Texas cattle prices have yet to be understood. We performed a hedonic analysis under a hierarchical model to explore how physical, morphological, weather, and market factors affect the prices of commercial animals sold at auctions. The primary monthly data ranges from 2012 to 2022. The findings indicated that weight, breed, and sex explain price variations. We provide evidence of Brahman's influence on prices. Finally, we documented the region's cattle cycles with a strong association with weather. The results have implications for farmers and policymakers. They show relevant factors in the cattle price formation process. We hope our investigation provokes prolific discussion at the Conference. Texas and Australia exhibit similarities in cattle production. An exchange of knowledge may enrich the participants' experience.

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299 A Weak Trend Kills Strong Commodity Price predictability: An Empirical Method for An Unrecognized Problem

Eugenio Bobenrieth[1], Juan Bobenrieth[2], Brian Wright[3], Ernesto Guerra[4]

[1]Universidad Catolica, Santiago, Chile. [2]Universidad del Bio-Bio o, Concepcion, Chile. [3]University of California, Berkeley, CA, USA. [4]Milwaukee School of Engineering, Milkwaukee WI, USA

Presentation Type:

3. Contributed Paper

Keywords:

12. Econometric Modelling

18. Grains and Cropping Systems

Paper/Poster Abstract:

Abstract

Linear autoregressive models constitute the predominant econometric speci cation for commodity prices. Linearity implies rejection of the standard nonlinear commodity storage model. We show how a weak trend can induce the illusion of linearity; the trend can transform a price series with strongly predictable price crashes, so that price changes appear to be unpredictable. We rationalize such inference using a dynamic model including speculative inventories and random production with a productivity trend. The model has two regimes. In one, price changes follow a stochastic trend with a positive drift independent of the productivity trend. In the other, the expected price change is a predictable price-dependent jump to its conditional price expectation, a price target following a weak deterministic trend induced by the weak productivity trend. We illustrate our results using samples of corn and cotton prices for which price autoregressions appear obviously linear and price changes appear to be non-predictable, as in simple unit root processes. For our empirical estimations we implement a novel asymptotically normal one-step estimator of the trend, the interest rate, and the price threshold of the nonstationary storage model.

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148 Drivers of Australia's Industrial Greenhouse Gas Emissions 2002-03 to 2019-20

Peter Meadows, Koenraad Van Landeghem

Australian Bureau of Statistics, Belconnen, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

12. Econometric Modelling

Paper/Poster Abstract:

Countries around the world are increasingly committing to net zero greenhouse gas (GHG) emission targets. These commitments will require the decoupling of economic activity from GHG emissions given their historical close relationship even as communities expect continued rising living standards. Decoupling and decomposition techniques and trend analysis can be used to measure and monitor whole-of-economy and sectoral progress on GHG emission reductions. They can inform climate policy, as countries tweak climate measures and expand the scope of climate action as more sectors are required to decarbonise. For instance, this analysis can be used to inform potential changes to Australia's Safeguard Mechanism.

This paper uses data from Australia's National Greenhouse Gas Inventory and the System of National Accounts to assess the relationship between GHG emissions and economic activity and energy consumption and quantifies the contribution of economic activity, structural change, energy efficiency and technological change to Australia's changing GHG emissions profile.

Between 2002-03 and 2019-20 Australia's net GHG emissions decoupled from economic growth as GHG emissions declined by nearly 17 per cent whilst the economy grew by 59 per cent, reflecting a period of near uninterrupted growth. Between 2002-03 and 2019-20 Australia's GHG emissions declined by 96 million tonnes of CO2-e. During this period economic growth added 239 Mt (million tonnes) of GHG emissions; structural change (in particular the growth of the services industries and the decline of the manufacturing industry) led to a decrease in GHG emissions of 99 Mt; improvements in energy efficiency detracted 26 Mt of GHG emissions and improvements in the GHG intensity of energy (i.e. technological change through fuel substitution or changes in product or industrial processes) contributed a further 210 Mt of reduced GHG emissions.

Sectoral experiences varied considerably, with GHG emissions from a shrinking manufacturing sector declining by 15.3 Mt whilst a booming mining sector experienced a rise in GHG emissions of 41.3 Mt between 2002-03 and 2019-20. The agriculture sector has seen a marked decline in emissions (108.8 Mt) as the sector experienced a drought and a change in the composition of its output. The electricity, gas, water and waste services sector (EGWWS) experienced absolute decoupling with economic activity increasing by 18% whilst GHG emissions declined 19.4 Mt.

A review of Australia's sectoral emissions experience highlights that well-designed climate policies can reduce the trade-off between economic activity, energy use and GHG emissions, critical if climate policies are to sustain long-term community support. Managing inputs into energy production are also critical to achieving net zero. Further investigation is needed to unravel the contribution of fuel type to decoupling emissions from economic growth.

Parallel 1F. Contributed Paper Session - Fisheries, Marine Systems and Aquaculture

10:30 - 12:10 Wednesday, 7th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre
Satoshi Yamazaki

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317 The influence of fishery subsidy on environment and fishers' income: does it aggravate poverty trap?

Yujuan Li

Massey University, Palmerston North, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

16. Fisheries, Marine Systems and Aquaculture

Paper/Poster Abstract:

Many studies have shown that fishery subsidies especially the harmful ones is one major contributor to overfishing, because fishery subsidy encourage excessive fishing effort (Sumaila, U.R., et al, 2010; 2021), thereby potentially leading to overexploitation and depletion of marine resources or biodiversity over time (Merayo, E., 2019; Clark, C.W., 2005). Furthermore, fishery subsidies have the effect of income redistribution, which may lead to the inequity in income distribution, some study show that a fisher involved in LSF (Large-scale Fishing) receives 3.5 times more subsidies than a fisher in SSF (Small-scale Fishing) (Schuhbauer A., 2017; 2020). Thus, the government support is not only being used exacerbate the degradation of our ocean's ecosystems, but also aggravate the inequitable distribution of income (Merayo, E., 2019).

Besides, there is a correlation between the two consequences of fisheries subsidies: resource depletion and poverty which result from unequal income distribution. On the one hand, the depletion of marine resources and biodiversity is a barrier to sustainable livelihoods for fishers (Nayak, P., 2014; FAO, 2015); in reverse, poverty among fishing communities has serious impacts on marine social-ecological systems (Kalikoski, D.C., 2019), as poverty usually motivates excessive fishing pressure, leading to a poverty trap that ensnares fishing communities in poverty (The, L.S. L., 2023). So, the two results of fishery subsidies may set fishery community into a "poverty trap."

Based on the panel data of China's coastal areas, the fixed effect model, quantile regression model, threshold regression model and 2SLS are adopted in this paper to discusses the environmental changes and the unequal income distribution that may be caused by fishery subsidies, as well as the interaction between them, and whether they will ultimately exacerbate the poverty-trap.

The results show that fishery subsidies do increase fishers' income on the whole, while the income-increase effect of fishery subsidies on low-income fishers is weaker than that of high-income ones. In addition, the marginal effect of fishery subsidies on fishermen's income increase is affected by the heterogeneity of marine environment. Moreover, fishery subsidies will lead to deterioration of the marine environment by increase the efforts of fishing and mariculture. Finally, the deterioration of the marine environment and the unequal distribution of income will interact to form a vicious circle, and eventually may lead to the poverty trap. The authorities should pay attention to how to divert the fishery subsidies, especially the harmful one to help the fishers get out of poverty trap, and address the global challenges: conserving marine resources, eradicating poverty and harmful fisheries subsidies.

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238 Determinations of Factors Influencing Willingness to Pay for Safer Fish Consumption in Bangladesh

Mohammad Saidur Rahman[1], Madan M. Dey[2], Md. Farid Dewan[3,1]

[1]Bangladesh Agricultural University, Mymensingh, Bangladesh. [2]Texas State University, Texas, USA. [3]Noakhali Science and Technology University, Noakhali, Bangladesh

Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

16. Fisheries, Marine Systems and Aquaculture

Paper/Poster Abstract:

Excessive use of antibiotics in fish production, contamination of heavy metals from unhygienic production practices, presence of pathogenic microorganisms, and use of ingredients like formalin and artificial dye to preserve and maintain the freshness of fish for an extended period is widespread in Bangladesh. These impose a health burden for mass consumers. Hence, the present study examined the determining factors of consumers' willingness to pay (WTP) for safer fish in Bangladesh. Three fish species, namely tilapia, pangasius, and rohu, were produced following controlled feed and management practices, considered as trial fish, and ran the required lab test on representative samples to assess the level of microbial contamination, heavy metals and antibiotic residues. Similar tests were conducted on the same fish species produced following traditional production practices, termed the control group, to assess how safe trial fish is. The experimental auction (Vickrey Auction) was performed in the Mymensingh, Narayanganj, and Patuakhali districts of Bangladesh to explore the consumers' WTP for safer fish. One hundred thirty-five (135) consumers took part to elicit the willingness for safer tilapia and pangasius fish and 94 for rohu fish. There were two sessions for each fish species, and control and trial fish were in separate bowls in each session. At the first auction session, consumers were blind about the sources and production practices followed for trial and control and placed their WTP based on physical attributes. In the next session, the sources, production practices, and lab test information were disclosed to the consumers, and they were requested to place a repeated bid for the same products based on the safety attributes. In both sessions, the consumers placed higher prices for the trial fish. The participants agreed to pay, on average, 52%, 39%, and 34% higher prices per kg of safer tilapia, pangasius, and rohu fish, respectively, than the bids for the control fish. It is also revealed that consumers' access to the safety information motivates them positively to place higher bids for safe fish in the second session of the auction. The second bid was 15%, 17%, and 6% higher than the consumers' first bid for safer tilapia, pangasius, and rohu fish, respectively. The informed consumers paid even lesser for control fish, suggesting decreased demand for traditionally cultured fish. To find out the factors that influenced the consumers to bid a premium price for safer fish, the regression model was executed, incorporating prices as the dependent variable and sociodemographic profile and fish attributes, both visible (size, color, glossiness, and freshness of fish gills) and invisible (level of pathogenic bacteria, antibiotic residue, and heavy metals contamination) as independent variables. The analysis revealed that education level, fish appearance, level of antibiotic residues, heavy metal contents, and presence of pathogenic bacteria influence the consumers to pay price premium significantly. The findings will help to explore a path to the availability of safer fish in the long run with quality assurance, and thus, producers will be encouraged to produce with logistic support from policy intervention.

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120 A Comparative analysis of poverty reduction research for fishers in developing countries

Gouri Mondal, James Camac, Tom Kompas

University of Melbourne, Victoria, Australia

Presentation Type:

3. Contributed Paper

Keywords:

16. Fisheries, Marine Systems and Aquaculture

25. Policy Analysis

Paper/Poster Abstract:

Extreme poverty in fisheries is clearly evident around the world. In practice, various strategies are suggested and often implemented to eliminate extreme poverty. However, the efficacy of these strategies is doubtful and needs to be reviewed. This study aims to conduct a comparative analysis of different poverty reduction strategies for the fishing community, with a focus on developing countries. The work is based on a systematic review of the literature and reported outcomes. At this stage, the analysis is bibliometric and qualitative but based on this work the study identified eleven major dimensions in poverty research. These dimensions are argued to be important if not essential for future project planning and policy to mitigate poverty.

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72 Antarctic Sanctuary: Behavioural Impact of International Marine Protected Areas

Yifan Lu, Satoshi Yamazaki

University of Tasmania, Hobart, Australia

Presentation Type:

3. Contributed Paper

Keywords:

16. Fisheries, Marine Systems and Aquaculture

25. Policy Analysis

Paper/Poster Abstract:

Are marine protected areas (MPAs) in international waters effective in deterring fishing efforts? Managing internationally shared resources proves to be challenging, as these resources are prone to intensive use and subject to overexploitation. Using high-resolution vessel tracking data from the Southern Ocean and exploiting quasi-random variation induced by geographical boundaries of the world's largest international MPA established in the Southern Ocean, we show a significant deterrence effect within the area where commercial fishing is prohibited. There is no evidence of fishing effort displacement or a concentration of efforts near the MPA boundaries. Moreover, by using vessel-level repeated cross-sectional data over the period before and after the creation of the MPA, we show that vessels operating near the MPA increased the hours of at-sea non-fishing activities in response to its establishment. While the economic impact of MPAs in national waters has been previously evaluated, there has been limited understanding of how MPAs established outside national jurisdiction influence fisher behaviour. This study fills that gap by providing the first causal evidence to address this issue. Drawing upon the institutional and environmental conditions in the Southern Ocean, our findings suggest that MPAs in international waters can effectively deter fishing efforts when supported by strong regulatory frameworks and incentives for voluntary compliance.

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192 Formalizing fish trade and market access: insights from the Solomon Islands

Kofi Apreku[1], Satoshi Yamazaki[2], Shoichi Kiyama[3], Keisaku Higashida[4]

[1]Honiara, Honiara, Solomon Islands. [2]University of Tasmania, Hobart, Australia. [3]Kyoto University, Kyoto, Japan. [4]Kwansei Gakuin University, Kwansei, Japan

Presentation Type:

3. Contributed Paper

Keywords:

16. Fisheries, Marine Systems and Aquaculture

17. Food, Health and Nutrition

Paper/Poster Abstract:

Coastal fisheries are vital for providing subsistence and livelihoods to local communities in Pacific Island countries. Despite the diversity of species and fishing methods across these nations, a common challenge lies in achieving market access to fully leverage natural resources for economic growth and improved food security. For example, while hundreds of commonly harvested species for human consumption have been identified in the Solomon Islands, they are primarily traded at the local community level and largely informal, involving direct transactions between individual fishers and consumers along roadsides. There are only a few organized formal fish markets, with Honiara Central Market being the largest formal fresh product market in the country. However, its profile and role in the local fish trade remain poorly understood. Between August and October 2022, we conducted interviews with 100 randomly selected vendors of coral reef fish in the market, aimed at addressing questions related to market access, including the types of fish available, their geographical origins, suppliers, and transportation methods. Additionally, we collected data on the ethnogeographic and socio-demographic characteristics of these vendors to gain insights into the formal reef fish trade in the Solomon Islands. Understanding the fundamental characteristics of the coral reef fish trade in the central formal market is essential to promote stakeholder intervention and collaboration. Such knowledge will help address the challenges faced by this vital source of food, nutrition and livelihood for coastal communities in the country.

Parallel 1G. Contributed Paper Session - Environmental Economics 1

10:30 - 12:10 Wednesday, 7th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre
Paul Burke

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206 Challenges in using Benefit:Cost Analysis (BCA) for protecting the Peel-Harvey estuary

Anna Roberts[1], Claire Doll[2], David Pannell[2], Geoff Park[1]

[1]Natural Decisions, Melbourne, Australia. [2]University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

The Ramsar-listed Peel-Harvey estuary is the largest and most diverse estuarine complex in south-western Australia. It is a key destination for tourism and recreation, particularly popular for boating, fishing and crabbing. The system suffered ecological collapse in the 1970s-80s due to nutrient enrichment. Rather than addressing the sources of the problem (a combination of very sandy soils, diffuse source pollution from agriculture, pressure for intensification and a lack of political will for unpopular policy measures), an artificial channel between the Peel-Harvey Estuary and the Indian Ocean was constructed to increase the flushing of the system. As well as buying time, this has enabled additional urban and agricultural development as well as increased monitoring and research to better understand the sources and effectiveness of actions needed. Catchment activities to address the sources of the problem have also occurred but at a scale that is too small to result in significant improvement, as is typical of most environmental challenges. Unfortunately the estuary is again suffering from nutrient enrichment problems as well as additional challenges such as reduced flows. These challenges again threaten the natural values and lifestyle of the region, with the added issue that major engineering options have been exhausted.

Despite knowing the sources of the problems and the challenges in addressing agricultural nutrient pollution, economics has been largely absent or ignored from decision-making. A BCA has now been commissioned including estimation of use and non-use benefits in protecting the estuary. The BCA is intended to provide the basis of developing a business case for markedly increased levels of investment to enable protection of the estuary. This paper discusses the approach taken to develop the BCA and the importance of using both available science and expert judgement to integrate available information in a defensible way, whilst also managing expectations of stakeholders and the prevailing politics of the day. The costs of addressing diffuse source pollution will be large, as well facing challenges regarding the adoptability of nutrient reduction practices and the will of institutions to consider additional unpopular policy tool choices.

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195 Turning data into information for better management of the Great Barrier Reef – Applications of an extended ecosystem accounting framework

Petina Pert[1], Anthea Coggan[2], Jeremy De Valck[3], Victoria Graham[4,5], Diane Jarvis[5], Cindy Huchery[6]

[1]CSIRO, Townsville, Australia. [2]CSIRO, Brisbane, Australia. [3]Central Qld University, Brisbane, Australia. [4]UTAS, Hobart, Australia. [5]JCU, Cairns, Australia. [6]GBRMPA, Townsville, Australia

Presentation Type:

3. Contributed Paper

Keywords:

7. Carbon and Nature Markets

16. Fisheries, Marine Systems and Aquaculture

Paper/Poster Abstract:

The Great Barrier Reef (GBR or the Reef) is a complex coastal system consisting of multiple, interconnected ecosystems such as coral reefs, seagrass meadows and mangroves. These ecosystems provide numerous ecosystem services that generate pluralistic benefits to local and more distant communities. Moreover, the finite supply of ecosystem services and the dynamic nature of interactions between their different beneficiaries create increasing competition for beneficiaries of ecosystem services from the GBR and risk of resource misallocation. Despite the long history of human use of Reef ecosystem services, management decisions have historically been made using ecological and biophysical data more so than socio-economic data. As a result, ecological and biophysical data tend to be systematically collected over a time series, with consistent data collection methodology findable in a centralised depository. Socio-economic data on the other hand, despite being extensive, tends to be lacking in these qualities.

One objective of the Australian Government and Great Barrier Reef Foundation (GBRF) Reef Trust Partnership funded Sustainable Use and Benefits for Marine (SEABORNE) project was to assist GBR management decision-making through better understanding and organisation of socio-economic data. In this paper we present an extension of the United Nations' System of Environmental Economic Accounting, Ecosystem Accounting (SEEA EA), and demonstrate how applying this framework as a lens across existing socio-economic data can assist in turning the plethora of existing data on Reef users, uses and benefits into information for management decisions. Our framework is based on a combination of the (ecosystem-centric) United Nations' System of Environmental Economic Accounting, Ecosystem Accounting (SEEA EA) framework, the (value-centric) Total Economic Value framework, and First Nations-centric frameworks. We refer to this framework as an extended SEEA EA approach. In this paper we demonstrate how the extended SEEA EA framework enables us to develop an understanding of a flow of value from ecosystem services to end-users which we term an Ecosystem Service Value Chain (referred to as value chains from here in). An ecosystem service value chain is a conceptual framework that represents the stages and processes involved in the delivery of ecosystem services, from the natural marine environment and its ecosystems (ie GBR) to the ultimate beneficiaries (government, industry, households, First Nations). Describing and populating the value chains for each Great Barrier Reef Marine Park Authority priority ecosystem service to the range of end-users not only enables a way to understand and rationalise the plethora of existing socio-economic data but also provides a systematic approach to understand the quality of this data, how this data can (or cannot) be used in decision making and priorities for future socio-economic data collection.

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250 Economic Evaluation of the Effectiveness of the Reef Trust Tenders

Mara Emmerling[1], Diane Jarvis[2], Stuart Whitten[3]

[1]James Cook University, Townsville, Australia. [2]James Cook University, Cairns, Australia. [3]CSIRO, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

26. Practice Change and Adoption

Paper/Poster Abstract:

Agricultural production has been identified as a key driver of global environmental degradation, including water pollution, greenhouse gas emissions, and impacts on biodiversity and water extraction. In Australia, the World Heritage listed Great Barrier Reef (GBR) faces significant threats due to climate change, exacerbated by sediment, nutrients, and pesticides runoff from agricultural activities. While Governments have invested over $4.4 billion (AUD) in a myriad of policies and programs to conserve and protect the GBR, slow progress has been made towards water quality targets and evaluation systems and reporting of effectiveness of agricultural programs remains a key knowledge gap. This study focuses on the evaluation of the Reef Trust Tenders, a program designed to reduce dissolved inorganic nitrogen (DIN) from sugarcane farms in the Wet Tropics and Burdekin regions entering the GBR. Farm-level panel data from 34 sugarcane farms in the Burdekin is evaluated, generating insights into their economic viability, and effects on reducing farming externalities and enhancing water quality. Robust statistical techniques were employed to identify whether and to what extent the Tender achieved their stated design objectives, facets of cost-effectiveness and contribution to the DIN water quality targets. The analysis indicates that the Burdekin Tenders successfully reduced nitrogen application by over 966 tonnes (which includes an over 309 tonnes abatement over contracted levels), contributing around 13 percent to the Burdekin DIN reduction target. While some heterogeneity in cost-effectiveness exists among projects, the average price for DIN reduction at the end of catchment ranges between $63-76/kgDIN, which is noticeably lower than the benchmark maximum of $150/kgDIN. This highlights the Tender's (cost-) effectiveness in addressing water quality concerns, particularly compared to other programs in this space. This study incorporates both contracted and verified post-program data to assess effectiveness, marking a notable departure from previous studies. The result offers valuable insights not only for future policy and program design in the GBR catchment area, but also for other contexts with comparable institutional setting where attempts to address agricultural impacts on water quality are long-standing. Furthermore, it underscores the importance of targeted interventions and robust evaluation methods in achieving environmental conservation goals.

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218 Climate Resilient Investments under Climate Change in Australia: A Case Study on the South Coast in Bega Valley Shire

Russell Wise[1], John Marinopoulos[2], Stefanos Xenarios[1], Paul Box[3], Peter Heinmiller[2], Russell Gorddard[1], Nick Mesic[2], Seona Meharg[1], Greg Parish[1], George Tieman[2], Sofia Azevedo[4]

[1]CSIRO, Canberra, Australia. [2]Value Advisory Partners, Melbourne, Australia. [3]CSIRO, Sydney, Australia. [4]Value Advisory Partners, Melbourne, Austria

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

14. Environmental Economics

19. Impact Assessment

25. Policy Analysis

Paper/Poster Abstract:

Australia has witnessed some of the most severe natural hazard-induced disasters over the last decade. The need for designing resilience investments customised to the features of each region through place-based approaches is becoming increasingly recognised as critical and urgent. However, planning and evaluating investments aimed at climate adaptation and disaster resilience for ensuring the sustainable well-being of communities is fraught with significant technical, socio-cultural, governance, political, economic, and environmental challenges. Even when there is a desire to invest in climate-resilient assets or adaptive capacity, there are few established frameworks or legislated requirements to guide and facilitate this. In this study, we present the Enabling Resilient Investment (ERI) approach developed to build understanding and national capabilities in how public and private investment processes account for uncertainty, climate disruption, and value creation through resilience. The ERI is an evolving approach of methods, tools, and processes for developing and testing investment processes and methods in applied projects. The ERI approach has been applied in 12 projects to date, with 4 in the Bega Valley Shire alone due to this region experiencing about 30 disasters over the last 4 years that have severely challenged local communities' livelihoods and well-being. The Bega Valley Shire and its diverse landscapes are characterised by heterogeneous levels of exposure and vulnerabilities to these hazards. Consequently, population settlements, built infrastructure, and critical infrastructure (e.g., transport networks) are highly exposed to natural hazards. We, therefore, introduced the ERI approach in the Bega Valley Shire through targeted engagements and workshops to draw on local and regional experiences, perspectives, values, and knowledge to build a shared understanding of the causes of vulnerability, visions of more desirable disaster-resilient futures, and high-level options and pathways for steering towards these more desirable outcomes. We developed two place-based resilient investment cases using novel systems- and values-based approaches that identified bundles of assets (across different infrastructure classes), services, risk mitigation measures, and resilience opportunities (e.g., enhanced productivity, service reliability, amenity values, etc) in a range of high-priority locations across the region. These priority place-based resilience investment cases were identified in consultation with the Bega Valley Shire Council and others representing key stakeholder groups. The analysis considered the plausible changing dynamics of hazards and impacts over an investment period of 20-30 years to explore the possible performance or suitability of the bundles of options and opportunities. The options are developed and tested regarding their ability to respond well (perform satisfactorily) to each future scenario. We further evaluated and translated the practical, technical, economic and policy lessons from Bega Valley Shire to scale out (to other Local Governments) and scale up (through regional bodies, NSW State agencies and the Federal level) and contribute to national capabilities on climate resilient investment and disaster risk reduction initiatives.

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96 Fuel prices and ambient air pollution: A study of Sydney

Jian Li, Paul J. Burke

Australian National University, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

11. Ecological Economics

14. Environmental Economics

Paper/Poster Abstract:

This paper explores the relationship between fuel prices and air quality for the case of Sydney, Australia. We use daily and monthly data from air quality monitoring stations in various locations for the period 2004–2022 to explore the effect of fuel prices on ambient levels of several pollutants: PM10, NO2, PM2.5, and CO. We control for variables including bushfire occurrence, weather conditions, and seasonal effects. We also use the log world oil price as an instrumental variable. The results suggest that higher fuel prices are associated with significantly lower ambient

pollution levels. The findings are useful for air pollution prediction and have a number of implications for efforts to improve ambient air quality in this major city.

Parallel 1H. Contributed Paper Session - Impact Assessment

10:30 - 12:10 Wednesday, 7th February, 2024
Location Room 6, (Level 5) Marie Reay Teaching Centre
Sonia Akter

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240 The Impact of Agriculture on Educated Poverty through a Machine Learning Approach

Dias Satria[1], Mangku Purnomo[1], Risti Permani[2], Tri Wahyu Nugroho[1], Diego Irsandy[1], Rismania Damayanti[1]

[1]Universitas Brawijaya, Malang, Indonesia. [2]University of Queensland, Queensland, Australia

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

19. Impact Assessment

Paper/Poster Abstract:

Agriculture has long played a pivotal role in the economic landscape of many developing countries, including Indonesia. However, poverty remains a persistent challenge, exacerbated by the COVID-19 pandemic, which has affected various segments of society, including 'educated poverty.' This phenomenon entails individuals with secondary education and above struggling to escape poverty despite their educational attainment. Therefore, this study aims to delve into the critical role of agriculture in influencing poverty, particularly 'educated poverty,' in East Java. Utilizing data from the Indonesian National Survey, this research employs a range of machine learning classification methods, including Random Forest (RF), Extreme Gradient Boosting (XGBoost), Artificial Neural Network (ANN), and K-Nearest Neighbor (KNN). The findings underscore the profound impact of agricultural variables on poverty. Crop yield, land ownership, access to agricultural technology, and participation in agricultural training programs emerge as crucial determinants in understanding 'educated poverty' within the context of East Java's agricultural sector. In light of these findings, policymakers are urged to prioritize agricultural development programs that promote sustainable farming practices, equitable land distribution, and the widespread adoption of modern agricultural technologies. By addressing these agricultural factors, East Java can make significant strides in reducing 'educated poverty' and fostering overall economic development.

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110 Three decades of inter-city growth in China: Impacts of economic, natural and social amenities

Zhihui Li[1], Chao Li[2], John Gibson[3], Xiangzheng Deng[1]

[1]Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing, China. [2]COMPASS, University of Auckland, Auckland, New Zealand. [3]Department of Economics, University of Waikato, Hamilton, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

19. Impact Assessment

Paper/Poster Abstract:

The attractiveness of cities as places to live determines population movements into or out of them. Since the relaxation of the household registration system (hukou) and the economic reform in the late 1970s, China has experienced unprecedented largescale internal migration. The location choice and livelihoods of urban migrants are critical to the sustainable development of cities. The relative attractiveness of each urban location depends on a bundle of economic, natural, and social amenities. The weights for factors such as employment, wages, cost of living, housing conditions, social services, and the accessibility and quality of environmental attributes can be derived from the differences in the population growth of each city, especially when the driving force for growth has been inward migration. By identifying the driving mechanisms for relative population growth, this research can help policymakers to formulate reasonable sustainable city development governance measures. In this paper we relate the resident population changes for over 300 cities, observed in China's 2000, 2010 and 2020 censuses, to vectors of local economic characteristics and social and natural amenities. The analysis focuses on the impacts of a diverse set of drivers of the migration patterns in China. Findings from this study will improve our understanding of China's internal migration and the role of various types of amenities in determining the differing growth paths of cities. This understanding can help with China's management of the largest rural-to-urban population flows in human history.

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177 Public Agricultural Research and Development and Farm Productivity: Evidence from Japan

Yuko Akne[1], Nobuhiro Hosoe[2]

[1]Nihon University, Fujisawa, Japan. [2]National Graduate Institute for Policy Studies, Tokyo, Japan

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

27. Productivity and Efficiency

Paper/Poster Abstract:

The need for research and development (R&D) to improve productivity is indisputable. Public R&D institutions play an integral role in improving agricultural productivity because almost all individual farmers have insufficient capital to invest independently in R&D. Many scholars have empirically shown that public agricultural R&D investments contribute to the improvement of agricultural productivity both within and across countries.

Although we could not find any studies on the effects of agricultural R&D on the productivity in Japan, agriculture in Japan has been empirically shown to comprise heterogeneous farms. This indicated that public R&D does not affect them uniformly. Hence, this study empirically demonstrates the influence of local public agricultural R&D on heterogeneous farmer productivity. We focus on the effects of R&D and extension for which local public agricultural R&D institutions are charged.

In agriculture, different agents, such as farmers and researchers, are charged with enhanced productivity. In other words, there are physical spatial distances between them, and the possibility for decision-making mismatch. Collaborative work between them is essential to achieving results from investments. These procedures are crucial for applying new technologies and cultivating new breeds in real-world settings. The geographical proximity between farmers and researchers helps to communicate and frequently observe experimental situations in their fields. Therefore, this study also focuses on the interaction effects of distance between farmers and the nearest local agricultural R&D institution. The importance of distance from R&D institutions has been examined in previous studies but limited to spillover among farmers and the adoption of cultivated breeds at narrow local levels. This study contributes to the empirical research of this influence at the national level.

In this analysis, we employed a fixed effects model for unbalanced panel data consisting of 3,774 farmers in 2012 and 2015. The dependent variable was total factor productivity (TFP), as estimated using farm-level data by Akune and Hosoe (2021). The independent variables are local public agricultural investments for R&D and extension stocked for 0, 5, 10, 15, 20, and 25 year periods, and the interaction term of distance to the nearest local agricultural R&D institution. There are six other independent variables: a dummy for full-time farmers and proportion of agricultural sales as farmers' business behaviors; age and squared age; and dummies for heirs, environmental certification, and mountainous regions as their business environment.

As a result of the estimation, we found not only that public local agricultural R&D and extensions significantly and positively affected farmers' TFP when stocked for 15 years but also that the distance between farmers and the nearest local agricultural R&D institution reduced the effects of R&D. In addition, the dummy for full-time farmers and proportion of agricultural sales were significantly positive, age was positive, and squared age was negative. These results indicate that more professional and younger farmers under a certain age have higher TFP.

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23 Investigating the Causal Effect of Natural Disasters on Household Food Insufficiency in the US

Ahmad Wahdat[1], Sam Polzin[2]

[1]Purdue University, West Lafayette, USA. [2]MBTA, Boston, USA

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

17. Food, Health and Nutrition

Paper/Poster Abstract:

Various natural disasters are injuring, displacing, and economically damaging more and more people in the United States. In the 2010s, an average of 8.87 million people per year were affected by these disasters, compared to 2.08 million in the previous decade. Research has shown that households affected by disasters, particularly hurricanes and flooding, often experience higher rates of food insecurity due to limited access and availability of food resources in the aftermath. However, these studies often focus on localized contexts and rely on convenience samples. The diverse nature of disasters, some with unclear time dimensions and vast spatial coverage, presents significant challenges in assessing their impact accurately.

Our study employs a nationally representative sample from the 2023 Household Pulse Survey (HPS) and utilizes the potential outcomes framework to estimate the causal effect of natural disaster-induced household displacement and property damage on food insufficiency, a severe form of food insecurity. Our findings indicate that household displacement caused by natural disasters leads to a substantial increase in food insufficiency, with an average increase of 9.6 percentage points (or 91.2% increase) compared to non-displaced households. In terms of the heterogeneous effects, brief displacement of up to a week results in a 77.1% increase in food insufficiency, while extended displacement of greater than a week leads to a 103.5% increase. Households that experience light property damage see a 69% increase in food insufficiency, while those with heavy damage face a staggering 115.2% increase compared to unaffected households. To ensure the generalizability of our results to the U.S. population, we account for survey weights that adjust for nonresponse and undercoverage. Without these weights, population treatment effects are underestimated.

Food insecurity, characterized by insufficient resources for food, has severe health consequences, including anemia, birth defects, and mental health issues. Our study is important for policy considerations and understanding food insecurity's underlying mechanisms. For instance, disaster displacement can disrupt access to cooking facilities and force families into emergency shelters. Housing damage can lead to additional financial burdens, reducing the resources available for food. Emergency food assistance programs can become overwhelmed after natural disasters. Despite the growing body of literature, there remain major gaps in our understanding of the complex interactions between natural disasters and food systems, and the ensuing impact on food security.

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174 Are extreme bushfire events worsening Australia's socio-economic disadvantage? Empirical evidence from the Black Summer Fires using census data

Sonia Akter, Quentin Grafton

Australian National University, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

We examine the impact of the catastrophic 2019–2020 Australian bushfires (Black Summer) on socio-economic disadvantage of the affected communities using the difference-in-differences method. We have combined the National Indicative Aggregated Fire Extent (NIAFE) dataset published by the Department of Agriculture, Water and the Environment and 2011, 2016 and 2021 Socio-Economic Indexes for Areas (SEIFA) published by the Australian Bureau of Statistics. The results reveal a significant negative impact of the Black Summer fire exposure on socio-economic disadvantage of the affected communities. More specifically, the Black Summer fire affected communities, on average, experienced 5.857% increase in their socio-economic disadvantage ranking in 2021 relative to 2016 and 2011 than the unaffected communities located within 20km radius of an affected community. The magnitude of the increase in socio-economic disadvantage ranking was significantly higher for the communities that belonged to the bottom five deciles of socio-economic disadvantage in 2016 than those that were among the top five deciles. Our spatial analysis reveals that the adverse impact of bushfire exposure on socio-economic disadvantage persisted mainly in inner regional, outer regional and remote areas of New South Wales and Victoria, the two worst-hit states of the Black Summer catastrophe. Consistent with the finding of an overall increase in socio-economic disadvantage, we find a significant decline in economic resources of the bushfire affected communities. Median weekly household income in the Black Summer fire affected locations dropped by A$35 in 2021 relative to 2016 and 2011. Additionally, we observed a change in population composition in the bushfire affected locations in terms of a decline in foreign-born populations and age group 35-55y and an increase in population of age group 65y and over and indigenous population. These findings suggest that, without appropriate social protection programs to support recovery after such extreme bushfire events, the increased frequency and intensity of large-scale bushfires in Australia and globally are likely to intensify socio-economic disadvantage of communities and widen economic inequality among them.

Lunch

12:10 - 13:10 Wednesday, 7th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Lunchtime Session - "3-Minute Thesis Competition"

12:20 - 13:00 Wednesday, 7th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
John Rolfe

The 3-Minute Thesis competition is an opportunity for Postgraduate students to raise the profile of their research, and to improve or employ their presentation and research communication skills.

The 3-Minute Thesis competition will be run based on The University of Queensland rules (https://threeminutethesis.uq.edu.au/resources/competition-rules) and judging criteria (https://threeminutethesis.uq.edu.au/resources/judging-criteria-and-panel).

Keynote: “How politicians make decisions. And how you can influence them to make better ones”

13:10 - 14:10 Wednesday, 7th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

John Thwaites

Abstract: This keynote by former Victorian Deputy Premier, and Chair of the McKinnon Institute for Political Leadership, Professor John Thwaites AM, will discuss how evidence is used by politicians, why best evidence is often not followed and how researchers can influence politicians to use their research evidence. It will examine how politicians regard academic research and how policy is made in practice. Research evidence is often not used in the political process because of the different drivers of science and politics and the nature of modern government. Politics and research have different timescales and focus. Emotion and values play a key part in political decision making. Politicians use heuristics in coming to decisions, in part because they are too busy to properly assess the best evidence. If researchers are to influence politicians, they need to better understand politics and politicians. Ten ‘commandments’ of influencing government will be presented that can help guide the way in which researchers present their research to have the most influence. Finally, some reforms to political processes wil be considered that could make it more likely that robust evidence will be used in future.

Professor John Thwaites AM is a Professorial Fellow, Monash University, and Chair of the Monash Sustainable Development Institute and Climateworks Centre. John is the Chair of the National Sustainable Development Council, which has developed the Transforming Australia: SDGs Progress Report 2018. He was previously Chair of the National Sustainability Council an independent Council appointed by the Australian Government, which produced the Sustainable Australia Report in 2013. He is a Co-Chair of the Leadership Council of the UN Sustainable Development Solutions Network (SDSN) launched by the Secretary General of the United Nations to provide expert advice and support to the development and implementation of the Sustainable Development Goals. He is also the Chair of the SDSN Association, which operates the SDSN network around the world. John was appointed Member of the Order of Australia for “significant service to the environment and to the people and Parliament of Victoria" in the 2021 Australia Day Honours.

10 minute break to move rooms

14:10 - 14:20 Wednesday, 7th February, 2024

Parallel 2A. Special Session - "Efficient and Just Water Reallocation: What Policy Approaches are Needed to Address the World's Water Crises?"

14:20 - 15:20 Wednesday, 7th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

Paul Wyrwoll

Water insecurity poses an existential risk for societies, economic sectors, and ecosystems across the world. Climate change and population pressures are magnifying unsustainable management of surface and groundwater resources. Economists and policy-makers recognise the growing need for policy mechanisms to reallocate water across different uses, users, geographies, and time. Many policy options have been tested to manage trade-offs across competing water uses, including water markets, infrastructure regulation, water pricing, technology subsidies, and property rights reform. Yet, institutional capacities and political barriers vary across contexts. There are no one-size fits all solutions to water reallocation. And there are important considerations beyond the allocative and dynamic efficiency objectives that typically occupy economists: access to water is a human right across multiple dimensions, including drinking water and cultural values. These rights are gaining prominence as policy-makers and politicians in Australia and globally are being called on to address water injustice.

This session brings together a panel of early-career and senior water economists to consider future policy approaches to efficient and just water reallocation in Australia and the Asia-Pacific. The session begins with interactive audience responses to statements on the sessions themes from media, policy reports, and other sources. Each panellist will then provide short responses to the framing question. A moderated discussion between panellists will follow, and then an audience question and answer component.

Panellists include (alphabetical order):

- Dr Safa Fanaian, Crawford School of Public Policy, Australian National University

- Professor Quentin Grafton, Crawford School of Public Policy, Australian National University

- Dr Constantin Seidl, School of Economics and Public Policy, University of Adelaide

- Dr JuliaTalbot-Jones, School of Government, Victoria University of Wellington

- Professor Sarah Wheeler, School of Economics and Public Policy, University of Adelaide

The session will be moderated by Dr Paul Wyrwoll, Institute for Water Futures and Crawford School of Public Policy, Australian National University. The Centre for Water Economics, Environment and Policy at the ANU Crawford School is convening the session.

51 Efficient and Just Water Reallocation: What Policy Approaches are Needed to Address the World's Water Crises?

Safa Fanaian[1], Quentin Grafton[1], Constantin Seidl[2], Julia Talbot-Jones[3], Sarah Wheeler[2], Paul Wyrwoll[1]

[1]Australian National University, Canberra, Australia. [2]University of Adelaide, Adelaide, Australia. [3]Victoria University of Wellington, Wellington, New Zealand

Presentation Type:

2. Special Session

Keywords:

23. Market Design and Policy

31. Water

Parallel 2B. Contributed Paper Session - Consumer Choice

14:20 - 15:20 Wednesday, 7th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre
Curtis Rollins

80 Exploring the Influence of Consumers' Knowledge on Attitude and Purchase Intention for Organic Foods: A case study from Australian market.

Chitpasong Kousonsavath[1], Lenka Malek[1], Wendy Umberger[2], Di Zeng[1]

[1]The University of Adelaide, South Australia, Australia. [2]Australian Centre for International Agricultural Research, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

9. Consumer Choice

Paper/Poster Abstract:

Organic foods are widely recognized for their health benefits and positive environmental impact, and are often considered a better alternative for promoting sustainable consumption. While potential drivers of and barriers towards organic food consumption have been explored, there has been limited exploration of consumers' understanding of organic food production and how this knowledge translates into purchase intention. This study aims to investigate consumers' subjective and objective knowledge of certified organic food and its association with attitude and stated purchase intention. An online survey of 1,001 Australian consumers in 2021, showed that Australians generally have higher knowledge of organic food inspection and certification processes, but are less knowledgeable regarding production-related aspects. Econometric analysis reveals that subjective knowledge is strongly and positively associated with stated purchase intention, but only weakly related to attitude. Further, objective knowledge was found to be higher among organic food buyers compared to non-buyers; and was found to be positively associated with attitude. These findings confirm the importance of improving consumers' actual knowledge of organic food production, which could potentially drive their purchase.

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95 Consumer adoption of innovative alternative proteins in New Zealand: A comparison between plant-based, cultured and insect-based food

Ou Wang[1], Federico Perez-Cueto[2], Riccardo Scarpa[1], Frank Scrimgeour[1]

[1]University of Waikato, Hamilton, New Zealand. [2]Umeå Universitet, Lärarutbildningshuset, Sweden

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

9. Consumer Choice

Paper/Poster Abstract:

Research background: Food innovation is transforming our food system. This claim can be supported by the rapid development of innovative alternative protein (IAP) products. Plant-based food products have become complements or substitutes for animal sourced foods in consumers' daily lives. Furthermore, the increasingly innovative IAP product - cultured meat - has made its way into the actual market (e.g., Singapore), and its production have remarkably declined, plummeting from over 10,000 US dollars per pound in 2013 to approximately 10 US dollars per pound in 2021. Insect-based food is also emerging as an innovative alternative for animal-raising protein, especially in regions with a long history of incorporating local insects into dishes. However, there is still a lack of understanding of the influence that innovation-adoption characteristics (IACs) have on consumer adoption of IAPs.

Research objectives: This study has two main objectives. First, to explore and compare the influence of consumers' IACs on their trust and purchase intentions towards plant-based food, cultured food, and insect-based food. Second, to compare consumers' trust and purchase intentions towards seven specific IAP products, namely plant-based meat, plant-based milk, cultured fresh meat, cultured processed meat, cultured seafood, cell-based milk, and insect-based food.

Methods: Data was collected through a web-based survey conducted in New Zealand (n= 1019). Consumers' trust and purchase intentions of the seven specific IAP products were assessed using 7 point Likert scales, and are described as means (SD). An exploratory factor analysis was conducted to identify an adjusted IAC factorial construct that would be suitable for the real consumer sample in relation to the adoption of an innovative product or service. A structural equation model was developed to examine the association between consumers' IACs, trust, and purchase intentions of cultured, plant-based, and insect-based food products. To examine the mediation effect of trust on the relationships between the IACs and purchase intentions of the three IAP categories, a bootstrap sample of 5,000 was used for the path analysis based on the structural equation model.

Results: Consumers' trust and purchase intentions of the three categories of IAP were found to be significantly influenced by several or all of the following IACs: perceived subjective incentive, perceived complexity, perceived relative advantage, perceived risk, and trialability. When examining specific food products, consumers exhibited significantly higher levels of trust and intention to purchase plant-based food products, such as plant-based meat and plant-based milk. Trust and intention was comparatively lower towards cultured fresh meat, cultured processed meat, cultured seafood, and cell-based milk, and insect-based food. Conclusion: Perceived subjective incentive, perceived complexity, perceived relative advantage, perceived risk, and trialability influence trust and intention to purchase IAP. At the moment, plant-based alternatives remain the preferred by consumers. There is still way ahead before cultured (cell-based) proteins and insects to reach comparable trust and intention to purchase. Stakeholders in the food industry should take these findings in consideration when formulating effective promotional strategies for such products.

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129 Impulsiveness affects stated preferences. Is it a cause of hypothetical bias?

Curtis Rollins, Michael Burton, David Pannell

University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

29. Valuation

Paper/Poster Abstract:

This paper examines whether and how impulsiveness affects stated preferences. Impulsiveness is a psychological trait of individuals associated with low self-control, risk-seeking behaviour, and present bias. These characteristics of impulsiveness could explain variation in preferences between individuals, or who is more prone to hypothetical bias in stated-preference surveys. Using a psychometric scale measuring impulsiveness, we estimate hybrid choice models

to understand how impulsiveness affects responses in seven choice experiments, and one measure of real behaviour. The experiments cover a range of topics, including biodiversity policy, urban parks, and earthquake risk mitigation. In all seven experiments, more impulsive respondents were less likely to select the status quo alternative, either because they were less responsive to costs, or because they preferred new alternatives. However, impulsiveness did not significantly affect real behaviour in the case where real behaviour was observed. These results suggest that impulsiveness could be a cause of hypothetical bias in stated-preference research. This points to the need for further research to improve our understanding of psychological drivers of hypothetical bias, how or whether they can be mitigated, and whether stated-preference questions are suitable for all types of people.

Parallel 2C. Contributed Paper Session - Development Economics 2

14:20 - 15:20 Wednesday, 7th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre Ram Pandit

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134 Spilling Over: The Benefits of Public Works Projects for Groundwater in India

Hemant Pullabhotla[1], Patrick. A. Behrer[2]

[1]Deakin University, Melbourne, Australia. [2]World Bank, Washington DC, USA

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

14. Environmental Economics

Paper/Poster Abstract:

The depletion of groundwater is a global crisis. This is nowhere more true than in India. Of the major groundwater aquifers in the arid and semi-arid areas of the world, those in northwestern India experienced the most prominent and fastest declines in water storage capacity from 2002 to 2013, with a total decline roughly double the other major arid and semi-arid aquifers. Recognizing the importance of groundwater and irrigation in Indian agriculture, the Indian government has attempted numerous policy programs to manage and mitigate groundwater withdrawals for irrigation. This goal has been the explicit purpose of some policy programs (e.g., the Atal Bhujal Yojana plan) and an ancillary target of others, for example, the Mahatma Gandhi Employment Guarantee Act of 2005 (NREGA). The NREGA was primarily a rural employment program to reduce poverty and rural unemployment. However, it had a secondary goal of increasing rural infrastructure to enhance rural productivity. These infrastructure projects explicitly targeted the creation of durable public works projects that improved irrigation and water conservation, and more than half of the initial funding was for water-related projects. In this paper, we examine the impact of NREGA implementation on groundwater levels throughout India.

Despite the large and growing body of literature on NREGA, the extent to which NREGA succeeded in providing valuable, efficiency-enhancing assets remains unanswered. Examining the impact of NREGA on groundwater levels provides an indirect test of its success in providing useful infrastructure. Improving irrigation, water conservation, and water storage should result in higher groundwater levels as these improvements allow for increased groundwater recharge. Examining NREGA's impact on groundwater levels thus provides a test of the effectiveness of the infrastructure construction it financed without directly assessing the quality or completeness of individual projects.

Empirically, we use a difference-in-differences framework that takes advantage of the sequential implementation of NREGA across the country, coupled with data from more than 10,000 test wells that measure groundwater levels throughout India. Our results suggest that NREGA did succeed in improving groundwater levels. These effects are concentrated in the states that were most successful in implementing NREGA generally and those that implemented the largest number of water conservation and irrigation projects specifically.

Higher groundwater levels have meaningful consequences for Indian farmers. Total area irrigated increases after the implementation of NREGA. More tellingly, the area irrigated by wells increased significantly after NREGA was implemented. This increase contrasts with no observed change in the area irrigated by canals or ``other sources'' of irrigation water. Consistent with more irrigation water being available, we observe increases in the soil moisture content, and this effect is concentrated during the winter cropping season when irrigation levels most determine soil moisture. Likely as a consequence of the increased availability of irrigation water, we find that farmers substantially increased their irrigation of high-value, water-intensive crops after the implementation of NREGA.

Our paper demonstrates the positive environmental spillover effects that welfare programs such as public works can generate in a developing country.

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89 Impact of Cash Transfer Programs on Food, Agriculture, Economic, and Environmental Outcomes

Pallavi Shukla, Hemant Pullabhotla

Deakin University, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

14. Environmental Economics

Paper/Poster Abstract:

Introduction

Cash transfer programs are now the most popular policy tool for poverty reduction around the world. There are more than 200 cash transfer programs globally, and the largest of these ongoing programs, in terms of coverage, is run by the government of India called the PM KISAN Samman Nidhi Program. This program provides approximately $110 per year to all farm households in India – more than 140 million families – costing around 0.5% of the country's GDP. This is the only cash transfer program in the world targeted specifically at farmers. Yet, few quantitative research

studies have looked at the large-scale impact of this program. Qualitative evidence suggests that the program may have helped farmers by easing credit constraints, but without causal, quantitative evidence, there is little we can say.

Research Problem

This project examines the impact of the world's largest cash transfer program on the following four distinct outcomes:

1. Food and Agriculture Outcomes: Did the program increase agricultural productivity and food production among targeted farmers?
2. Economic Outcomes: Did the program increase targeted farmers' incomes? Were there spillover effects for the non-targeted population in the village?
3. Resilience: Did the program help farmers recover from natural disasters like floods, droughts, extreme heatwaves, and other natural and economic shocks? Did the program affect seasonal distress migration from rural to urban centres?
4. Environmental Outcomes: Did the program affect the rate of deforestation in beneficiary areas? Did the program increase the rates of crop burning and other slash-and-burn activities in the area?

Methodology

To estimate the impact of India's cash transfer program, our statistical methodology compares outcomes in locations with a higher intensity of the program with those with a lower intensity. We employ two complementary econometric methods: (i) a difference-in-difference methodology and (ii) a spatial regression discontinuity design. The first method uses the spatiotemporal variation in the number of beneficiaries in the program at the village level to estimate program impacts. In the second method, we additionally leverage the variation in the amount paid under the program by different state governments (in addition to the national program) and compare villages that differ in program intensity on either side of state borders. Both sets of analyses include multiple robustness tests to rule out potential confounding factors and ensure we capture the effect of the program alone.

To evaluate the impact of the program on environmental factors like deforestation, rates of crop burning, and slash-and-burn activities, we combine geo-referenced administrative data and remotely sensed panel data on annual global forest cover loss from Hansen (2013) and Global Forest Watch using statistical methods to estimate counterfactual deforestation and crop burning rates in the absence of the program. To capture temporal variation in weather, we use data on average annual surface temperature and average precipitation from NASA. For elevation and slope data, we use SRTM 90m Digital Elevation Database version 4.1.

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351 Welfare impact of recent commodity price rise on households: The case of South Sulawesi, Indonesia

Ram Pandit[1], Rakhmat Nurul Prima Nugraha[2], Seamus Pandit[3], Anas Iswanto Anwar[2]

[1]University of Western Australia, Perth, Australia. [2]University Hasanuddin, Hasanuddin, Indonesia. [3]Monash University, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

Paper/Poster Abstract:

In recent years, there has been a marked increase in commodity prices. The lagged effect of COVID-19 pandemic, the conflict between Ukraine and Russia, and global economic outlook have partly contributed to recent commodity price rise, affecting household welfare negatively across the globe. Indonesia has been affected by these domestic and international factors, and experienced a major food price inflation since 2019. What is the welfare impact of the commodity price rise is an important question to explore to develop policy measures to support needy households. In this paper, we examine the welfare loss, as measured by compensating variation, on households in South Sulawesi, Indonesia and its five market clusters – Bone, Bulukumba, Makassar, Palopo, and Parepare. We specifically focus on recent (2021-2022) commodity price rise and its welfare impacts based on the consumption of 10 key commodities – rice, beef, chicken egg, chicken meat, red onion, white onion, red chilli, cayenne pepper, cooking oil and sugar. We utilise the commodity price data reported by Bank Indonesia and consumption data derived from March series of National Socio-economic Surveys (SUSENAS) for the years 2019 to 2022, and estimated the Quadratic Almost Ideal Demand System (QAIDS) models to examine expenditure shares, expenditure elasticities and price elasticities. We then computed the welfare loss (compensating variation) at the household level at the provincial and market cluster levels. Our results indicate that estimated expenditure share of households is highest for rice (57.3%) and lowest for beef (0.6%). Beef (5.002), chicken meat (3.118) and red chilli (1.462) are found to be expenditure elastic (i.e. elasticity > 1), whereas rice (0.861) and sugar (0.495) are expenditure inelastic. Based on compensated own price elasticity estimates, beef (-1.41), chicken meat (-1.58), red chilli (-1.8), and sugar (-1.71) have elastic demand, but rice (-0.31) and cooking oil (-0.69) have inelastic demand. Further, we find that the impact of commodity price rise on household welfare differ by demographic characteristics of the households – area (urban/rural), welfare card holder (no/yes), and family size (<= 4 persons or >=5 persons). The average welfare loss in 2022 to support households to remain at pre-COVID 19 level of consumption utility is about Rp 18,939/week (A$ 1.76/week). At the regional market cluster level, the largest welfare loss is in Palopo (Rp 30,363/week), followed by Parepare (Rs 23,776/week), Makassar (Rp 24,817), Bone (Rp 21,617), and the lowest loss is in Bulukumba (Rp 11,705/week). The policy implication of these results is that commodity price rise affects the net consumer households differently due to different level of food price inflation in the regions. Indonesian and provincial government in South Sulawesi need to support affected households through food aid or food price subsidy policy that corresponds to their welfare loss.

Parallel 2D. Contributed Paper Session - Agricultural Technology and Innovation 1

14:20 - 15:20 Wednesday, 7th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre Masood Azeem

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180 Climate Variability and the adoption of Climate-Smart Agricultural practices in Ethiopia: Insights from a Temporal and Geospatial Analysis

Tadiwos Zewdie TIRUNEH, Alexandra Peralta, Adam Loch, Alec Zuo

University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

4. Agricultural Technology and Innovation

8. Climate Change

26. Practice Change and Adoption

Paper/Poster Abstract:

Climate-related challenges are increasingly affecting the agricultural sector, with farmers in developing countries being the most affected. This underscores the importance of adopting Climate-Smart Agriculture (CSA) to ensure the sustainable productivity and resilience of farmers.

This study explored the adoption patterns of various CSA practices, tracing their temporal shifts and geographical distribution, while examining their interaction with climate variabilities. Using a panel household survey dataset from rural Ethiopia (2011/12, 2013/14, 2015/16, and 2018/19), and combining with village-level historical climate data - including precipitation, wet-day frequency, and temperature - our method mixes both descriptive and geospatial analysis. We explored a range of climate-smart practices that potentially serve the purposes of productivity, resilience, and mitigation. These encompass crop-yield improving, agronomic and soil conservation measures, as well as livestock management practices.

We find the adoption patterns of majority of CSA practices present diverse trajectories. Notably, there has been an uptrend in the use of improved crop seeds and inorganic fertilizers, while agronomic and soil conservation measures show fluctuating patterns. Livestock related practices, though rising, maintain low adoption rates. A closer look at regions reveals noticeable disparities in CSA uptake, which reveals diverse behaviours among farmers by location. The intensity of adoption, indicated by the CSA portfolio index, presents a rising pattern between 2011/12 and 2015/16, with a slight decline by 2018/19, with varied pattern by regions, signifies the challenges associated with simultaneously adopting a wide range of CSA practices. Results of geospatial analyses highlight the existence of resilience in farming, especially in the central to northern part of the country, amidst climate variability. However, its limited geographic spread underscores a broader gap. These are compounded by our findings of presence of diverse climatic challenges by locations. Therefore, adaptive solutions should be tailored to address specific challenges posed by different climate variabilities, promoting sustainable and resilient crop and livestock production across the diverse regions of the country. Consequently, policymakers should give precedence to region-specific CSA adoption and intensification strategies over broad-based approaches.

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273 Do behavioural traits explain temporal variation in CASI adoption? A study in EGP of India

Kalyan Kanti Das[1], Arunava Ghosh[1], Maria Fay Rola-Rubzen[2], Achyoung Lepcha[3], Tapamay Dhar[1], Apurba Kumar Chowdhury[1], Roy Murray-Prior[4]

[1]Uttar Banga Krishi Viswavidyalaya, Cooch Behar, India. [2]University of Western Australia, Perth, Australia. [3]Seacom Skill University, Sriniketan, India. [4]Agribiz RD&E, Yungaburra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Possible reasons for the slow pace in the adoption and adaptation of Conservation Agriculture-based Sustainable Intensification (CASI) technologies were investigated with the implementation of an Australian Centre for International Agricultural Research (ACIAR)-funded and University of Western Australia-led research project, 'Understanding Farm-Household Management Decision making for Increased Productivity in the Eastern Gangetic Plains (EGP)". One of the primary aims of this project was to incorporate behavioural insights to reflect better the context of smallholders on the out-scaling of CASI. In the process, the primary question that plagued the researchers was 'how consistent the farming folk of EGP are in their adoption behavior?' 'Are the effects of the application of behavioural economics durable?' 'Is adoption of CASI still increasing or maintained after the initial application of behaviourally-informed strategies?' With these fundamental questions in the backdrop, an attempt was made to understand the 'temporal' variation of CASI adoption between two differential points of time – during the initial and final phase of the project implementation, keeping the set of respondents unchanged. A total of 602 functional heads of farm families from 30 different locations in the northern part of West Bengal, an Indian state in EGP, were interviewed during 2019-2020 & 2021-2022. We observed a net increment of 34.33% & 25.84% in the number of CASI adopters and acreage during these two points of time, respectively. This is accompanied by a significant rise in % allocation (towards CASI) of net cultivable acreage. In the meantime, swapping of adopters and non-adopters between two time periods gives rise to four distinct categories viz., adopters becoming non-adopters, non-adopters remaining unchanged, adopters remaining unchanged, and non-adopters becoming adopters. We find a significant difference between categories regarding non-behavioral traits like gender, education, knowledge about CASI, net cultivable area, and behavioral traits like perceived self-efficacy, collective efficacy, social support, etc. Using multinomial logit model analysis, we found that knowledge about CASI, perception of social support & self-efficacy are likely to push adoption favourably & significantly. Therefore, having a supportive 'social system' environment is thought to be helpful in the noteworthy growth of CASI adoption.

Key Words : CASI Adoption, Temporal Variation, Behavioural Traits, Multinomial Logit Model.

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86 Ripping barriers to crop root exploration in sands generates substantive cost-benefit in South-Eastern Australia

Muhammad Masood Azeem, Therese McBeath, Rick Llewellyn

CSIRO, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

Deep ripping involves loosening the soil at greater depths than traditional cultivation practices, potentially increasing yields on compacted soils. With advances in technology and crop production systems, deep ripping has become an increasingly common practice on constrained sandy soils of South-Eastern Australia. However, deep ripping requires substantial investment and responsiveness can be highly variable across sites, season, and timescale. Quantitative evidence on the economic viability and expected return on investment at different ripping depths has been lacking. This study addresses this knowledge gap by analysing returns from deep ripping using data from 162 treatment x site years from on-farm sandy soil experiments conducted between 2014 and 2021 in the Southern cropping region of Australia (250-400mm annual rainfall). Cost benefit analysis and Monte Carlo simulations are employed to provide probabilistic outcomes, considering a range of scenarios and uncertainties related to costs and benefits. Our results show that in 73% of cases there was a positive net present value (NPV) and benefit cost ratios (BCR). NPV range across all sites and treatments varies from -$406 ha^{-1} to $1218 ha^{-1}. We find that ripping within the depth range of 40-50 cm, which targets the most constrained part of the soil profile yields higher profits as opposed to ripping at either 30cm or 60cm. A ripping depth of 40 and 50 cm has a 95% chance of achieving an NPV above $100 and $150 per hectare within 4 years, respectively. Nevertheless, deep ripping constitutes a laborious and expensive undertaking. To maximize the economic benefits of ripping, it is crucial to consider the factors that impact return on investment at the whole-farm business level. Our comprehensive whole farm case studies, conducted at six major trial locations, provide valuable insights. These studies indicate that the assumption that each farm will have soil-specific variations (eg. zones) in the crop response to ripping will play a significant role in determining the cost-benefit and the eventual payback from the ripping project. Moreover, other whole-farm factors including labour available for the ripping operation, costs associated with different models of machinery ownership and operation, systems trade-offs from the investment in amelioration (eg. timeliness of other operations) will be a major determinant of the return on investment.

Parallel 2E. Contributed Paper Session - One Health

14:20 - 15:20 Wednesday, 7th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre
Tiho Ancev

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298 The economics of antimicrobial resistance: what do we know?

dominic moran

Edinburgh, Edinburgh, United Kingdom

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

17. Food, Health and Nutrition

Paper/Poster Abstract:

There is a need to develop an evaluation framework to identify intervention priorities to reduce antimicrobial use (AMU) across clinical, agricultural and environmental settings. Antimicrobial resistance (AMR) can be conceptualised and therefore potentially managed in the same way as an environmental pollution problem. That is, over-use of antimicrobial medicines as inputs to human and animal health leads to unintended leakage of resistance genes that further combine with natural or intrinsic resistance in the environment. The diffuse nature of this leakage means that the private use decision is typically neither cognisant, nor made responsible for the wider social cost, which is the depletion of wider antibiotic effectiveness, a common pool resource or public good. To address this market failure, some authors have suggested a potential to learn from similar management challenges encountered in the sphere of global climate change, specifically, capping use of medically important drugs analogous to limits set on greenhouse gas emissions. Drawing on experience of the economics of greenhouse gas mitigation, this paper explores a potential framework to develop AMU budgets based on a systematic comparative appraisal of the technical, economic, behavioural and policy feasibility of AMU reduction interventions across the One Health domains. The suggested framework responds to a call for global efforts to develop multi-dimensional metrics and a transparent focus to motivate research and policy, and ultimately to inform national and global AMR governance.

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252 Breaking Siloes: The Role of Economics in One Health Implementation

Justin McKinley, Angus Campbell, Barbara McPake

Nossal Institute for Global Health, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

6. Biosecurity

22. Livestock Systems

Paper/Poster Abstract:

The world grapples with multifaceted challenges in applied economics, among which the concept of One Health emerges as a critical focal point—defined by the Quadripartite One Health High-Level Expert Panel as "*an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.*" This interconnectedness underscores the urgency for collaboration and innovation across sectors, a challenge that demands cohesive solutions rooted in the principles of economics.

In the domain of economics, the integration of divergent sectors into the comprehensive paradigm of One Health poses a significant challenge. Human, animal, and environmental health often operate within separate specialized areas (each with its corresponding subfields in economics), resulting in a fragmented approach to addressing health-related issues. This study delves into the largely unexplored domain of One Health Economics, emphasizing the advantages of cross-sectoral joint-working, especially in nations characterized by significant resource constraints.

Efficient allocation of limited resources is a primary challenge in addressing health concerns spanning species and ecosystems. Economics offers a solution with its ability to optimize resource allocation and utilization. By adopting a One Health perspective, nations can harness the synergy of physical and human capital across sectors. This

cooperative approach not only enhances overall health outcomes but can also increase economic efficiencies through joint working. This collaboration leverages existing infrastructures and expertise, maximizing their potential impact on animal, human, and environmental health outcomes.

Moreover, the integration of economics and One Health goes beyond resource sharing. Economists, equipped with the ability to analyse intricate systems, predict trends, and propose policy interventions, play a pivotal role in the future of One Health. Incorporating economic principles into the One Health approach facilitates evidence-based decision-making. Economic models assess intervention cost-effectiveness across multiple sectors, evaluate the societal impact of health policies, and serve as a vehicle for communication among stakeholders. Through economic analyses, stakeholders can prioritize interventions, ensuring sustainable improvements in human, animal, and environmental health. Furthermore, economics provides stakeholders with the tools to build business cases and more effectively communicate the importance of One Health interventions to policymakers and donor organizations.

This study presents a compelling argument for the broader integration of economics within the field of One Health. It examines successful case studies where economic principles have been effectively applied in One Health contexts and explores potential avenues for further expansion of economic approaches within the realm of One Health.

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34 Food Safety in Vietnam: A One Health Approach

Tiho Ancev

University of Sydney, Sydney, Australia

Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

17. Food, Health and Nutrition

Paper/Poster Abstract:

Food safety promotes healthy communities. It involves producing, handling, preparing, and storing food in ways that reduce the risks of foodborne illness and poisoning from agrichemicals and microbial toxins. Vietnam faces food safety challenges from agricultural, human health and economic perspectives. Unsafe foods cause human morbidity and mortality and diminish the credibility of agricultural products in domestic and international markets.

In this paper we take a One Health approach to identify food safety risks, practices that generate these risks and their drivers, and develop measures and further proposals to promote improved food safety in SE Asia. We pursue the research questions by: a) conducting a survey of producers of vegetables (N=11) that are commonly consumed across a wide range of the population in Vietnam: green mustard and water spinach; b) conducting a laboratory analysis of vegetable material (N=18) for these two products and testing for contamination with cypermethrin and E. Coli; c) conducting a survey of producers (N= 20), marketers (N= 10) and retailers (N= 30) for Tilapia, a fish species widely grown in aquaculture and widely consumed in Vietnam; and d) conducting a survey of consumers (N=400) of these foods, eliciting responses about incidence of symptoms of food borne ailments, seeking medical attention for those symptoms, time lost off work or school due to the symptoms, and consumers' willingness to pay for improvement of food safety of the foods consumed.

Key findings from the survey of consumers are that about 7% of the sampled households stated that they experienced symptoms that were suspected of food poisoning in the last 3 months. About 55% of these households sought medical attention, overwhelmingly from family and friends, but seeking medical treatment from pharmacy and hospital also accounted for about 17% of the total sample. Some 69% who had food borne illnesses in the last three months took some medicines to reduce their symptoms. The most common treatment was antibiotics, followed by others and medicines that relive the symptoms. Most people who had food borne illnesses missed work or school for at least 0.5 days and at most 7 days (hospitalised), with an average of 1.5 days/case. Using estimates of cost-of-illness from the literature we arrive at a very conservative estimate of some USD 10 million per year cost of food borne illnesses for Hue City, Vietnam. We also find plausible estimates of consumers' WTP for food safety improvements.

Parallel 2F. Contributed Paper Session - Environmental Economics 2

14:20 - 15:20 Wednesday, 7th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre Bill Malcolm

339 The assessment of economic and environmental impacts of water use efficiency and farm practices through an economic and biophysical integrated model

Francisco Rosas[1], Tiho Ancev[2], Miguel Carriquiry[3], Franco Frabasile[1], Andres Saracho[4]

[1]Universidad ORT Uruguay, Montevideo, Uruguay. [2]University of Sydney, Sydney, Australia. [3]Universidad de la Republica, Montevideo, Uruguay. [4]Universidad de la Republica, Salto, Uruguay

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

31. Water

Paper/Poster Abstract:

Water quantity and quality are important drivers of social and economic development but are affected by actions of economic agents whose objective of welfare optimization often fail to incorporate the social costs or (environmental) externalities generated by their individual actions. Integrated assessment modelling (IAM) seeks to study these

phenomena in an integrated fashion, and therefore, considering the mutual feedback between the environmental and economic outcomes.

In this paper we follow a IAM approach by integrating a hydrological model (SWAT version 2012, Neitsch et al. 2011) calibrated to a particular river basin, with an economic model of farmer's decision under uncertainty. Input variables of the latter are the output variables of the SWAT model and a set of other exogenous variables (prices, policy parameters, etc.) relevant for the problem at hand. We also feed output variables of the economic model into SWAT generating a full model integration. We rely on the concept of certainty equivalent from expected utility theory to assess the economics of our problem because it can simultaneously consider the benefits driven by average profits as well as their variability. We present an application of this modelling approach to the Tala River basin located in Salto, Uruguay, for which the SWAT (2012 version) model parameters were calibrated to the observed production and environmental characteristics.

In this paper we analyze a set of water use efficiency scenarios in irrigated crops, arising from reducing water losses in the conveyance channels. This is a pressing problem in Uruguayan agriculture and other intensive irrigated areas of the World, because when water distribution is performed by channels, losses from the water source to the irrigation fields, tend to be significant depending on the type and frequency of maintenance of the channels. Investing in water use efficiency seek to tackle one of the main challenges of irrigated agriculture which involves reducing the likelihood of water shortages in dry periods. We set up scenarios of efficiency in water conveyance ranging between 65% and 95% and evaluate their effects in farmers profits and water quantity and quality at the basin outlet. These levels of efficiency are driven by the frequency of channel maintenance, which increase costs, but also, increase water availability allowing to increase the expected irrigated area. Furthermore, on the environmental side, there is an impact in water flows that directly affects quality attributes such as nutrient concentration levels (nitrogen and phosphorous).

The IAM approach allows us to analyze the mentioned effects simultaneously within the same model framework. Our results show that the optimal level of efficiency (measured by the certainty equivalent) is 80% or maintaining channels every three years. Higher frequencies (and efficiencies) imply lower benefits because maintenance costs rapidly increase compensating the increase in revenues. Furthermore, these benefits are achieved with an improvement in water quality and quantity attributes.

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50 Overcoming habit formation in the production of wine

Kristina Mozgovaia

CERGE-EI, Prague, Czech Republic. Charles University, Prague, Czech Republic

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

32. Wine and Horticultural Systems

Paper/Poster Abstract:

Evidence indicates that climate change negatively affects to agricultural sector and wine production, in particular. To prevent the negative consequences of climate change, one example of an adaptation policy is the implementation of grapevine genetics (Duchene, 2016), while organic farming may be used as an approach to mitigate the consequences of climate change (Vinci et al., 2022). To this end, the European Commission's objective is to reach the European Green Deal target of at least 25% of the European Union's agricultural land under organic farming by

2030. As wine production is accompanied by polluting factors of production, including pesticides (Pazzirota et al., 2013), the European Commission also aims to reduce pesticide use that exacerbates climate change.

The shift from conventional to organic wine production leads to the creation of new products, particularly wines with different organoleptic properties (Pedroza and Herrell, 2022). Although new products could potentially be more appealing to consumers, the presence of habits in wine consumption has already been confirmed (Castellini and Samoggia, 2018; Rahmani et al., 2019) and dominates over the propensity for a variety of products. Habitual consumer behavior may inhibit the producers' motivation to switch to less toxic production techniques, including organic farming. In this study, I address the question of why the wine sector needs a policy aimed at pesticide use and explain the potential problems of switching from conventional to organic techniques for managing pests. Motivated by the necessity for environmental sustainability in wine production, I identify new theoretical mechanisms that may prevent producers from switching to production techniques with low chemical inputs.

In addition to common assumptions about the constraints of the supply side of the wine market, I add considerations about the demand side in my model. The feature of the demand side is the presence of habits in consumers' preferences that may result in low demand for new products and low profitability in the production of new wines. Under habit, I assume addiction or consumption of past purchased wines. I find that a pesticide taxation policy may force producers to switch to production with low chemical inputs and, therefore, contribute to overcoming the consumers' habits. My results suggest that by taking into consideration the presence of habit among wine consumers, the effect of implementing a pesticide taxation policy in wine production is stronger compared to the case if consumer preferences are considered without habits. In view of existing debates on environmentally friendly methods in wine production, these results may be useful in developing policy recommendations in the wine sector.

To my knowledge, this study is the first theoretical work in wine research that combines the impact of habit and production with pesticide use in one model with a view to mitigating climate change issues. The model contributes to the agricultural sector in different ways. First, I provide a solid explanation for the efficiency of the pesticide taxation policy. Second, the model can be calibrated both on data from the wine sector and other agricultural products as well.

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22 Neutralizing Nitrogen’s Negatives: What to do about negative externalities from nitrogen used in farming cotton, vegetables and sugar cane?

Chinthani Rathnayake, Bill Malcolm, Garry Griffith, Alex Sinnett, Paul Deane

The University of Melbourne, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

If production activities involve the potential of causing negative externalities, society will bear costs either as a result of the negative externality, or as the true cost of producing goods and services, or less of them, without producing the negative externality.

In market economies, at times markets deliver too much of a bad thing or not enough of a good thing, and people's well-being is reduced below what it could be if markets had worked better. When markets fail to deliver goods, governments are bound to intervene on behalf of the people to fix problems arising from the failure.

Implicit in public policies to ameliorate negative effects caused market failure is that (i) users of the nations resources have a duty of care that comes with the right to operate a business using people's resources; (ii) benefits of correcting the market failure (costs avoided) and reducing the pollution are expected to exceed costs to society of the pollution plus costs of implementing the solution; and (iii) the producer is causing pollution because they are meeting demands of consumers, so producers and consumers are expected to bear their shares of costs they are imposing on peoples well-being.

The suite of solutions to negative externalities commonly advocated and used includes regulation; a tax on pollution; tradeable permits to pollute; paying subsidies to polluters to encourage and enable them to do less of a bad thing and more of a good thing. The economic objective of policy implemented to reduce negative externalities is for there to be a marginal net benefit from the reduction in the negative externality (increase in producer and consumer surplus) and for this state is to be achieved at least cost.

Pollution from nitrogen used in agriculture causes negative externalities from nitrous oxide (N_2O) which contributes to global greenhouse gases, and nitrate and ammonium polluting water and air. The focus in this paper is on one of the forms of pollution from using nitrogen to grow agricultural products. The focus is on N_2O pollution from nitrogen used in growing cotton and vegetables in Australia, and N_2O emissions and water pollution from nitrogen used to grow sugar cane in North Queensland. The methods of estimating possible marginal changes in economic surplus from costs of these negative externalities is outlined and results reported. The main public policy options to reduce these negative externalities are canvassed and their 'fit' considered.

Parallel 2G. Contributed Paper Session - Policy Analysis

14:20 - 15:20 Wednesday, 7th February, 2024
Location Room 6, (Level 5) Marie Reay Teaching Centre
Dominic Smith

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116 Pathway of Smallholder Farmers Towards Carbon-neutral Agriculture in Indonesia

IQBAL SALEH SITOMPUL, RISTI PERMANI

University of Queensland, Gatton, Australia

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

26. Practice Change and Adoption

Paper/Poster Abstract:

Greenhouse gas (GHG) emissions have become a global threat to the agri-food system with a projected amount of 37.49 billion metric tons in 2022 and are expected to reach 52.4 billion metric tons in 2030. In addition to being severely affected by climate change, the agricultural sector is also the second largest contributor to global GHG emissions, accounting for 18.4%. This concern has increased interest among policymakers, researchers, and the private sector, among others, in delivering public policies, research and development, and investing in carbon-neutral agriculture, respectively. Despite vast and expanding literature on climate change and GHG mitigation and reduction, our understanding of how to improve the capacity of smallholder farmers to contribute to carbon-neutral agriculture remains lacking. While there is a growing number of studies looking at pathways to carbon-neutral agriculture, many of these studies only focus on national data, policies, strategies, and GHG emission calculations without defining specific actions feasible for smallholder farmers. Therefore, this study aims to develop a framework for smallholder farmers' pathway to carbon-neutral agriculture. First, the study reviews the definitions, key components, best practices, and indicators of achieving carbon-neutral agriculture based on international literature. Then, it identifies different policy measures to achieve carbon-neutral agriculture within a smallholder farming context. Finally, a modified conceptualisation framework for facilitating smallholder farmers' shifts towards carbon-neutral agriculture is introduced. This study delves into international literature and programs while focusing on the Indonesian context with the likely applicability of lessons to other developing countries. Carbon-neutral agriculture topics are of policy importance given that the Indonesian Ministry of Agriculture supported by the World Bank recently completed "The Grand Design of Low Carbon Sustainable Development in Agriculture" with three agricultural 'sectors' identified as priority areas, namely agriculture on peat land, the rice field, and the livestock sector. The study highlights diverse on-farm and postharvest practices, stakeholders, policy interventions to promote carbon-neutral agriculture, as well as potential impacts and outcomes of carbon-neutral agriculture from a sustainability lens.

Keywords: Carbon-neutral agriculture, smallholder farmers

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271 Public Policy Dialogue To Transform The Agriculture Development In Indonesia

Jarot Indarto[1], Teddy Kristedi[2], Wahida Maghraby[3]

[1]Director of Food and Agriculture at Ministry of National Development Planning Indonesia, Jakarta, Indonesia. [2]Head of Policy Engagement, PRISMA, a partnership between the Government of Indonesia (Bappenas) and the Government of Australia (Department of Foreign Affairs and Trade) ., Surabaya, Indonesia. [3]Policy Analyst - Indonesian Center for Agricultural Socioeconomic and Policy Studies, Ministry of Agriculture, Bogor, Indonesia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

25. Policy Analysis

Paper/Poster Abstract:

1. INTRODUCTION

Poverty, climate change and food security are inextricably linked (World Bank, 2022). The rise of food commodity prices in 2021 was a significant factor in pushing approximately 30 million people in low-income countries toward food insecurity. At the same time, the global food system is responsible for about a third of greenhouse gas emissions and is the number one source of biodiversity loss.

The threat of food insecurity is also being highly considered by the government. Almost 43 per cent of Indonesia's population live in rural areas, close to 29 per cent work in the agricultural sector, and 50 per cent of the farmers are smallholders, earning an average of US$3.2 per day (BPS,2023). With climate-related shocks on the rise and El Niño around the corner, helping to improve the productivity and resilience of farmers has become a more important challenge to answer.

2. THE AGRI-POLICY LANDSCAPE

The Ministry of National Development Planning (Bappenas) has set Climate change, poverty and food security as a focus of the National development transformation plan to improve the modernisation and resilience of the agriculture sector in Indonesia for the next five years. It also aligned with the country's commitment toward Sustainable Development Goal (SDG) one, ending poverty; SDG two, ending hunger; and SDG thirteen, climate action.

PRISMA facilitated a series of public-private policy dialogues to support Bappenas to support Bappenas with evidence to support the policy. The policy discussions build on examples of what has proved to be effective, integrating the inputs from farmers, farmers associations, the private sector, academics, government officials and think tanks across the food supply chain.

3. THE METHOD AND DISCUSSION

There are two multistakeholder consultative FGDs at regional levels, followed by a national-level workshop. The FGDs series examined the ecosystem of agriculture modernisation, the barriers, solutions, and the three pillars of planning, namely regulations, institutions, and financing and investment.

Two multistakeholder consultative Focus Group Discussions (FGD)s were conducted at regional levels to capture voices from Indonesia's eastern and western regions. The regional workshops were built upon preliminary study, leveraging PRISMA knowledge gained from close collaboration with agribusiness entities, the public sector and farmers across Indonesia, mainly in the arena of food crops, agri-finance, mechanization, irrigation and brokering research to commercials.

The findings and recommendations from the regional workshops are discussed and summarised at a national-level plenary workshop to confirm and crystallise the key takeaway from the regional workshop to the national-level stakeholders, which were presented to several international organizations as well as the Ministry of Agriculture and the National Research and Innovation Agency (BRIN).

4. CONCLUSION

The multistakeholder consultation workshops serve as a vehicle to develop a comprehensive background study on agriculture modernisation and resilience in Indonesia, contributing to Bappenas' planning process for the Nation. The core of the workshops was a facilitated FGD process to foster interactive and intensive discussions drawing on regional and national level voices.

63 Calculation of livestock biomass and value by province in Indonesia: Key information to support policymaking

Dominic Smith[1], Nyak Ilham[2], Riyandini Putri[3], Widagdo Sri Nugroho[4], Tarni Cooper[1], Harimurti Nuradji[3], Indi Dharmayanti[3], Di Mayberry[5]

[1]Griffith Asia Institute, Griffith University, Brisbane, Australia. [2]Research Centre for Behavioural and Circular Economics, Research Organization for Governance, Economy and Community Welfare, National Research and Innovation Agency, Jakarta, Indonesia. [3]Research Centre for Veterinary Science, Research Organization for Health, National Research and Innovation Agency, Bogor, Indonesia. [4]Faculty of Veterinary Medicine, University of Gadjah Mada, Yogyakarta, Indonesia. [5]CSIRO Agriculture and Food, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

22. Livestock Systems

25. Policy Analysis

Paper/Poster Abstract:

Accurate estimations of the biomass and value of livestock in Indonesia are of great use in supporting investment decisions by the public and private sector and as a basis for estimating the losses due to animal disease.

Biomass and livestock value for key livestock species (cattle, buffalo, sheep, goats, pigs, chickens) for all provinces of Indonesia were derived from secondary data using a novel spreadsheet-based model. Using beef cattle as an example, we also explored the use of a herd dynamics model to validate data on populations and productivity, and these were found to be robust.

Total livestock value is estimated to be almost USD54 billion in 2021, comprising almost USD33 billion of population value and almost USD21 billion of production value. Beef cattle account for 44 % of total value and chicken (broiler, layer and native chickens) account for a further 36 % of the total.

Breaking the data down by province reveals the regional importance of some livestock types that are of relatively minor importance nationally (pigs in NTT and sheep in West Java). It also reveals the importance of livestock in the poorest provinces of Indonesia, where livestock acts as a store of wealth and serves socio-cultural purposes.

Afternoon Tea

15:20 - 15:50 Wednesday, 7th February, 2024

Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Parallel 3A. Special Session - "Resilience in Agri-Food Systems"

15:50 - 17:30 Wednesday, 7th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
David Ubilava

This session adopts an interdisciplinary approach to empirically examining several key questions organized around the general theme of agri-food system resilience. From the COVID-19 pandemic to climate change, armed conflict and global labour shortages, food production systems worldwide face an unprecedented set of disruptions. How and why some systems seem to remain resilient to these disruptions while others do not present both a conundrum and a learning opportunity for agricultural economics.

In our session, we will break from the classic format to consider “lightning presentations” on examples of system resilience, or the lack thereof:

- David Ubilava, University of Sydney, Sydney, Australia

- Timothy Richards, Arizona State University, Phoenix, USA

- Ariel Ortiz-Bobea, Cornell University, Ithaca, USA

- Alexandra Hill, UC Berkeley, Berkeley, USA

- Sarah Smith, UC Davis, Davis, USA

- Aleks Schaefer, Oklahoma State University, Stillwater, USA

Richards and Ubilava develop a new price-based measure of resilience and examine how firm-level flexibility affects retail food system resilience following a beef packing plant fire that removed 6% of the US supply of beef from the market for a 4-month period in 2019. They find that retailer inventories were a key driver of resilience and that retailer margins were able to serve as effective “shock absorbers” in preventing supply chain disruption from impacting consumer welfare.

Ortiz-Bobea explores the agricultural R&D needs for US agriculture under climate change. Previous work has shown that anthropogenic climate change has and will continue to slow agricultural productivity growth. This work sheds light on the research funding needed to compensate for the potential slowdown arising from a changing climate.

Hill explores how recent US legislation that extends overtime standards to agricultural workers, who were previously exempt, shows negative effects on individual worker hours and earnings.

Smith examines the effects of weather and climate change on postharvest quality losses using data on 1.3 million truckloads of processing tomatoes in California.

Schaefer examines how increased concentration in the meatpacking industry has led to higher meat prices, increased industry productivity, and lower wages for meatpacking workers.

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113 Resilience in Agri-Food Systems

David Ubilava[1], Timothy Richards[2], Ariel Ortiz-Bobea[3], Alexandra Hill[4], Sarah Smith[5], Aleks Schaefer[6]

[1]University of Sydney, Sydney, Australia. [2]Arizona State University, Phoenix, USA. [3]Cornell University, Ithaca, USA. [4]UC Berkeley, Berkeley, USA. [5]UC Davis, Davis, USA. [6]Oklahoma State University, Stillwater, USA

Presentation Type:

2. Special Session

Keywords:

1. Agribusiness

3. Agricultural Production

Parallel 3B. Special Session - "Financing ecological restoration across intensive use landscapes"

15:50 - 17:30 Wednesday, 7th February, 2024
Location Cinema, Kambri Cultural Centre
Helena Clayton

This special session is focused on exploring the challenges and opportunities of financing landscape-scale ecological restoration across intensive-use landscapes. Agricultural and resource economists have played a leading role in understanding the policy, institutional and human dimensions of these challenges and opportunities.

The objective of this session is to facilitate the exchange of ideas that bring together insights from applied economics with various interdisciplinary perspectives in exploring the grand challenge of addressing ongoing biodiversity decline across Australia's intensive-use landscapes. The session will showcase the latest research from the Australian National University's Sustainable Farms cross-college

initiative, in collaboration with our partners from Regen Farmers Mutual. Presentations will provide insights from ecology, economics, finance, sociology and law.

The critically endangered box-gum grassy woodland ecological community will be used as real-world case study for this session. The case study landscape will help in exploring the nature of the challenges for financing ecological restoration across some of Australia's most productive agricultural environments.

Participants in this session will gain greater understanding of the challenges involved in landscape restoration and the information required to align finance with restoration priorities. We will explore topics such as the potential for private benefits from on-farm conservation, consumer preferences and price premiums, the role of farmer cooperatives in harnessing green finance, and the challenges for government policy and programs to support and finance landscape-scale ecological restoration outcomes.

Small groups of presenters will give concise presentations on various topics across the overarching session theme. This will be followed by an extended Q&A panel discussion. Presenters for this session include:

- David Lindenmayer, Michelle Young, Tamara Harris, and Helena Clayton from the Fenner School of Environment and Society, ANU

- Andrew MacIntosh from Law, ANU

- Rebecca Pearce from Sociology, ANU

- Katarina Kormusheva from the College of Business and Economics, ANU

- Rohan Clarke and Andrew Ward from Regen Farmers Mutual

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188 Financing ecological restoration across intensive use landscapes

David Lindenmayer[1], Andrew MacIntosh[2], Rebecca Pearce[3], Katarina Kormusheva[4], Michelle Young[1], Tamara Harris[1], Helena Clayton[1], Rohan Clarke[5], Ryan Wilson[6]

[1]Fenner School of Environment and Society, Australian National University, Canberra, Australia. [2]Law, Australian National University, Canberra, Australia. [3]Sociology, Australian National University, Canberra, Australia. [4]College of Business and Economics, Australian National University, Canberra, Australia. [5]Regen Farmers Mutual, Melbourne, Australia. [6]Department of Climate Change, Energy, the Environment and Water, Canberra, Australia

Presentation Type:

2. Special Session

Keywords:

5. Biodiversity

7. Carbon and Nature Markets

Parallel 3C. Contributed Paper Session - Energy and Utilities 2

15:50 - 17:30 Wednesday, 7th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre Jack Pezzey

214 Adaptive capacity to climate change: Does energy aid matter?

Rabindra Nepal[1], Yang Liu[2], Kangyin Dong[3]

[1]University of Wollongong, Wollongong, Australia. [2]University of International Business and Economics, Beijing, China. [3]School of International Trade and Economics, Beijing, China

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

11. Ecological Economics

14. Environmental Economics

Paper/Poster Abstract:

The 27th Conference of the Parties (COP27) called for greater funding to meet the rising need for adaptation financing to help vulnerable groups cope with climate change. This gap can be partially filled by energy aid to developing nations. This research seeks to investigate the impact of energy aid on recipient countries' adaptive capacity to climate change. For this purpose, we empirically examine the effects of energy aid on adaptive capacity and explore potential heterogeneity and impact mechanisms using a balanced panel dataset of 64 countries from 2002 to 2020. Our findings are as follows: (1) Globally, the regions with the most severe lack of adaptive capacity are mainly located in sub-Saharan Africa, South Asia, Central Asia, and western South America. (2) Energy aid exerts a positive and substantial influence on the adaptive capacity, particularly attributed to non-renewable energy aid (NAID), energy policy aid (PAID), and energy distribution aid (DAID). (3) Energy aid can serve as a substantial contributor to the adaptive capacity of lower middle-income (LMI) countries, upper middle-income countries (UMI), and high-income (HI) countries, except for low-income (LI) countries. (4) Energy aid can indirectly enhance the adaptive capacity by boosting innovation capacity. Moreover, the positive effect is stronger in countries with higher government quality. Finally, we propose specific policy implications to improve the efficiency of energy aid and enhance adaptive capacity.

332 Do stepwise subsidies distort technical change? Evidence from Driving Range-Based Subsidies for Electric Vehicle in China

Tong Zhang[1], Paul Burke[2], Hua Liao[1]

[1]Beijing Institute of Technology, Beijing, China. [2]Australian National University, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

12. Econometric Modelling

13. Energy and Utilities

25. Policy Analysis

Paper/Poster Abstract:

Government incentive policies may cause its own distortions or loopholes that are not ideal in first-best settings. We study one such distortion, using evidence from stepwise electric driving range-based purchase subsidy program for electric vehicles (EVs) in China. Using variation from the program's eligibility cutoffs and the rollout of the subsidy, we quantify the unintended effect of such program on technical change in EV market, based on model-level data on new EV launches from 2016 to 2022. We use bunching analysis to show that automakers increase vehicle range in response to subsidy and excess bunching can be observed at subsidy cutoffs. However, the increase vehicle range is gained by sacrificing other EV attributes. Specifically, the maximum speed, motor power, and tyre width of EVs at the subsidy notches reduced to increase driving range to be eligible for higher subsidy rates using a difference-in-difference strategy. The results suggest that the audit on attributes of EVs should be strengthened for the subsidy eligibility.

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319 Preferences and perspectives for the future of the energy transition

Lavinia Poruschi[1], Rod McCrea[1], Mitchell Scovell[1], Sharon Rosenrauch[2], Josh Reynolds[2], Andrea Walton[1], John Gardner[1]

[1]CSIRO, Brisbane, Australia. [2]DCCEEW, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

9. Consumer Choice

13. Energy and Utilities

Paper/Poster Abstract:

Australia is in the midst of an energy transition aimed at increasing renewable energy integration and reducing carbon emissions. This transformation involves significant changes to energy infrastructure, including generation, storage, and distribution processes, as well as economic adjustments. These changes offer both challenges and opportunities, encompassing the development of new transmission lines, solar arrays, onshore and offshore wind farms, and improved energy storage capabilities. This energy transition is often framed as a complex trilemma, where the goals of ensuring a reliable energy supply, promoting environmental sustainability, and maintaining affordability for customers need to be balanced.

There is also a growing societal expectation that this transition will benefit communities near energy infrastructure and society as a whole. Our research explores people's preferences for future energy transition scenarios and whether perceived local or broader societal benefits influence these preferences, in addition to factors like affordability, sustainability, and reliability. In essence, we investigate the possibility of a fourth dimension, a quadrilemma, where economic benefits, such as job creation, become a crucial aspect of the energy transition.

Our study draws upon data collected in a 2023 survey of 6,707 Australians regarding their attitudes toward the energy transition and their preferences for the future. This presentation will explore what are the main drivers of slower or faster energy transition preferences Additionally, we consider the impact of related variables, such as climate change beliefs, perceptions of environmental risks, the effectiveness of emissions mitigation, financial circumstances, and knowledge about relevant infrastructure and technologies.

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253 A case for taxing as well as subsidising renewable energy: can Australia learn lessons from Pigou, Tinbergen and Romer?

Jack Pezzey

Australian National University, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

13. Energy and Utilities

Paper/Poster Abstract:

An inconvenient truth, stemming from inescapable thermodynamic constraints, is that all energy production, transmission and use does environmental damage. Renewable energy is no exception: it creates local damage, as well as global benefit by being carbon-free when generated. Giant windfarms and pumped storage schemes damage hilly sites of high conservation and/or amenity value. Long-distance transmission lines cause disruption, unsightliness and fire risk. Mining low-grade ores for the critical minerals needed for batteries, etc, cause much local damage.

This paper analyses the political economy of how to avoid excessive damage from the rapid expansion of renewable energy needed to decarbonise the Australian economy. In principle the efficient solution is to charge appropriate environmental prices on all forms of energy damage, both local and global (the lesson of Pigou: internalise

externalities), so that renewable energy would be both generally encouraged by not paying a carbon price, yet locally discouraged where appropriate to avoid excessive local damage. And in principle the equitable way to alleviate the impacts of higher energy prices on poor people is to make suitable transfer payments (the lesson of Tinbergen: don't use a single policy to address both environmental and equity concerns).

But Australia's lack of a carbon price means the carbon-free advantage of renewable energy has not been internalised, and the support needed to advance renewable energy has been distorted. Examples are subsidies for renewable energy installation, and for renewable energy R&D instead of all R&D (the lesson of Romer: internalise general knowledge externalities, but don't pick winners); a growing technological determinism, like views that damaging transmission lines and windfarms must be built, whatever the local opposition, and certainly should not be taxed; or that governments should play an important role in the selection and location of new, low-carbon industries like green steel or green hydrogen, rather than leaving this to market forces (like proximity to ports, or the wages needed to attract workers to hot, remote deserts) as modified by carbon pricing. In addition, Australia's drift to a less progressive tax system has undermined its ability to make politically effective transfers. Overall energy prices are then too low, encouraging the large majority of customers who have no problem affording energy to use too much, and discouraging the higher energy efficiency which should be an inherent part of the economy's decarbonisation.

As well as identifying ideal policy combinations, this paper explores diverse economic and political steps towards them, starting from existing, far-from-ideal realities, with attention to their revenue implications, even though such steps cannot be guaranteed to increase overall welfare (the second-best lesson of Lipsey and Lancaster). Examples include requiring transmission network operators to pay more compensation per kilometre; using increasing block rates in electricity pricing, as a more direct, perhaps politically attractive way of addressing equity concerns; and a compilation of the main facts and arguments that could be used in public debate to move Australia towards the restoration of carbon pricing, and away from the assumption that it is forever politically impossible.

Parallel 3D. Contributed Paper Session - Development Economics 3

15:50 - 17:30 Wednesday, 7th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre
Shyamal Chowdhury

20 Adoption of Climate-smart Technology to Alleviate Poverty in South-western Bangladesh

Sazia Ahmed

University of Waikato, Hamilton, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

26. Practice Change and Adoption

Paper/Poster Abstract:

The paddy production in the south-western coastal part of Bangladesh is highly susceptible to climate change, salinity and natural disasters. Climate-smart agricultural technology (CSAT) safeguards farm income from climate-induced crop loss while lowering emissions. The main objective of the research is to trace out the factors determining the adoption of climate-smart technology and their participation in multidimensional poverty (MPI) alleviation. The study surveyed 1050 farm households from the coastal part of South-western Bangladesh and random sampling procedure has been applied for the accuracy. The study deployed binary logistic, IV Tobit, and Endogenous Switching Regression (ESR) regression analysis to obtain the research objective. The ESR model postulates that the CSAT adoption decision is determined by farm income, paddy yield, access to extension service and digital info. The adopters of the CSAT are more likely to reduce MPI (-0.101, $p<0.01$) than the non-adopters. The counterfactual effect also demonstrates that current non-adopters may minimize MPI if they adopted the CSAT (0.029). Therefore, the e-agricultural and CSAT training, decentralization of CSAT, and e-agriculture as a separate wing can incentivize and encourage adoption to boost agricultural yield and curb rural coastal poverty of South-western Bangladesh.

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196 Agricultural mechanization and non-farm employment of rural women

Wanglin Ma[1], Xiaoshi Zhou[2]

[1]Lincoln University, Christchurch, New Zealand. [2]China Agricultural University, Beijing, China

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

10. Development Economics

Paper/Poster Abstract:

This study analyzes the impacts of adoption and intensity of agricultural mechanization on non-farm employment of rural women using the 2016 China Labor-force Dynamics Survey (CLDS) data. We capture mechanization adoption as a dichotomous decision and adoption intensity using three types of farming strategies: non-mechanized, semi-mechanized, and full-mechanized. Non-farm work is considered as work types (self-employment or wage employment) and work locations (local or migrated non-farm work). Both inverse probability weighting with regression adjustment (IPWRA) estimator and multivalued treatment effects (MVTE) model are utilized to address the selection bias issues. The IPWRA estimates reveal that mechanization adoption increases the rural women's probabilities of participating in non-farm work in general, and wage employment, local and migrated non-farm work in particular. These impacts are larger for unmarried women. The MVTE estimates show that relative to non-mechanized farming, adoption of semi- or full-mechanized farming increases the probabilities of rural women's participation in non-farm work, wage employment, and local and migrated non-farm work, and adopting full-mechanized farming plays a larger role. Relative to semi-mechanized farming, adopting full-mechanized farming does not have a significant impact on any type of non-farm work.

12 Transformation of financial institutions grants from the government to inclusive financial institutions in Indonesia

Rika rachmawati

National Research and Innovation Agency, Jakarta, Indonesia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

2. Agricultural Finance

Paper/Poster Abstract:

Low-income communities have limited capital and access to money or loans from formal financial institutions. To solve the problems, the government provides solutions, one of them is by forming a microfinance program, namely Rural Agribusiness Business Development (PUAP). PUAP program is one of the grant activities to farmer group association (Gapoktan) with a total capital assistance of IDR 100 million. The problem with the 52,186 Gapoktan units that participated in PUAP activities, only 7,703 units (15%) were transformed into Agribusiness Microfinance Institutions (LKMA). This paper differs from others as it briefly explains the PUAP/MFI's institutional transformation and the factors that affect its sustainability, which is so far still limited discussed. The paper aims to see what transformations Gapoktan becomes an inclusive LKMA and the level of sustainability of the LKMA. The research was conducted in Kendal Regency, Central Java- Indonesia, in 2022 on 5 LKMA. The process of transforming LKMA into an inclusive financial institution is analyzed descriptively. LKMA sustainability levels were analyzed using a multidimensional scaling (MDS) approach with the Rapfish application. So far, MDS with the Rapfish application is still very limited for microfinance analysis. MDS analysis is employed because it is relatively simple and effective for looking at sensitive attributes in improving sustainability and generating leverage attributes that can be used for policy-making. The result study shows that the transformation of PUAP into LKMA is driven by the ability to improve legality, financial governance and diversify the customer's business field. The five LKMAs have a sustainability status of 'sufficient' in running their business, with an index value of more than 50%. The study recommends 1) the Indonesian government could assist LKMA in improving its legality and 2) LKMA's management should get training by experts to improve its financial capability to manage the cost saving.

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290 Measuring Women's Empowerment in Agriculture: Insights from the Women's Empowerment as Labour (WEAL) scale

Sophie Lountain

University of South Australia, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

10. Development Economics

Paper/Poster Abstract:

The significance of women's roles in agriculture has grown substantially across many developing regions, although it is unclear whether this has led to improvements in women's welfare. Women's empowerment is increasingly recognised as a "prerequisite" for global food security and contributes significantly to food production. In most developing countries, women produce 60 to 80 per cent of the food, accounting for half of the global food production. However, a substantial portion of their agricultural labour remains informal or unpaid, and a gender gap persists due to entrenched social and cultural norms, leading to the undervaluing and often overlooked status of female farmers.

Many agricultural development initiatives aim to empower women while improving agricultural productivity, income, and health outcomes and reducing poverty, hunger, and undernutrition. However, empowerment's complex and multidimensional nature makes its measurement challenging, and consistent, affordable approaches for enumerating empowerment still need to be developed. There is also a gap between rhetoric about empowerment and the outcomes of interventions, which seems more likely to close when greater attention is given to its consistent measurement.

This paper revolves around a central question: "How can we assess and enhance the measurement of women's empowerment in agricultural research for development?" In this paper, we define the concept of women's empowerment within the agricultural research for development sphere, recognising its critical role in enhancing gender equality. Our exploration begins with examining the rationale behind empowerment, an overview of current methodologies for evaluating women's empowerment in agriculture, and the consideration of whether alternative measures drawn from the economic property rights literature could provide a more efficient and consistent measurement approach. Subsequently, we use primary data to experiment with a simplified metric for women's empowerment and introduce an innovative tool supported by exploratory factor analysis.

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115 Information Campaign on Arsenic Poisoning: Unintended Consequences in Marriage Market

SHYAMAL CHOWDHURY[1], Prachi Singh[2]

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Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

14. Environmental Economics

Paper/Poster Abstract:

Unintended consequences of public policies, while common, are under-studied and often unaccounted for in economic analysis. In this paper we study the unintended consequences of a public information campaign on water quality on the marriage market in rural Bangladesh. Despite being heavily contaminated with arsenic, groundwater

was the main source of drinking water for rural dwellers in Bangladesh since the 1970s. This created a major health emergency in the country as arsenic exposure causes multiple health problems, ranging from skin lessons to various types of cancer. However, until the mid 1990s, the contamination remained largely unknown and became public knowledge only later through a nationwide information campaign. We study the impact of the campaign on marriage patterns in rural Bangladesh. Using a difference-in-difference model, we analyse the age at marriage, bride price agreed at the time of marriage and find that both of them decreased in arsenic affected areas compared to areas unaffected by arsenic contamination. The effect on age at marriage is primarily driven by younger cohorts who got married earlier. Additionally, we find an increase in the likelihood of females having their first child at an early age (between 16 to 20 years). These are important social consequences, however, often ignored in most analyses.

Parallel 3E. Contributed Paper Session - Agricultural Technology and Innovation 2

15:50 - 17:30 Wednesday, 7th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre
Di Zeng

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276 Capturing the role of behavioral intention towards farmer adoption decisions of CASI technologies in Eastern Gangetic Plains of India

Kalyan Kanti Das[1], Arunava Ghosh[1], Maria Fay Rola-Rubzen[2], Achyoung Lepcha[3], Tapamay Dhar[1], Apurba Kumar Chowdhury[1], Roy Murray-Prior[4]

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Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

There is increasing evidence that an individual's intention to adopt, dis-adopt or non-adopt an innovation is influenced by personal traits, attitude, subjective norms and self-efficacy. While one's attitude reflects beliefs about an innovation, self-efficacy indicates confidence about one's performance with the innovation, and subjective norms reflect perceptions about other people's attitudes. This research study, with the implementation of an Australian Centre for International Agricultural Research (ACIAR)-funded and University of Western Australia-led research project, 'Understanding Farm-Household Management Decision making for Increased Productivity in the Eastern

Gangetic Plains (EGP)", attempts to understand slow adoption/out scaling of Conservation Agriculture-based Sustainable Intensification (CASI) technologies in Eastern Gangetic Plains of India using the postulation of the Theory of Reasoned Action proposed by social psychologists like Ajzen, Fishbein and others. A total of 409 adopters and 193 non-adopters of CASI distributed over 30 different locations in the northern region of West Bengal, India constitutes the sample of this study and the information about different personal traits were collected through face-to-face interview method during 2019-2020. Farmers' 'agreement' or 'dis-agreement' was captured using a 5-point likert scale response with regards to well-constructed statements under attitude, self efficacy and subjective norms respectively. Mann-Whiney U test showed significant and positive differences in between adopters and non-adopters with respect to these statements (under each major behavioural trait) with a few exceptions. These two categories of farmers also significantly differ with respect to social and demographic features like membership in farmers associations, existing CASI knowledge, participant's gender, training attendance, etc. We further proceed to understand the overall relationship following binary logit model including all the social, demographic, and behavioral explanatory variables. We find highly significant positive effects of perception about self-efficacy (p=0.004) and attitude (p=0.10) towards CASI adoption; so are the effects of CASI knowledge (p=0.00) and farmers' group membership (p=0.02). Marginal analysis indicates about 11% increase in CASI adoption with a unit increase in membership in farmers' organization. Similarly, a unit increase in perception towards self-efficacy or attitude towards CASI has the likelihood to increase adoption by 0.9%. Thus, behavioural 'intention' plays an important role in better CASI adoption in Eastern Gangetic Plains of India. The findings of this study can be used in developing appropriate responses and shaping the policy road map to improve technology adoption in India.

Key Words : CASI, self-efficacy, subjective norms, attitude, policy framing

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326 The Digital Divide and Smallholder Farmers Adoption of Mobile Phone for Agriculture Activities: The Case of Eastern Indonesia

Evita Hanie Pangaribowo[1,2,3], Deden Dinar Iskandar[4], Catur Sugiyanto[5]

[1]Faculty of Geography, Universitas Gadjah Mada, Yogyakarta, Indonesia. [2]Center for Population and Policy Studies, Universitas Gadjah Mada, Yogyakarta, Indonesia. [3]Master and Doctoral Programmes in Leadership and Policy Innovation Graduate School Universitas Gadjah Mada, Yogyakarta, Indonesia. [4]Faculty of Economics and Business, Diponegoro University, Semarang, Indonesia. [5]Faculty of Economics and Business, Universitas Gadjah Mada, Yogyakarta, Indonesia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Advances in information and communication technology (ICT) have facilitated economic development in the world and been mandated in Sustainable Development Goals. In many countries, ICT has been integrated in various public services through e-government and also in social assistance programs where aid recipients can access and receive the program digitally. However, the impact of this technological progress is not evenly distributed. The digital divide to ICT between groups who have access and those who do not or have limited access has made farmers left behind and face more risks. In the agricultural sector, upgrading from subsistence farming to advanced agriculture is considered as a way to improve farmer welfare. With the availability of technology and innovation, farmers enhance their welfare through adopting this technology and innovation. The widespread adoption and dissemination of ICT and agricultural innovation through mobile phone is an important component for agricultural progress and rural

development. ICT also facilitates farmers' access to real-time data for agricultural activities, seed varieties, pest control, disease outbreaks, market prices, and weather information. This is important information for farmers to maintain and diversify their production, make informed decisions about sales activities and negotiate better prices, ultimately contributing to market participation and higher income potential. Having the vast potential of digital economy in agricultural sector, little is known about how adoption of digital technologies for farming activities has taken places in various context.

This study looks at several strategic issues related to efforts to build a digital economy for agriculture in Indonesia: the socio-economic and spatial differences. An inclusive digital economy for agriculture can be achieved if networked internet is available evenly and the digital divide is minimized. At the same time, it should emphasized that nobody is lagging behind in terms of its accessibility and utilization. Smallholder farmers face complex barriers limiting their farming activities and accelerate their agriculture activities to non-subsistence farming. This study also aims to fill the literature and policy gap on the barriers to adopt digital technologies among smallholder farmers in eastern Indonesia, a region which has a lower level of development than the western region of Indonesia. More specifically, individual, community, and institutional factors limit smallholder farmers to adopt digital technologies in their farming activities were examined. Mobile phone utilization in agriculture activities was specifically used as proxy for ICT adoption. This study employed Indonesia Family Life Survey (IFLS)-East data to rigorously explore socio and spatial differences in the use of mobile phone for farming activities as one of the ICT application for agriculture. The preliminary results identified ICT adoption based on a combination of various farmer and community characteristics. The probit regression result further revealed that ICT adoption clearly vary in terms of mobile phone ownership, plot size, gender of household head, and access to market. This study indicated that better access to market was strongly correlated with ICT network. This finding provides insights that ICT adoption for smallholder farmers should be accompanied by efforts that address digital divide and institutional changes through land access.

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67 A paradigm shift for farm management

David Rees

Self employed, Albany W.A. 6330, Australia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Time alone suggests that farm management practices should be reviewed and this is supported by personal experiences from consulting to broad-scale farmers in Western Australia. Current farm management practices in Australia arose from crises of survival of farm businesses from the 1960s. The focus was on cost control that aimed to deliver cashflow profit every year. Farming was important enough to the economy to warrant government support in these crises and with the large number of farms, efficiencies were seen in providing this support through groups.Now, Thomas Kuhn’s concepts of a “paradigm” and “paradigm shift” could help apply necessary updates. Examples of his “anomalies” are recent changes in the farming environment as well as my experiences. The most notable anomaly is the recent acceleration of land values that now provides strong business equity for most farms and should relieve past constraints on finance. This has been driven by a track record of productivity improvement which had not been evident in the past to farm management practitioners. Associated with productivity improvement has been an increase in scale of successful farms, increased availability of data collected on-farm and social and political challenges in farming communities. To align with these trends, a proposed priority of a new farm management paradigm would increase focus on long-term investment, albeit sacrificing cost control and short-term

cashflow. New sources of data collected on-farm is another anomaly with direct relevance to the individual farm and providing long-term information that is not generally available from formal research trials.Such changes will increase difficulties of decision making by adding new complexity, but experiences of farm business success in Western Australia and relatively recent literature suggest that “intuition” may help management and could be tested with potential interventions. Kuhn’s model suggests that a paradigm shift can be a slow process, but motivated case study farmers could directly benefit and farm management consultants and industry researchers would follow.

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168 Modernising ABS Agriculture Statistics

Rob Walter

Australian Bureau of Statistics, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

In 2023, Australian agriculture is adapting to a range of challenges including market access, climate change and bio-security risks. Data and statistics are increasingly important in supporting this adaptation for farmers, industry groups, researchers and government. This is changing the requirements of the Australian agriculture data ecosystem so it can provide:

- More timely and frequent agricultural statistics with greater regional detail to support response and recovery from localised events like natural disasters and bio-security outbreaks.
- Improved accuracy and greater coherence between agricultural data from different sources to improve trust in statistics and effectiveness in informing decisions.
- New insights into the performance of the agricultural sector to inform progress on issues such as sustainability measures, emissions reduction, and labour availability.
- Reductions in regulatory and reporting burden (including survey reporting) for farmers and agricultural businesses.

The Australian Bureau of Statistics (ABS) is an important part of the Australian agriculture data ecosystem and to meet these requirements it is changing the way it produces agriculture statistics.

We have stopped large agricultural surveys, reducing administrative burden from ABS surveys on farmers and agricultural businesses by over 97%.

At the same time, we are developing processes to produce agriculture statistics using new data sources together with smaller surveys to fill data gaps. These new data sources include information from farms, digital agriculture companies, industry groups and governments and is driven by the growing use of technology and data within the agricultural sector.

These new data sources are often faster to access and include more detail than traditional survey data. This can improve the timeliness and regional detail of agricultural statistics which is important to support good decision-making about localised issues such as infrastructure development or natural disaster response.

The modernisation of official agricultural statistics is not something that the ABS is doing in isolation. We are engaging in partnerships between farmers, agribusinesses, industry, academia, and governments to ensure that the existing data is used in the best possible way to produce the statistics that are needed to support Australian agriculture.

A key part of this engagement is the formation of statistical working groups made up of industry experts to co-design methods to produce statistics using new data sources. This collaborative approach helps to build trust in the resulting statistics because they make sense with other data sources used within the industry.

However, the complexity of negotiating data access and developing new methods across a broad range of agricultural commodities means that there will be some gaps in the ABS' agricultural statistics in the short and medium term.

This paper and presentation will explore the context for why and how the ABS is modernising its Agricultural Statistics Program within the broader agricultural statistics and data ecosystem. It will also provide an update on the progress and future steps in transitioning to a modernised set of official agriculture statistics.

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260 How does cooperative membership affect agricultural technology adoption in China? Exploring possible mechanisms

Di Zeng

University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

The effect of cooperative membership on agricultural technology adoption has been intensively investigated across a variety of rural settings in the world, where a positive effect is usually found. However, most existing studies only seek to identify the empirical relationship without exploring the mechanisms mediating the hypothesized relationship. These possible mechanisms remain to be an important knowledge gap, which is necessary in assisting policy decisions in hope of stimulating technology adoption from this perspective.

In this study, we aim to explore the possible pathways as of how such effects occur. We make a fourfold hypothesis that corporate membership can stimulate agricultural technology adoption in three ways, namely through 1) better resource access, 2) better general information access (from cooporative events about agricultural technologies), 3) peer learning (from other cooporative members about a technology), and 4) exemplary self-perception (where members perceive themselves as role models of others, e.g. non-members, and adopt agricultural technologies with social desirability bias). Testing for these mechanisms are meaningful as it may reveal finer scale information as of how the effects are realized.

Using a household survey data from China, these complimentary mechanisms are tested. Baseline regression modelling is implemented, with mediation models and cohort analysis with homogenized subsamples further implemented. It has been found that, overall, coopoerative membership is positively associated with agricultural

technology adoption, which is consistent and robust across alternative specifications and with or without instrumental variable regression techniques. Moreover, regarding the possible mechanisms, it is found that peer learning and exemplary self-perception are significantly associated with technology adoption, while better resource or general information access do not play a significant role. These results are intuitive as in the study area, resource or information constraints are largely removed with digital technologies, while peer effects and social desirability bias still partly explain technology adoption.

We further interpret these two significant factors in context and better details. On the one hand, we discuss that learning from peers is usually the dominant strategy not only from a real option perspective but also of practical significance in the rural setting in China during economic transition. On the other hand, peer learning is also intertwined with social desirability bias that village leaders, party members, or other village elite often exercise in maintaining their leadership roles and gain social respect. From a practical perspective, these institutional and cultural mechanisms are important to understand as they may provide very unique pathways towards agricultural technology adoption in China. While these findings may not speak strongly to the external validity of the identified mechanisms in other developing country settings, they are nevertheless meaningful to understand given the size of the Chinese economy as well as the need for fast agricultural modernization across the country.

Parallel 3F. Contributed Paper Session - Biosecurity

15:50 - 17:30 Wednesday, 7th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre Tom Kompas

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65 Meat consumption and animal diseases – How do goat meat consumers react to African Swine Fever outbreaks?

Luis Emilio Morales[1], Nam Hoang[1], Van Nguyen Huu[2], Ba Nguyen Xuan[2], Nga Bui Thi[3], Cuc Ngo Thi Kim[4], Nguyen Viet Don[4], Ammaly Phengvilaysouk[5], Alison Colvin[1], Stephen Walkden-Brown[1]

[1]University of New England, Armidale, Australia. [2]Hue University of Agriculture and Forestry, Hue, Vietnam. [3]Vietnam National University of Agriculture, Hanoi, Vietnam. [4]National Institute of Animal Science, Hanoi, Vietnam. [5]Livestock Research Centre, National Agriculture and Forestry Research Institute, Vientiane, Lao, People's Democratic Republic

Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

17. Food, Health and Nutrition

Paper/Poster Abstract:

Nowadays, consumers are increasingly concerned about animal diseases and their conditions under different farming systems, due to their effects on animal welfare and human health. These concerns are also related to several cases of food scandals and the negative impacts of the COVID-19 pandemic. This study aims to assess the factors that are related to the likelihood that meat consumers react negatively to animal diseases that could affect other animals different than the meat consumed. For that purpose, 241 and 475 goat meat consumers were selected in Laos and in Vietnam, respectively. They were classified into three categories under analysis: 1) those who reduced their goat meat consumption when there was an African Swine Fever (ASF) outbreak (16% and 4%, respectively), 2) those who were more careful when buying goat meat (21% and 13%, respectively), and 3) those who did not change their goat meat consumption (63% and 83%, respectively). Between 17% and 37% of goat meat consumers either reduced their goat meat consumption or were more careful when buying and eating this meat during the last ASF outbreak in 2019, which suggests that some consumers perceive the risks of an animal disease could have impacts to human health beyond a particular type of animal. This study uses multinomial logit models to estimate the relationships of socio-demographics, preferences and motives with the likelihood a consumer reduced their goat meat consumption or was more careful when buying and eating the product. In Laos, when respondents cared about the origin of the goat meat, they agreed that eating the product improved their mood and the price of it is not expensive, they were more likely to reduce their consumption due to ASF concerns. In contrast, when respondents were more educated, spent a higher proportion of their income on food, considered goat meat as healthy and they found it is convenient to eat goat meat, they were less prone to reduce their intake. In addition, when respondents were married, they had a high frequency of consumption and considered this meat has natural content, they were more likely to be extra careful when buying and eating goat meat; however, when respondents were female, older, care about the origin and agreed with the views that goat meat is healthy, has a good sensory appeal and it is not expensive, they were less prone to be extra careful. Among Vietnamese respondents, those who spent a higher proportion of their income in food, considered it is convenient to eat goat meat and had ethical concerns about the product, were more likely to reduce their consumption; while when they believed that goat meat has natural content they were less likely to reduce their consumption. In addition, when respondents lived in urban areas, they were more likely to be extra careful when buying and eating goat meat; however, when they believed goat meat intake improved their mood, it is convenient, it has natural content and they were familiarised with eating it, they were less likely to be more careful.

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234 The economics of engaging the community and industry in biosecurity

Susan Hester[1,2], Louise Clery[3], Natalie Myring[3], Aaron Saint[4], Richard Harslett[4], Matt Jones[4], Ana Gould[4], Tom Kompas[1]

[1]CEBRA, University of Melbourne, Melbourne, Australia. [2]University of New England, Armidale, Australia. [3]Agriculture Victoria, Attwood, Australia. [4]Department of Jobs, Skills, Industry and Regions, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

6. Biosecurity

25. Policy Analysis

Paper/Poster Abstract:

Across the globe, governments routinely engage industry, the community and others in the detection, reporting and monitoring of biosecurity threats – known as passive or general surveillance. In Australia, this engagement is driven by the entrenched notion that biosecurity is a ‘shared responsibility’ – that everyone has important roles and responsibilities in the management of biosecurity risks. As a result, expenditure on community and industry engagement activities are common in invasive species response strategies. Engagement programmes appear to be beneficial — data is routinely reported by programme managers on the location and occurrence of pests and

diseases, programmes have established biosecurity networks that may be used during pest, disease and weed outbreaks, and knowledge and capacity building that result from general surveillance programmes might result in improved and faster response to outbreaks. It is unclear, however, whether the community engagement programmes that enable passive surveillance provide a good return on investment for governments — the impacts of programmes are seldom subject to economic analysis. In this piece of work we discuss data collection and analysis that will enable improved decision-making relating to programme investment and resource allocation.

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103 Understanding recreational boat owners' preferences and motivations for mitigating marine biofouling

Richard Yao[1], Alaric McCarthy[2], Melissa Welsh[3], Mark Newton[4]

[1]Scion, Rotorua, New Zealand. [2]Cawthron Institute, Nelson, New Zealand. [3]Scion, Christchurch, New Zealand. [4]RMA Ecology, Auckland, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

6. Biosecurity

14. Environmental Economics

16. Fisheries, Marine Systems and Aquaculture

29. Valuation

Paper/Poster Abstract:

Marine biofouling, characterised by the accumulation of microorganisms, plants, and animals on submerged surfaces, encompasses invasive species that imperil marine ecosystems and resources. Non-native biofouling species, specifically, exert adverse effects on primary industries, indigenous species, and recreational pursuits. This study investigates the preferences and motivations of recreational boat owners in safeguarding their vessels from biofouling organisms. Employing the Choice Experiment (CE) framework, we assess respondents' relative inclinations towards modifications in environmental goods and services provision. Behavioural motives are analysed through the application of the Theory of Planned Behaviour (TPB), offering insights into intentions for specific actions.

A carefully designed online survey instrument, incorporating CE and TPB questions, is crafted based on a scoping literature review, key informant interviews, focus groups, and preliminary tests. This survey has been recently disseminated to recreational boat owners throughout New Zealand, with an anticipated response from approximately 800 participants by December 2023.

Focus group outcomes with recreational boat owners underscored their foremost concerns encompassing marine ecosystem health, uniformity in marine biosecurity policies, fuel efficiency of boats, and the financial implications of maintaining biofouling-free hulls. The data participants from two focus groups also revealed a rise in boat upkeep expenses, ranging from 21% to 33%, primarily attributed to the costs associated with maintaining hull cleanliness. A survey of half of New Zealand's local territorial authorities (e.g., regional councils) unveiled regional disparities in hull

cleanliness regulations, with some areas lacking definitive guidelines. These findings from the scoping phase inform the structural framework for analysing CE and TPB survey data.

Analysis of survey responses is slated for December 2023 to January 2024. The results will be presented at the AARES conference, offering valuable insights into the preferences and motivations that drive recreational boat owners in mitigating the impact of marine biofouling on their vessels and the broader marine environment.

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274 Management of Aquatic Invasive Species: Public Preferences and Policy Implications

Olesya Savchenko, Abhishek Rajan, Candice Prince, James Leary

University of Florida, Gainesville, USA

Presentation Type:

3. Contributed Paper

Keywords:

6. Biosecurity

25. Policy Analysis

Paper/Poster Abstract:

Invasive species pose a growing threat to ecosystems worldwide. Global annual costs of biological invasions exceeded $420 billion in 2019 and the number of invasive species is expected to increase by 36% by 2050 (IPBES 2023). As a result, managing invasive species has become a policy priority in many countries. Despite the large public spending and significant advances in invasive species management, control of invasive species remains complex due to the challenges arising from conflicting management preferences, motivations, and economic considerations of different stakeholders. There exists limited literature on public perceptions and preferences related to AIP management (Fouts et al. 2017). Developing a better understanding of the public's preferences for AIP management is crucial for the effective implementation of invasive management policies.

This paper informs AIP management by assessing the public's awareness, preferences, and willingness to pay (WTP) for different AIP management methods using the case of hydrilla (Hydrilla Verticillata) management in Florida, USA. Hydrilla, a submersed AIP, is one of the most difficult-to-control and damaging aquatic invasive plants (4). Despite Florida being a national leader in AIP, hydrilla control has been challenging due to differences in stakeholder preferences for how it should be managed. Using a choice experiment survey of 3,069 adults living in Florida, USA, we quantify WTP for different hydrilla management methods and related factors such as effectiveness, coverage left after treatment, and non-target impacts. These estimates are needed to understand the preferences for management methods such as mechanical harvesting or herbicide use, and the trade-offs individuals are willing to make for different attributes of these methods. We assess how preferences for hydrilla management methods vary with socioeconomic characteristics and other attributes. Finally, we evaluate how information from different sources impacts individual's preferences for different management approaches.

We show that individuals have the highest preference for a hybrid hydrilla management approach that combines mechanical harvesting and herbicide use, followed by mechanical harvesting alone and lastly herbicide use alone. Although aquatic herbicides are highly effective and shown to be safe, individuals expressed the lowest WTP for managing hydrilla solely through this method. Respondents prefer a hydrilla management strategy that has low levels of hydrilla coverage left after treatment, a longer period of suppression, and minimal impact on aquatic life. We find

substantial heterogeneity in preferences among various stakeholders. Lake visitors have a higher WTP for a hybrid control approach ($19 vs. $11 for non-visitors), while fishermen show the highest preference for mechanical harvesting ($22), and those without fishing licenses or waterfowl permits prefer the hybrid approach most ($8). We find that providing information from scientific sources has a significant impact on respondents' WTP compared with other sources of information, easing their concerns over herbicide use. Insights from our analysis emphasize the need to tailor AIP management strategies to the preferences of different stakeholders and utilize trustworthy, scientific sources to promote management practices. The WTP values from our analysis also serve as important references for benefits transfer methods applied to management of hydrilla and other AIPs.

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309 Global warming, changing trade patterns and biosecurity pest pathways

James Camac, Tom Kompas, Matthew Cantele, Christine Li, Andrew Robinson

University of Melbourne, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

6. Biosecurity

8. Climate Change

Paper/Poster Abstract:

Climate change will have substantial impacts on global economies by directly and indirectly affecting agricultural, manufacturing and labour productivity, along with damages to a wide range of other assets and economic activity. Some regions will be impacted more severely than others and this will result in substantial changes in trade patterns and import-pathways for invasive pests and diseases. Our work integrates a large dimensional climate and trade model with an analysis of pest pathways into Australia based on interception data, climate and habitat suitability, changing trade patterns and the host exporting country. We also develop an online tool that allows for an analysis of these impacts across each of 70 different countries and regions and more than 60 commodity sectors. The results provide insight into future biosecurity risk by country and at the Australian border.

Parallel 3G. The Centre for International Economics (CIE) Contributed Paper Session - Valuation

15:50 - 17:30 Wednesday, 7th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre
Claire Doll

68 Achieving safe, clean dirking water across small, rural and remote communities: how much are Australians willing-to-pay?

Ana Manero[1], Wiktor Adamowicz[2], Sonia Akter[1], Alaya Spencer-Cotton[1], Peter Coombes[1], Paul Wyrwoll[1], James Horne[3], Nina Lansbury[4], Sandra Creamer[4], Kat Taylor[1], Safa Fanaian[1], Quentin Grafton[1]

[1]ANU, Canberra, Australia. [2]University of Alberta, Alberta, Canada. [3]James Horne and Associates, Canberra, Australia. [4]UQ, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

29. Valuation

31. Water

Paper/Poster Abstract:

Across regional and remote Australia, provision of safe drinking water remains a challenge, particularly in small towns and communities, i.e. under 10,000 inhabitants. A recent service gap analysis (Wyrwoll et al., 2022) estimated that, in 2018-19, at least 260,000 people in small towns were supplied with water that failed to meet all Australian Drinking Water Guidelines (ADWG) for ‘good quality’, at least once a year. Sub-standard water may entail heath-risks and result in a greater financial burden upon households who must rely on purchased bottled water.

Consistent supply of good quality drinking water in remote areas can be very costly, with water users and utilities often unable to bear the costs. Given the high costs and the relatively small number of people affected, universal good quality dirking water in Australia has been typically regarded as a low priority for policymakers seeking to benefit larger populations at lower costs. However, the lack of action means Australia is failing to meet Sustainable Development Goal target 6.1 and the Human right to Water.

In this study, we seek to understand the level of public support for a program targeting universal access to 'good quality' drinking water across Australia. In other words, we aim to understand whether members of the Australian population would derive benefit for such program, even if they are not directly impacted by sub-standard dirking water. For this aim, we conducted an Australia-wide stated preferences survey, with over 3,500 participants, eliciting votes for a water quality improvement program to be financed through an annual household tax, for 10 years.

Our results indicate a clear public support for the proposed program, with willingness-to-pay (WTP) in excess of $200 per household per year, for our most conservative model. Surprisingly, we found no statistically significant differences between residents of metro areas and those outside. Conversely, respondents who indicted they had no experience living, visiting or having family/friends in small towns had a significantly lower WTP. An interpretation is result is that greater awareness of issues affecting rural and remote communities can lead to greater support for public interventions addressing such issues. Our results are particularly timely, given the renewed emphasis by Australia's Labor government on water security, including investments into programs targeting access to a safe and reliable water supply for all.

224 Understanding cultural ecosystem services benefits of trees: A survey of Tasmanian residents

Sorada Tapsuwan, Tim Capon, Murni Po, Daniel Mendham

CSIRO, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

29. Valuation

Paper/Poster Abstract:

The Millennium Ecosystem Assessment (2005) framework offers a structured framework for identifying and grouping the types of ecosystem services benefits that people accrue from the environment, such as trees and forests. Following this framework, England et al. (2020) offered a comprehensive review of the ecosystem services benefits that agroforestry, i.e. trees on farms, provide to agricultural production. These benefits include benefits to animal production (e.g. reduced heat stress, improved stock productivity/behaviour/health, improved milk quality), benefits to pasture production (e.g. increased pasture, improved pasture quality, increased forage quality), benefits to water quality (e.g. reduced runoff and sedimentation), benefits to carbon sequestration (e.g. increased carbon sequestration in soil/biomass), benefits to biodiversity (e.g. increased vertebrate biodiversity, improved habitat function/quality, improved stream micro-invertebrate biodiversity), and benefits to soil erosion prevention (e.g. reduced soil/slope/gully erosion). From these benefits, we can gather that trees on farms provide provisioning, regulating, and supporting services. However, what is missing from this list are the cultural services benefits that “can be important to individual and communities and in some cases are the core drivers for motivating change” (England et al., 2020). This objective of this paper is to present the cultural ecosystem services benefits that relate to trees on farms, and trees in other locations, including urban trees, rural street trees, and trees in nature conservation parks. Findings from this study were derived from an online survey of Tasmanian residents conducted in May 2022. A total of 594 Tasmanian residents participated in the survey. Participants were asked to state how often they visit or pass through urban parks, rural areas, farmland, and nature conservation areas. They were also asked to rate on a scale of 1 to 5, where 1= Not at all important and 5=Extremely important, how important it was for them to see more of different types of trees being planted, including urban park trees, farm trees and nature conservation trees. Visitation rate and importance ranking questions were then related to people’s ratings of cultural ecosystem services statements. Findings from this research suggest that people hold different types of cultural ecosystem services, depending on the type and location of trees. This confirms our hypothesis that cultural ecosystem services vary from one individual to another depending on how they interact with the environment.

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163 Community use and values for urban lakes: a choice modelling study in the Australian Capital Territory

Amar Doshi[1], Boris Lam[2], Liam Calley[1], Buyani Thomy[3,4], Danswell Starrs[5], Ralph Ogden[5]

[1]Natural Capital Economics, Brisbane, Australia. [2]Natural Capital Economics, Melbourne, Australia. [3]Outside Partners Pty Ltd, Brisbane, Australia. [4]Charles Sturt University, Bathurst, Australia. [5]ACT Environment Planning and Sustainable Development Directorate, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

29. Valuation

Paper/Poster Abstract:

Urban lakes provide a range of diverse and competing benefits to the community in the Australian Capital Territory (ACT) and the environment. There is a clear tradeoff between outcomes from using the lakes as stormwater management assets and its community values in terms of recreation and amenity. Lake managers face significant challenges in reconciling these tradeoffs to determine an appropriate level of investment in upstream water quality management to maximise the total benefit to the community and environment. This is particularly due to the lack of study of the community values of the lakes, driven by the corresponding values being non-market in nature. This study, funded by the ACT Government, addressed this gap by employing discrete choice experiments for Lakes Burley Griffin, Ginninderra, and Tuggeranong. A representative sample of the ACT population were surveyed and responded to a choice experiment to determine the willingness to pay (WTP) for attributes of the lakes that corresponded to amenity, on-water access, and lakeside facilities. The results demonstrated significant willingness to pay values, particularly for improvements to amenity at between $140–$280 per person annually, depending on the lake. Furthermore, the WTP values for on-water access for primary and secondary contact recreation were lower than other attributes at $48–$76 per person annually—an important consideration given management is publicly funded through rates and taxes on the entire population and prevailing focus has typically been on lake users. Most importantly, the WTP values were significantly higher than benefit values estimated for stormwater quality management. This provides valuable insight for ongoing management of ACT's urban lakes, which has typically prioritised stormwater quality management benefits over community values.

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191 The case for greening Metropolitan Melbourne: a spatially prioritised cost-benefit analysis

Boris Lam[1], Jim Binney[2], Dom Blackham[3], Jake Allen[3]

[1]Natural Capital Economics, Melbourne, Australia. [2]Natural Capital Economics, Brisbane, Australia. [3]Mosaic Insights, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

14. Environmental Economics

Paper/Poster Abstract:

The Metropolitan Melbourne population is growing and expected to exceed 8 million by 2051. The large-scale expansion and intensification of urban development to accommodate the future population is driving the loss of trees, shrubs, and grasses (collectively, the urban forest). As the urban forest declines, the critical habitats for native fauna and the myriad of other benefits are lost. In particular, the loss of cooling benefits exacerbates the increasing effects of climate change, resulting in more frequent, longer, and more severe heatwaves impacting human health, productivity, and way of life. Targeted investment in urban greening is critical to reverse these impacts from losses in urban forests in a growing urban environment like Melbourne. While decision-makers have developed urban greening

targets, there was a lack of detailed understanding of where and how much public funding to invest to deliver on these targets. In this project, a city-wide mapping and cost-benefit analysis was utilised to inform a prioritisation of urban greening initiatives in Metropolitan Melbourne. This involved comprehensive spatial analysis—to identify high priority hotspots—and estimation of long-term investment costs using a data and stakeholder-driven costing tool. Finally, an ecosystem services framework and a range of economic valuation techniques were utilised to develop a case for investment through a cost-benefit analysis. The results demonstrated that the value of benefits of greening Metropolitan Melbourne were significant—for every $1 investment in urban vegetation the benefits to the community, business and governments across Metropolitan Melbourne was estimated at approximately $2.16 and $6.70. This represented a landmark finding for the city in considering a concerted effort across councils to invest in a prioritised urban greening initiative.

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37 What's (not) to like about trees?

Claire Doll[1], Curtis Rollins[1], Michael Burton[1], David Pannell[1], Katrin Rehdanz[2], Juergen Meyerhoff[3]

[1]University of Western Australia, Perth, Australia. [2]University of Kiel, Kiel, Germany. [3]Berlin School of Economics and Law, Berlin, Germany

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

Urban forests contribute to liveable cities by providing a range of ecosystem services, including urban heat island mitigation. Because of the environmental and social benefits associated with urban trees, State and local governments across Australia are implementing strategies to increase tree canopy cover on a variety of land use covers. These efforts extend to residential street verges, where there are opportunities to achieve continuous and converging tree canopy. However, the success of these strategies is dependent on community acceptance of urban greening programs and perceptions of the trees that are planted. Using a best-worst scaling survey, and with Perth, Western Australia as a case study, we first elicit individuals' preferences for different aesthetic, environmental, and maintenance characteristics of street trees. Next, we examine preferences for different tree species that are commonly planted by local governments on verges. We employ two-stage sampling to understand whether providing additional information on top-rated tree characteristics influences tree species rankings. The results of this study will help environmental managers understand what information about tree species should be communicated to residents to increase acceptance of street tree programs.

Parallel 3H. Contributed Paper Session - Conservation

15:50 - 17:30 Wednesday, 7th February, 2024

Location Room 6, (Level 5) Marie Reay Teaching Centre Sayed Iftekhar

74 Assessing Community Readiness for Payments for Ecosystem Service Schemes for Tropical Primary Forest Protection in the Democratic Republic of Congo

Andrew Buckwell[1], Christopher Fleming[1], Glenn Bush[2], Joseph Zambo Mandea[2], Fitalew Taye[1], Brendan Mackey[1]

[1]Griffith University, Brisbane, Australia. [2]Woodwell Climate Research Center, Falmouth, USA

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

7. Carbon and Nature Markets

Paper/Poster Abstract:

Primary forest conservation is essential for limiting climate change, for meeting conservation objectives, and the Sustainable Development Goals. Schemes that compensate communities for forgone extractive uses are important policy tools, but effective deployment demands an understanding of local deforestation drivers and host communities' preferences. We use Q-methodology to reveal discourses present in three communities in the Democratic Republic of Congo. Our results reveal three factors with a common emphasis on forest conservation and preferences for compensation in the form of social investments, rather than cash. The main contrasts were in attitudes towards farming. The first discourse, we call conservationist—open to ideas, displayed a commitment to learning better practices for community material benefit in service of forest conservation. The second discourse, which demonstrated greater confidence in their capacity to support livelihoods from farming, we call aspirational artisans. The third, which was acutely aware of the impact of their farming on forest conservation, we called passive, conflicted farmers. We also demonstrate an aspiration for the continued development of farming amongst participants, which although still correlated with preferences for forest conservation, may lead to compensation schemes inadvertently stirring future land use tensions if design does not reconcile agricultural development and conservation.

71 Human dimensions of marine parks and no-take marine reserves

Matthew Navarro

UWA School of Biological Sciences and UWA Oceans Institute, The University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

16. Fisheries, Marine Systems and Aquaculture

Paper/Poster Abstract:

No-take Sanctuary Zones within marine parks are critical to Australia's biodiversity conservation efforts, but relatively little is known about their social and economic dimensions. This presentation draws on Australian national surveys with recreational users of marine parks conducted between 2018 and 2023, as well as a large national survey of the Australian general public to distill insights about changes in Knowledge, Attitudes and Practice (KAP) that have occurred over time and across jurisdictions. We find evidence of high levels of support and positive attitudes towards no-take sanctuary zones in marine parks amongst all groups, including the general public, recreational fishers and non-fishing recreational users of marine parks. We also show increases in awareness and support for marine parks over the 5 year time span of our survey data. These results contrast with media and key user group portrayals of attitudes towards no-take sanctuary zones in marine parks, instead highlighting positive attitudes especially in the medium to long term.

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143 Benefit transfer to value environmental projects in developing countries: Potential challenges and solutions

Md Sayed Iftekhar

Griffith University, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

14. Environmental Economics

Paper/Poster Abstract:

Ecosystem protection and rehabilitation projects are likely to generate multiple ecosystem service benefits. Many of these benefits (such as potable water supply and production of goods) could be measured using existing market prices. However, many other types of benefits (such as improvement in aesthetics, and recreation opportunities) often do not have clear market prices. Application of nonmarket valuation techniques is common to assess the nonmarket values of such ecosystem services. However, conducting primary nonmarket valuation studies requires considerable time and effort which are often unavailable during the rapid economic assessment of projects. This is particularly challenging for agencies in developing countries who are often capacity and resource constrained. The application of benefit transfer techniques could be useful in this context. In this paper, based on a systematic review of literature potential challenges of benefit transfer in developing country context will be discussed. Further, potential solutions to tackle these challenges will be discussed.

Conference Dinner

18:30 - 22:30 Wednesday, 7th February, 2024
Location Village Centre, Australian National Arboretum, Canberra

Conference Dinner

- 6pm First bus departs Kambri towards the Arboretum
- 6:30pm Drinks service starts
- 7pm Dinner starts

A fun filled night celebrating the annual AARES awards (https://www.aares.org.au/awards/) recipients at a stunning location.

The National Arboretum Canberra is a 250ha arboretum established after the area was burned during the 2003 Canberra Bushfires. It was officially opened in 2013 and is home to over 44,000 trees from around the world and Australia.

The dinner will be held in the National Arboretum's award-winning Village Centre with world-class architecture and breathtaking views. The dinner menu will showcase local (within a 100km radius) produce from Canberra. Buses will be provided for delegates to get to and from the National Arboretum, Canberra.

AARES Conference Registration Desk Open [7:30AM to 4:30PM]

07:30 - 08:00 Thursday, 8th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Tea and Coffee on arrival

08:00 - 08:30 Thursday, 8th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Parallel 4A. Special Session - "Designing social incentive mechanisms for the effective provision of Landcare-relevant Public Goods"

08:30 - 10:10 Thursday, 8th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

Steven Schilizzi

Conservation programs in Australia and elsewhere have thus far mainly relied on financial incentives (i.e., a market-based approach) to promote conservation actions on private land. However, the (cost-)effectiveness of conservation programs in promoting the provision of environmental public goods, such as biodiversity and clean water, has remained limited. Environmental degradation is still happening at an alarming rate. Poor performance of conservation programs has been criticized on four major issues in their design and implementation: low participation rates, lack of coordination in conservation efforts among landholders, the neglect of behavioural factors in program design, and failure to achieve long-lasting behavioural changes after financial incentive program ends. Given that budgets for conservation programs are often short-term, thin, and scarce, questions still remain about how conservation programs should be designed so that the desired environmental outcomes can be achieved at the lowest possible cost in both the short and long term. Recent literature suggests that a social incentive approach could be effective in supercharging the (cost-)effectiveness of a market-based approach, thereby promoting long-lasting pro-environmental behaviour. However, evidence about the effectiveness of social incentive approaches, particularly social normative interventions, is still sketchy.

The objective of the proposed session, part of an ARC-Discovery Project, is (1) to highlight key challenges and opportunities in using social incentives to enhance pro-environmental behaviour; and (2) to provide insights and stimulate discussions on the potential of promising social mechanism design solutions, with the aim of fostering collective action on delivering Landcare-relevant public goods on private land.

Presenter(s) details:

- Prof. Steven Schilizzi, The University of Western Australia, Email: steven.schilizzi@uwae.edu.au. “A brief introduction to the ARC Discovery Project on redesigning Landcare policy using both economic and non-economic incentives” (5 minutes)

- Prof. Alexander Vostroknutov, Maastricht University, Email: a.vostroknutov@maastrichtuniversity.nl. “Why do people follow social norms?” (15 minutes)

- Mr. Daniel Martinez Felip, The University of Western Australia. Email: daniel.martinezfelip@research.uwa.edu.au. “Designing norm enforcement mechanisms for the provision of environmental public goods: A laboratory experiment approach” (15 minutes)

- Ms. Mimi Salminah, The University of Adelaide, Email: mimi.salminah@adelaide.edu.au. “Biodiversity conservation programs in the Mount Lofty Ranges Region: To what extent do social norms play a role in promoting landholders’ conservation actions?” (15 minutes)

- Prof. John Rolfe, Central Queensland University, Email: j.rolfe@cqu.edu.au. “Identifying underlying social incentives that drive landholder decisions to improve land management practices in Great Barrier Reef catchments” (15 minutes)

Q & A - Discussion (25 minutes)

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203 Designing social incentive mechanisms for the effective provision of Landcare-relevant Public Goods

Steven Schilizzi[1], Alexander Vostroknutov[2], Daniel Martinez Felip[1], Mimi Salminah[3], John Rolfe[4]

[1]The University of Western Australia, Perth, Australia. [2]Maastricht University, Maastricht, Netherlands. [3]The University of Adelaide, Adelaide, Australia. [4]Central Queensland University, Queensland, Australia

Presentation Type:

2. Special Session

Keywords:

5. Biodiversity

21. Land and Natural Resource Management

Parallel 4B. Special Session - "Technological Progress, Institutional Reform and Agricultural Productivity Growth: Opportunities and Challenges in the post-Covid era"

08:30 - 10:10 Thursday, 8th February, 2024
Location Cinema, Kambri Cultural Centre
Yu Sheng, Xunpeng Shi

Theme

It is widely believed that a new wave of technological revolution in the fields of life science, information and communication technology, and artificial intelligence etc. has substantially

promoted technology progress in agriculture and remained an essential path for resolving global food security since the mid-1990s (Gordon 2000, 2016; Pardey and Alston 2019). The technological revolution was expected contributing to a sustained burst of faster-than-normal agricultural productivity growth adding to the benefits from the "Green Revolution" back to the 1960s. Between 1961 and 2018, global agricultural TFP—a widely used indicator for technology progress—grows on average at the rate of one percent a year. The growth in agricultural TFP has accounted for more than half of agricultural output growth over the same period. Meanwhile, agricultural TFP growth also helps to facilitate economic structural transformation by reallocating rural labour into the industrialized sectors, thus having a powerful effect on poverty reduction.

Yet, a growing body of empirical evidence suggests a wide-spread and significant slowdown in agricultural TFP since the turn of the century (Alston *et al* 2010; Sheng *et al* 2015; Ball *et al* 2018; Pardey and Alston 2019; Chambers *et al* 2020). As is reported in Ball *et al* (2018), average agricultural TFP for 17 OECD countries (including 14 EU countries and Australia, Canada and the United States) has grown at a sluggish rate of 0.5 percent a year after 2000, approximately one-third of its long-term average since 1973. The counter-intuitive observation of slowdown agricultural productivity growth stimulated a renewed interest in questions about how new technological revolution may affect agricultural productivity growth and the pathway of rural development.

This symposium proposes to explore the impact of new waves technological innovation (including mechanization, information and communication, and biotechnology) and their potential impact on agricultural productivity growth. Four papers will assess the overall impact of agricultural innovations on agricultural productivity in a global context (including major OECD countries and developing countries in Asia) and, based on this, discuss the channels and mechanisms through which agricultural innovations generate impacts. The aim is to better understand the mechanisms of agricultural productivity growth and to further promote rural development in the new era.

Format

The symposium will be organized in a hybrid way, which includes invited speakers to present their research papers, the comments from invited discussants, and open-floor discussion. The session is designed to take up to 90 minutes in total, and host 4 presentations with each presentation taking about 15 minutes plus 5 minutes for comments/discussion from the invited discussants. At the very end of the session, a 10-minute period will be used for open discussion and questions for all presenters.

Presenters Details

- Yu Sheng, Professor and Deputy Director, China Centre for Agricultural Policy, Peking University
yu.sheng@pku.edu.cn

- Baodong Cheng, Professor, School of Economics and Management, Beijing Forestry University
baodongcheng@163.com

- Zhenlin Weng, Professor and Deputy Director, School of Economic and Management, Jiangxi Agricultural University, China

- Haiyan Deng, Associate Professor, School of Management and Economics, Beijing Institute of Technology
mariadeng716@126.com

- Xixian Zheng, Ph.D. candidate, School of Economic and Management, Jiangxi Agricultural University, China, zxx19981114@163.com

- Wenmei Liao, Professor and Deputy Director, School of Economic and Management, Jiangxi Agricultural University, China, liaowenmei@126.com

Invited Discussants

- Yu Liu, Professor, Institute of Science and Development, Chinese Academy of Sciences
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- Junfei Bai, Professor, College of Economics & Management, China Agricultural University
jfbai@cau.edu.cn

Short abstracts for the proposed presentations

Technological Change, Capital Deepening and Cross-country Agricultural Labor Productivity Growth: Evidence from 17 OECD Countries

This paper uses the KR framework to investigate how recent technological (GMO/ICT) revolution could affect the way of technology progress in agriculture. By applying deterministic production-frontier analysis (DEA) to the newly developed production account data for agriculture of 17 OECD countries over the 1973-2011 period, we analyse ALP growth and its components before and after revolution periods. We show that ALP growth among the OECD countries is determined by technology progress other than capital deepening, especially among developed countries. Although technology progress in the very capital-intensive countries continues to grow when new wave of technology revolution arrives after 1998, it does slowdown in most relative labour-intensive countries which caused a decline in both average growth rates of TFP and ALP. Our finding implies that the new wave of technology revolution is causing technology progress in agriculture to shift from Hick-neutral towards the labour augmented direction, causing the concern of increased inequality that could arise from new technology revolution.

Keywords: Productivity slowdown in agriculture, Technological progress, DEA, Capital deepening

Impact of GMO Revolution on Agricultural TFP: A New Global View

This paper examined the impact of GMO adoption on agricultural total factor productivity (TFP) across countries, with a focus on the interaction between biological and mechanical technologies in affecting agricultural productivity. Based on the TFP concept, we derive the theoretical relationship between agricultural TFP, capital deepening and the GMO technology, and apply the time-variant difference-in-difference approach to a balanced panel data of agricultural input and output data for 147 countries over the period of 1961-2016 for empirical test. We show that the net productivity

gains from the GMO technology since the mid-1990s averaged only at 1 percent across countries, which much smaller than the prediction of the existing microeconomic literature. A further cross-country comparison analysis shows that developing countries biased to choose the GMO varieties with IR traits to save production costs which have lowered the marginal returns to mechanical innovation and thus offset the positive productivity gain of the GMO technology. Our finding provide useful insights for policy makers with the aim to better use GMO technology, calling for more attention from the general public for balancing use of the newly developed bio-technology.

Keyword: GMOs, Time-variant DID, Capital deepening

Conflict or Coordination? A Spatio-temporal Analysis of the Coupling Relationship between Agricultural Carbon Emission Efficiency and Food Security in China

Wenmei Liao and Xixian Zheng

Abstract Feeding 9 to 10 billion people by 2050 and preventing dangerous climate change are two major challenges facing humanity, especially for developing countries. Therefore, exploring the conflicts and synergies between agricultural carbon emission efficiency (ACEE) and food security (FS) is of great significance. Taking China as a case, this study constructed an indicator system to evaluate ACEE and FS. Using the Super-SBM model and the entropy weighted TOPSIS method, we measured the ACEE and FS of 31 provinces in China from 2007-2021, respectively, and discussed the spatiotemporal distribution characteristics of both ACEE and FS. Further, we used the coupling coordination degree model to calculate the coupling coordination relationship between ACEE and FS, and summarized the dynamic evolution process of the coupling coordination degree (CCD). Finally, Moran's I index and Getis-Ord Gi* index were used to conduct global and local spatial autocorrelation analysis to examine the spatial agglomeration pattern of CCD. The results show that: (1) China's ACEE and FS showed fluctuating upward trends during the study period, with regional differences in both systems, and FS lagged behind ACEE. (2) The spatiotemporal distribution of CCD showed fluctuating upward trends in all regions during the study period, but there were still gaps from the standard of high coordinated development. CCD differed between regions, with northeast and central China outperforming western and eastern China. (3) The global spatial autocorrelation results show that CCD has a significant positive spatial autocorrelation effect. LISA cluster analysis found that the northeast traditional grain production areas are stable high value clustering cores, while Shandong and other secondary grain production areas are gradually forming high value clusters. Some provinces like Tibet are positively affected by spillover effects. The hot spot analysis also shows that the hotspot areas of high-value clusters exhibited an expanding trend year by year. Therefore, China should implement differentiated policy measures to achieve coordinated development of agricultural carbon mitigation and food security.

Provincial Spatial Features of Chicken Prices and its Dynamic Correlation Analysis ——based on the panel data from 2008 to 2020 in China

XIE Ning, Weng Zhenlin*, Liu Xiaochun, Huang Yixian

Abstract The aim of this study is to analyze the spatial characteristics of chicken distribution across provinces in China and investigate the factors that influence the price system of chicken.

Understanding the inter-provincial price linkage effect is crucial for managing the uneven development of the broiler industry at a regional level. Using the inter-provincial panel data collected between 2008 and 2020, a spatial correlation test was performed to analyze the geographical relationships. Additionally, a generalized forecast error decomposition analysis was applied to examine the intensity and direction of the connections between chicken prices across different provinces. (1) Chicken prices in China are not simply randomly distributed, but have obvious spatial clustering characteristics, showing a spatial evolution pattern of "high-high clustering in the southern region and low-low expansion from east to west." (2) The correlation between each beef market is different and time -variant. Anhui, Guangdong, Henan, Heilongjiang, Zhejiang, Hubei, Hebei, Jiangxi, Sichuan, Shandong, Jilin, Guangxi, and Fujian have a high positive net correlation and are considered "leaders" or "initiators" of chicken price fluctuations. Ningxia, Qinghai, Tianjin, Gansu, Hainan, Shaanxi, Inner Mongolia, Jiangsu, Shanxi, Shanghai, Beijing, Yunnan, Xinjiang, and Guizhou have a high negative net correlation and are classified as "receivers" of chicken price fluctuations. (3) The impact of broiler production scale on chicken meat price fluctuations is significant but limited in scope. The effect of broiler production scale on the price of surrounding chicken meat decreases with increasing geographic distance. The government should establish a national unified market for fresh agricultural products and vigorously develop infrastructure such as cold chain logistics and e-commerce platforms in the central and western regions. This will allow underdeveloped areas in the central and western regions to enjoy the benefits of agricultural industrialization. At the same time, large-scale broiler farming enterprises should be set up in these regions to promote the development of the broiler industry and meet the local residents' demand for chicken meat consumption.

Keywords Provincial chicken prices; Price transmission; Generalized Forecast Error Variance Decomposition

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269 Technological Progress, Institutional Reform and Agricultural Productivity Growth: Opportunities and Challenges in the post-Covid era

Yu Sheng[1], Zhenlin Weng[2], Xixian Zheng[2], Wenmei Liao[2]

[1]Peking University, Beijing, China. [2]Jiangxi Agricultural University, Nanchang, China

Presentation Type:

2. Special Session

Keywords:

4. Agricultural Technology and Innovation

27. Productivity and Efficiency

Parallel 4C. Contributed Paper Session - Agricultural Finance

08:30 - 10:10 Thursday, 8th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre
Alexandra Peralta

241 Can insurance help reduce the environmental impacts of farming?

Peter Thorburn[1], Jody Biggs[1], Tony Webster[2], Larelle McMillan[1]

[1]CSIRO, Brisbane, Australia. [2]CSIRO, Cairns, Australia

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

18. Grains and Cropping Systems

26. Practice Change and Adoption

28. Uncertainty and Risk

Paper/Poster Abstract:

Discharge of dissolved inorganic nitrogen (DIN) from sugarcane farms is a major threat to the Great Barrier Reef (GBR), a World Heritage listed ecosystem with an annual value of AUD6.4B to the Australian economy. An important pathway to reducing these impacts is to have farmers optimise N fertiliser applications to their crops. For sugarcane farmers, managing N fertiliser is an exercise in risk management, i.e. applying high rates of N to minimise the risk of low yields. We asked: Could insurance provide an alternative risk management tool and facilitate reduced N fertiliser applications? In answer to that question we developed an original insurance concept to manage the risk to yields, and reduce the financial risk associated with optimising N applications. This required determining, amongst other things, whether the insurance was structured as an indemnity or parametric product, the spatial and temporal scale at which it was offered, and whether there was farmer appetite for such a product. For the latter problem, we developed a prototype commercial product and had sugarcane farmers “buy” mock insurance. Feedback from the farmers about the concept was positive. Biophysical and financial outcomes of these “purchases” were evaluated over 70 years. The average outcome was farmers being financially better off by >AUD8/ha because payouts from the insurance policies combined with the savings in fertiliser costs were greater than insurance premiums. Insurance broker’s fees and insurer’s “underwriting profit” were both approximately AUD 6/ha. If these policies were purchased over 40% of the study region there would be approximately 100 t/year less DIN discharged to the GBR from those catchments. Achieving this outcome through government grants and incentives would cost AUD15-27M/year. This innovative insurance concept can thus provide financial benefits for farmers, insurance companies and the public, as well as environmental benefits for the GBR. The concept can be generalised to other crops, other environmental issues and to simpler problems such as drought-induced yields.

98 Impacts of Digital Financial Services in Agriculture: A Systematic Literature Review

Rida Akzar, Alexandra Peralta, Wenzhu David Tang

University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

19. Impact Assessment

Paper/Poster Abstract:

Financial inclusion has taken centre attention on the global development agenda over the past few decades, aligning with the Sustainable Development Goals (SDGs). International organisations, governments, and donors have dedicated substantial resources to promote digital finance initiatives in developing regions. The premise behind this initiative is that access to digital financial services can substantially reduce transaction costs, offer secure savings solutions, expand access to credit and insurance, and, consequently, contribute to achieving multiple SDGs. Recent literature reviews have mainly focused on mobile financial services' impact on transactions, such as government-to-person (G2P), person-to-person (P2P), cash transfers, and remittances, as well as their effects on household income and resilience to economic shocks.

However, a substantial knowledge gap remains regarding the effects of digital financial services on agricultural activities, agricultural income, and related outcomes. Furthermore, limited evidence exists concerning how digital financial services affect these agricultural-related outcomes. Thus, this systematic literature review aims to address the research question: "What are the economic and social impacts of digital financial services on households engaged in agricultural activities in developing countries, particularly in the context of agricultural activities (from production to delivery to final consumers, if available)?".

In review, we used broader terms for the definition of digital finance terminologies that are commonly used to represent mobile financial services, which include all the different types of financial services that can be accessed via a digital platform, including mobile money, savings, credit, and accounts held via digital apps that may or may not be linked to a financial institution such as bank, credit union, and microfinance. Our search terms included impact assessment estimation methods to ensure the inclusion of robust studies establishing causal relationships. We followed the Preferred Reporting Items for Systematic Literature Review and Meta-Analyses (PRISMA) methodology (Page et al., 2021).

We utilised the advancement of artificial intelligence Python-based to automate the search and downloading process of studies from different main databases including Web of Science Core Collection, Scopus, Google Scholar and organisation websites widely known conducting impact assessments studies. We utilised a machine learning, AsReview (van de Schoot et al., 2021), to streamline the screening of a vast volume of studies during the abstract review phase. This approach allowed us to identify studies warranting full-text review efficiently. We set exclusion criteria for both abstract and full-text reviews, with each paper assessed by two researchers for inclusion in the final list.

Among 19,320 studies, 136 studies were shortlisted for full-text review. The review process aims to gather critical information from the selected studies, including methodologies, impact mechanisms, impacts on intermediate and long-term outcomes, and heterogeneity analysis. While the review is still ongoing, our preliminary analysis of 31 peer-reviewed studies that have been included in this review reveals that only 8 of them are specifically focused on the agricultural context, examining outcomes related to the adoption of technologies, farm production, and income

levels. This synthesis will pinpoint literature gaps and offer insights for boosting financial inclusion, among agricultural households which form the backbone of many economies.

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145 Examining Financial Viability of Local Agricultural Lenders: Evidence from Taiwan

Yu-Xin Chen[1], Shuay-Tsyr Ho[2], Shang-Ho Yang[1]

[1]National Chung Hsing University, Taichung City, Taiwan. [2]National Taiwan University, Taipei City, Taiwan

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

28. Uncertainty and Risk

Paper/Poster Abstract:

Financial institutions serve as indispensable pillars for the sustainability of the economy by facilitating economic operations and growth through the provision of financing and investment services. Non-performing loan (NPL), often termed as "financial pollution," can catalyze a prolonged downturn in the real economy and have been linked to bank collapses (Ghosh, 2015; Makri et al., 2014; Naili and Lahrichi, 2022; Vithessonthi, 2016).

In the case of Farmers' Associations in Taiwan, agricultural finance exhibits distinctive characteristics that can affect the NPL ratio differently than they would in general financial institutions. Farmers' Associations play a vital role in facilitating credit access and loan availability for farmers in Taiwan. This study examined the key factors influencing the NPL ratio within the credit department of Farmers' Associations, while it, further, indicates how these deterministic factors could result in a higher risk in agricultural finance.

The secondary city/county-based data used in this study spans from 2006 to 2021. A total of 248 observations is utilized. This study leverages administrative data and uses two-step system Generalized Method of Moments (GMM) approach that helps address endogeneity issues and incorporate the lagged effect. Moreover, the multiple regression and fixed effect regression are conducted for results comparison. The dependent variable is NPL ratio, and independent variables include deposit to net asset ratio, current ratio, annual total precipitation, annual average temperature, cultivated area ratio, nominal GDP per capita, and president parties.

Results show that an excess liquidity, an extremely weather, i.e., cold damage and drought condition, a lower nominal GDP, a decrease ratio of cultivated area, and the potential political issue, it would lead to a higher NPL ratio. This indicates that the higher NPL ratio, the higher risk operation for the agricultural finance of Farmers' Associations in Taiwan. The importance of this research lies in its implications for policymakers, regulatory bodies, and financial institutions involved in agricultural finance. For example, regarding the results of weather variables in this study, government and policymakers can promote the weather-related insurance to support farmers and decrease the production risk in Taiwan.

A comprehensive understanding of the factors that determine credit quality within Farmers' Associations can help develop more efficient risk management strategies. Moreover, tracking the excess liquidity would help to ensure the stability of these institutions. In conclusion, this research serves as an important step towards understanding credit quality in agricultural finance. The novel insight into the interaction between political factors and specific determinants would be highly potential to be discussed during the conference.

345 A drought early warning system for Australia: translating seasonal weather forecasts into agricultural outcomes

Neal Hughes

ABARES, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

3. Agricultural Production

8. Climate Change

Paper/Poster Abstract:

The Australian agriculture sector is uniquely exposed to climate variability particularly drought. As the recent 2018--20 drought demonstrated, there remains high demand in government and industry for accurate and timely information on the effects of climate on agricultural outcomes. In 2022, the Australian Government established the Drought Early Warning System (DEWS) project, a partnership between ABARES and CSIRO linking weather data and forecasts with agricultural models to produce national outcome-based drought indicators for Australia.

The DEWS makes use of seasonal weather forecasts from the Bureau of Meteorology ACCESS-S2 model downscaled and calibrated to a 5km resolution. Historical and forecast weather data are used to force a suite of agricultural simulation models including APSIM, GrassGro, AussieGRASS and FarmPredict. This joint modeling system produces a range of agricultural drought indicators measuring winter and summer crop yields, pasture growth, and farm business profits, each defined as percentiles against an historical reference period. An operational prototype of the DEWS has been developed within the Senaps cloud-computing environment, with monthly updates being pushed to an online interactive user interface via the Climate Services for Agriculture (CSA) platform.

While the DEWS has been developed primarily to inform government drought response, the underlying data products have a range of other potential applications including agricultural production forecasting, drought and climate financial risk assessment, parametric drought insurance, and farm business performance benchmarking and decision support.

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66 Mobile Money and Rural Financial Markets in Developing Countries: Opportunities, Challenges, and Unexplored Pathways

Alexandra Peralta

University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

4. Agricultural Technology and Innovation

10. Development Economics

Paper/Poster Abstract:

Rural financial markets in developing countries face multiple challenges, including enforcement problems, information asymmetry, moral hazard, and shortage of collateral. These markets are characterised by fragmentation and credit rationing. Credit, savings, and insurance services predominantly operate informally, relying on social networks and informal arrangements among economic agents (Conning & Udry, 2007).

Mobile money, a financial service enabling individuals to deposit, transfer, and withdraw funds without requiring a traditional bank account, has gained significant popularity in the developing world. This technology enables people to conduct financial transactions using their mobile phones, making it accessible in areas lacking traditional banking infrastructure. Mobile money is expected to enhance efficiency by addressing various sources of market failure in rural financial markets.

Existing literature (Aron, 2018) suggest that mobile money can facilitate transactions in agriculture, and create opportunities for investments in agricultural activity through credit and savings applications on mobile phones. However, most of the literature has focused on the potential impacts of mobile money in agricultural activity and rural incomes via two main channels: remittances and cash transfers, and transactions in markets that are far.

Nonetheless, these anticipated benefits tend to overlook critical features of rural financial markets and agricultural activity. Actors within agricultural value chains, such as input suppliers, rural product traders, and processors, provide informal financial services to households acting as financial intermediaries. They play a pivotal role in assessing borrowers, monitoring loan utilization, and managing transaction costs (Conning & Udry, 2007). Many financial transactions among agri-food value chain actors are interlinked with other transactions. For example, input providers do not only sale agricultural inputs to farmers, but also provide them with credit. Processors and traders (as well as other buyers), not only purchase produce, but also facilitate credit and facilitate technology transfer. Many of these interlinked transactions tend to occur via informal market channels.

Given the relatively low levels of adoption and utilization of mobile and digital financial services in agriculture (Parlasca et al., 2022). It remains unclear whether mobile money and similar financial services may complement, replace, or coexist with existing arrangements (formal and informal) among actors in agri-food value chains. Moreover, the literature documents what is called a “quiet revolution” in the middle of agri-food value chains, this literature is not linked currently with the literature on mobile finance. This paper aims to examine the literature on these issues to expand and enhance our understanding of the potential mechanisms between mobile money and related financial services and agricultural activity in the context of developing countries.

References

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Parallel 4D. Contributed Paper Session - Land and Natural Resource Management

08:30 - 10:10 Thursday, 8th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre
Alec Zuo

122 Maximizing Impact: The Power Of Combining Land Tenure Formalization And Productive Social Safety Nets Programmes In Tanzania

Haji Msangi[1,2,3], Betty Waized[1], Daniel Ndyetabula[1]

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Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

While standard economic theory highlights the significance of secure property rights for agricultural productivity and broader economic prosperity, the empirical evidence on these relationships remains mixed and inconclusive. Recognizing that Land Tenure Formalization (LTF) may have limited impact in isolation due to the absence of complementary factors, this study explores the synergies between LTF and Africa's second largest cash transfer program, the Productive Social Safety Nets (PSSN) in Tanzania. Utilizing data from the fifth and most recent wave (2020/21) of the Tanzania national panel survey, we employ a doubly robust Inverse Probability Weighted Regression Adjustment (IPWRA) approach to estimate the individual and combined effects of LTF and PSSN on farm productivity, consumption expenditure, and food security.

Our findings reveal that joint participation in both LTF and PSSN programs significantly enhances farm productivity, household consumption expenditure, and food security. Importantly, the joint impact of LTF and PSSN exceeds the sum of their individual impacts, underscoring a substantial complementarity between these initiatives. However, we find no evidence of stand-alone impacts for either LTF or PSSN on all food security indicators, except for a slightly significant positive effect of PSSN on food consumption scores. Our analysis across different land tenure systems indicates a stronger joint impact of statutory LTF with PSSN compared to customary LTF with PSSN, with the opposite trend observed for stand-alone impacts.

These findings indeed challenge long-held assumptions in Tanzania's poverty reduction approach. Firstly, they cast doubt on the conventional belief that impoverished households should not participate in multiple programs simultaneously to ensure a broader reach. Instead, our research suggests that implementing both LTF and PSSN together leads to more equitable outcomes for these vulnerable households. Secondly, our findings also challenge the prevailing perception that social protection interventions like PSSN are primarily designed to alleviate poverty and vulnerability, while productive interventions should exclusively target non-poor households. Our study demonstrates that the goals of LTF and PSSN programs for impoverished households are best achieved when these programs are concurrently implemented, unveiling complementarities that have a positive impact on consumption, agricultural productivity, and food security.

As a result, we encourage policymakers to carefully consider the trade-off between equity and efficiency in their decision-making processes. While equity may often be a priority, our research suggests that promoting efficiency by allowing joint participation in programs like LTF and PSSN can yield significant benefits for impoverished households, ultimately contributing to more inclusive and sustainable poverty reduction strategies.

Finally, considering the inconclusive evidence on the effects of LTF, we recommend further empirical evaluations to illuminate interactions between LTF and other anti-poverty interventions such as credit access, extension services, farm input subsidies, irrigation, and farm mechanization programs. This deeper understanding will contribute to more informed and effective policy implications.

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171 A Plastic Fibre Tax in the European Union: Impacts on Agricultural Land Use

Dominic White, Niven Winchester

Auckland University of technology, Auckland, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

25. Policy Analysis

Paper/Poster Abstract:

The production and use of plastics has a high carbon emissions footprint and pollutes the environment from the mistreatment of waste. In 2022, members of the UN endorsed a resolution to develop a legally binding agreement by the end of 2024 to address the externalities associated with plastics (United Nations, 2022). Microplastic pollution, especially from plastic fibres in textiles and clothing, is increasing worldwide and will need region-specific policies to be addressed. One of the policy tools which could be used to reduce plastic fibres is a tax on plastic use by the clothing and textile industries. In this research, we use a computable general equilibrium (CGE) model to estimate the impacts of such a tax on agricultural land use and economic outcomes in the European Union. We also approximate the taxation rate required to reduce the use of plastic fibres in the European Union by 100 percent in 2040. To do this, we model two separate policy horizons: 2025 and 2040. In 2025, we estimate the initial changes to land use in agriculture and production from different magnitudes of plastic taxes. Regardless of size of the tax, there is an increase in the production and land use of cotton, wool, and other plastic fibre alternatives. The land used in other types of agriculture decreases as a result. To reduce the use of plastic fibres by 100 percent in 2040, the tax rate is significantly higher than the taxes implemented in 2025 and the magnitude of land use change to agricultural plastic alternatives is greater. In both policy horizons, there is a reduction in GDP and welfare due to the increased costs associated with clothing and textile production.

References:

United Nations. (2022). End plastic pollution: Towards an international legally binding instrument. Draft resolution written by the United Nations Environment Assembly of the United Nations Environment Programme in Nairobi, Kenya. Available from: https://news.un.org/en/story/2022/03/1113142 [Accessed 5th of October 2023]

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292 Is natural capital an important factor of production in agriculture: Tests and descriptive insights using omitted-variable DEA models

Daniel Gregg[1,2], Elizabeth Heagney[3], Daniel Hill[1,4]

[1]Heuris Pty. Ltd., Adelaide, Australia. [2]University of Adelaide, Adelaide, Australia. [3]Farming for the Future, Lismore, Australia. [4]Universtiy of New England, Armidale, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

21. Land and Natural Resource Management

Paper/Poster Abstract:

In an era of increased concern around environmental sustainability there is a view that agricultural performance is at risk, both due to a need to meet increasing calls for reducing negative environmental impacts of agriculture and as a result of changing environmental conditions. We present a more nuanced view – one that places natural assets as integral to agricultural activities and as being a core farm asset. We use a unique dataset combined with extended DEA models for non-discretionary inputs to reframe the relationship between agriculture and the environment as one that involves a range of different possible zones with different characteristics and different values to farm businesses. Our most important contribution is showing that natural capital is, with little doubt, an important factor of production in agriculture.

Beyond our headline finding, our main contributions are threefold. Firstly, we provide the first formal test of the role of natural capital as a factor of production in farming businesses. Our approach lies in leveraging the slow-moving nature of natural capital changes allowing treatment as a non-discretionary input in Data Envelopment Analysis (DEA) approaches to farm performance analysis. Specifically, applying a generalisation of the Ruggiero (1998) DEA approach for non-discretionary factors we are able to define clear tests for whether the omission of natural capital from the farm performance assessment regime is significant and substantive, and, given it is a significant factor, whether natural capital is a positive or negative factor of production. Our results show that natural capital is a major, and largely positive, factor of production within our sample.

Secondly, our study provides an early description of the relationship between natural capital and farm performance. Using a Generalised Additive Model (GAM) to allow for a flexible representation of the production environment in the second stage of the Ruggiero (1998) model we show that the relationship between farm natural capital and farm performance is complex (highly non-linear). For our sample it appears to involve a largely neutral (no contribution) relationship for farms with low levels of natural capital but a strongly positive relationship for farms with high levels of

natural capital. This dichotomy is possibly indicative of different management strategies but also shows that those farms with low natural capital are more likely to experience higher inefficiency.

Finally, we show that there are substantial and significant differences in management of farms with low natural capital and those with high natural capital. Input intensities for costly inputs tend to be higher for farms with low natural capital, a pattern that is further indicated by a higher level of costs per hectare. While revenues per hectare are also lower for high natural capital farms compared to low natural capital farms, this does not appear to translate to lower profitability. Our results also support the possibility that agri-finance industries may be penalising farms with high levels of natural assets with significantly lower farm asset values per hectare for farms with high levels of natural capital despite evidence that natural capital supports increased farm performance

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170 Market power in the Australian water market

Alec Zuo, Sarah Wheeler, Wenzhu Tang

The University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

23. Market Design and Policy

31. Water

Paper/Poster Abstract:

Although the MDB water markets have been continuously evolving and maturing – and are considered the most advanced water market system in the world (particularly in the Southern Basin) – information transparency (asymmetric information) amongst participants remains an unsolved issue, which prevents efficient markets and causes social harm.

Concentration in water ownership may result in market power, and consequently anti-competitive behaviours (imperfect competition) in the water markets. ACCC (2020) also alleged that investors used their market power to influence water market prices to their advantage. Large investors have multiple advantages that include analytical resources, financial market access and financial backing, and are not constrained by the need to apply water for agricultural production; therefore, it has been alleged that investors restrict market supply sufficiently to artificially raise allocation prices by a material amount and then supply allocations to the market at inflated prices at times of peak demand (ACCC 2020). Although this has not been shown quantitatively in the Australian market, overseas research has shown that barriers in Chile water markets caused by information asymmetry led to different prices for homogeneous water rights (Hadjigeorgalis & Lilywhite 2004) and that even small market power in a groundwater-dependent agriculture region in southern California led to sizeable distributional impacts (Bruno & Sexton 2020).

We link both ownership and trading register data to investigate imperfect competition and asymmetric information possibilities to uncover whether the alleged behaviour of investors have caused detrimental consequences to the market and whether there has been any abuse of market power.

The research questions include: what is the degree of difference in the bargaining powder of traders due to information asymmetry from the price; and what influence buyer and seller characteristics have on bargaining power in MDB water markets?

To answer these questions, following Harding et al (2003), the effects of buyer and sellers on bargaining power can be estimated by a hedonic pricing model where the dependent variable is the observed water price of a transaction and the independent variables include a vector of characteristics of water trade that are observed and known to the traders, vectors of differences and sums of seller and buyer attributes. Given the assumption of symmetric bargaining power (if buyers and sellers are identical then neither will have an advantage) and symmetric demand (buyers and sellers with identical demographic traits place equal value on the traded good); the estimated coefficients of the vector of differences of seller and buyer attributes provides direct measure of seller and buyer traits on bargaining power.

The data for estimating the hedonic pricing model are from state water registers (NSW, VIC and SA). Specific to each trade, attributes of both sellers and buyers are available such as water ownership types, water availability, climate conditions and trade experience, allowing us to estimate the effects of differences in buyer-seller attributes on water transaction prices. The preliminary results will be presented at the AARES conference in February in 2024.

Parallel 4E. Contributed Paper Session - Practice Change and Adoption 1

08:30 - 10:10 Thursday, 8th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre
Sam Coggins

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79 Unlocking Agricultural Mechanisation Potential in Indonesia: Barriers, Drivers, and Pathways for Sustainable Agri-Food Systems

Kodrad Winarno, Risti Permani

University of Queensland, Gatton, Australia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

26. Practice Change and Adoption

Paper/Poster Abstract:

Agricultural mechanisation is argued to play a crucial role in efforts towards achieving Sustainable Development Goals (SDGs) by increasing productivity and food quality, promoting resource efficiency, and mitigating climate change. However, the current uptake suggests significant disparities in mechanisation adoption among smallholder farmers, including in Sub-Saharan Africa. Recognising the importance of agricultural mechanisation for SDGs, scholars have identified factors influencing the adoption rates at the farm, local, and regional levels and the need to improve sustainable mechanisation. Nevertheless, fewer studies address the dynamics between the present and

likely future mechanisation pathways and the rapid and recent changes of technological advancement, socioeconomic and agroecological factors, including the supply and demand of mechanisation across the agri-food value chains. Using Indonesia as a case study, this study aims to assess the country's agricultural mechanisation state of play and systematically review the literature on its agricultural mechanisation level, barriers, drivers, and impacts of mechanisation adoption on sustainable agri-food systems. With its diverse agroclimatic conditions, farmland endowments, increased pressure for non-agricultural land use, rising real wages, high population density, urbanisation, and the continued dominance of smallholder farmers, learnings from this study are applicable to other developing countries' contexts. This study includes three stages. First, Indonesia's current agricultural mechanisation level is analysed by reviewing the government's and relevant institutions' regional data and documents. The discussion looks at agricultural mechanisation trajectory, regional disparities, and current policy approaches. Second, guided by the PRISMA framework, this study conducts a systematic literature review (SLR) to analyse studies on the mechanisation level, barriers, drivers, and impacts of agricultural mechanisation adoption in Indonesia from a sustainability lens. Finally, results from the first two stages are used to develop a novel framework for sustainable agricultural mechanisation development in Indonesia and its potential impacts and outcomes on sustainable agri-food systems. The framework considers relevant theories and frameworks such as the food system framework, the Theory of Change, and the innovation ecosystem mapping various external drivers, resources, key stakeholders, and pathways towards achieving desirable sustainable agri-food system outcomes and improved livelihoods. The study reveals Indonesia's low mechanisation level, significant regional disparities and opportunities to improve policy effectiveness. Various barriers to mechanisation adoption are also identified, including individual, market, regional, and institutional factors and agroecological conditions. Overall, the study highlights the importance of optimising the multi-stakeholder roles in agricultural mechanisation value chains, developing demand-led smallholder-inclusive sustainable agricultural mechanisation business models, and the need to investigate the potential of farmers' willingness to invest in mechanisation.

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14 How does Women Participation in Market-Oriented Crop Production Programs Impact Intimate Partner Violence in Malawi?

Robertson Khataza, Dorica Singini, Blessings Nyirongo

Lilongwe University of Agriculture and Natural Resources, Lilongwe, Malawi

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

19. Impact Assessment

Paper/Poster Abstract:

Intimate Partner Violence (IPV) continues to be a pervasive health and human rights concern that affects individuals and communities worldwide. Women's participation in market-oriented agriculture production is one of the common development policy strategies promoted to economically empower rural women and, thus, transform their livelihoods and reduce gender inequality. This report presents the results of a 2-year study conducted to investigate the relationship between women's participation in market-oriented horticultural crop production—a form of women's economic empowerment (WEE) program—and the prevalence of IPV in Malawi. Using telephone survey, the study collected two rounds of data from 927 and 909 households in Dedza and Mzimba districts between June 2022 and July 2023, respectively. The findings reveal that economic empowerment through market-oriented crop production positively increased women's autonomy, decision-making power, and overall well-being. Further, the results show that 57% of the sample had experienced either physical, sexual, mental or economic violence and abuse within a 12-month reporting period. IPV incidences were higher among women who participated in market-oriented crop production than non-participants. These results suggest that male-backlash behaviour is dominant in the study sites

such that a sense of women economic empowerment potentially fuels violence between marital partners. The study highlights the need for increasing IPV prevention-education programs to raise awareness about the dangers of IPV and encourage victims to utilise referral services which are available in the country.

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256 Tracking socio-economic impacts and opportunities of agricultural innovations in smallholder systems

Marta Monjardino[1], Rupak Goswami[2], Krishnendu Ray[3], Sanchayeeta Misra[2], Kalyan Roy[2], Esmat Begum[4], Mahanam Das[5], Afroza Chowdhury[6], Sukamal Sarkar[2]

[1]CSIRO, Adelaide, Australia. [2]RKMVERI, Kolkata, India. [3]BCKV, Kolkata, India. [4]BARI, Gaizpur, Bangladesh. [5]Shushilan, Dhaka, Bangladesh. [6]BRRI, Gaizpur, Bangladesh

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

26. Practice Change and Adoption

Paper/Poster Abstract:

Quantifying the complex trade-offs from the adoption of various interventions targeted at resource-constrained smallholder farmers remains a challenge for agricultural development agencies. Agrifood systems include multiple biological, economic, social and environmental constraints, interactions, synergies, risks and trade-offs over time, as well as broader adoption drivers, which all contribute to the complexity of the farmer's decision-making process. To fill this gap, we develop a Socio-Economic Tracker based on a 10-point impact scorecard to evaluate the relative impact and opportunity of agricultural innovations in smallholder agrifood systems across a range of metrics. The goal of this approach is two-fold: 1) to introduce consistency and structure in the multi-faceted analysis of agri-food systems across agroecological and socioeconomic contexts, and 2) to deliver a range of standard outputs that benefit and empower its users by assessing the value of specific innovations and allowing comparisons to be made across 10 different metrics. For each agricultural innovation, a score is calculated for the following metrics: 1. Productivity, 2. Profitability, 3. Riskiness, 4. Adoptability, 5. (Environmental) Sustainability, 6. Gender Equity, 7. Food Security, 8. Diversity, 9. Scalability, and 10. Marketability. The Socio-Economic Tracker builds on Value-Ag, a multi-tool approach that combines bio-economic modelling, risk analysis, adoption prediction and impact assessment to help determine the likelihood of agricultural innovations being adopted and then paying off over time. The main outcomes for a particular case study are useful insights for improving farm productivity and profitability while reducing risk exposure from an agricultural innovation, as well as the opportunity to out-scale these changes across farm types, project sites and/or regions according to predicted adoption outcomes. While impact scores 1-4 are generated through Value-Ag, the remaining six scores are being developed in collaboration with ACIAR and DFAT projects with focus on sustainable intensification of agrifood systems in the Indo-Pacific. The Socio-Economic Tracker offers a platform to evaluate alternative innovations in a rigorous, systematic and participatory manner across a range of scenarios, scales and metrics, thereby stimulating thinking and learning opportunities with the relevant stakeholders and increasing the scrutiny of projects so that they deliver greater value for money while fostering a more results-focused culture in developing countries.

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84 Making agricultural extension videos helpful, scalable and inclusive? A randomized trial in Bihar, India.

Sam Coggins[1], Paulo Santos[2], Sugandha Munshi[3], Shridhar Patil[4], Jeremy Smith[1], David Ireland[1], Shishpal Poonia[5], Deepak Kumar Singh[5], Anushka Asawarn[6]

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Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

26. Practice Change and Adoption

Paper/Poster Abstract:

Farmers, agricultural researchers and other extension actors increasingly develop videos to help farmers improve their farming practices in low- and middle-income countries. For instance, a farmer from Punjab has a YouTube channel called 'Farming Leader' with over six million subscribers and one billion views, where he shares videos of tractor reviews, vermicomposting methods, and other agricultural topics.

Farming videos are attractive extension tools because the marginal cost of replicating them is practically zero. However, they lack interactive discussions, making it challenging for farmers to trust, adapt, and provide feedback on recommended practices. Additionally, farming videos often exclude women, less affluent, and less educated farmers in low- and middle-income countries.

Person-to-person circulation of farming videos (in-person or via WhatsApp groups) may be one mechanism to capture the benefits of farming videos, while mitigating their downsides. However, we have little empirical evidence to assess the cost-effectiveness and inclusivity of this extension model. Numerous randomized trials have analysed factors affecting how farmers *use* farming videos to change their own farming practices. But, to our knowledge, no randomized trials have analysed factors affecting how farmers (or other extension actors) *access* and *share* these farming videos.

In collaboration with the Bihar State Government, we implemented a randomized trial testing whether the gender of farmers featured in videos influenced the reach and gender inclusivity of person-to-person sharing of these videos in rural Bihar (India). We sent three wheat agronomy videos via WhatsApp to 294 extension workers and asked them to share these videos with farmers in their communities. The extension workers were randomly assigned videos featuring either expert female or male farmers, covering topics such as planting dates, irrigation, and herbicides. We measured the scale of video circulation using link tracking (each extension actor received a unique link) and used phone surveys to observe the gender of people extension workers shared farming videos with. We also facilitated 22 follow-up qualitative interviews with video sharers.

Three preliminary findings caught our attention. First, 5% of extension actors facilitated more than 60% of video views (for the first video). Second, extension workers reported being more motivated to share videos when it aligned with their existing priorities, like recruiting farmers for on-farm field trials. Third, interviewed extension workers generally perceived videos as relatively uninfluential but still a helpful complement for face-to-face extension (a quick and easy way to engage with more farmers and provide reminders, reference material and credibility for their advice). One extension worker likened WhatsApp-based video sharing to "chutney" - something incomplete on its own but adding flavor to the main "rice and dahl" extension activities, such as face-to-face conversations and field demonstrations.

Parallel 4F. Contributed Paper Session - International Trade

08:30 - 10:10 Thursday, 8th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre
Rajendra Adhikari

35 Global Modelling of Agricultural Trade, Domestic Support and Consumer Tax Policies

Kym Anderson[1,2], Anna Strutt[3], Erwin Corong[4]

[1]University of Adelaide, Adelaide, Australia. [2]Australian National University, CAnberra, Australia. [3]Waikato University, Hamilton, New Zealand. [4]Purdue University, West Lafayette, USA

Presentation Type:

3. Contributed Paper

Keywords:

20. International Trade

25. Policy Analysis

Paper/Poster Abstract:

Tariff protection to farmers has fallen over the past three decades and partly been replaced by potentially less-costly domestic support. Meanwhile, support for farmers in some emerging economies has grown, and food consumer subsidies are large in a few countries. This paper provides new estimates of national and global economic welfare impacts of those policies, using the authors' modified version the latest global economy-wide GTAP (Global Trade Analysis Project) model calibrated to 2019. It does so by simulating the removal of agricultural domestic supports, food consumer subsidies, and agri-food import tariffs. The relative contributions of those three interventions to their combined global welfare cost are estimated. As well, their aggregate cost is compared with that from the removal globally of tariffs on imports of non-agricultural goods. We find that agricultural support policies are still an important part of the global welfare cost of all goods' trade-distorting policies (albeit much less costly than in 2001), and import tariffs still dominate the global welfare cost of all agri-food market intervention programs. Australia and New Zealand continue to be among the most hurt agricultural-exporting nations. We conclude by noting that the poorest of both net sellers and net buyers of agri-food products could be supported instead by direct fiscal e-payments at much lower cost than the current programs. Such reform would allow a re-purposing of national supports to relieve natural resource and environmental stresses, boost food and nutrition security, and alleviate poverty and income inequality.

258 Impacts of Trade Exposure on Crop Profitability in the United States

Jiyeon Kim, Jisang Yu

Kansas State University, Manhattan, USA

Presentation Type:

3. Contributed Paper

Keywords:

20. International Trade

25. Policy Analysis

Paper/Poster Abstract:

Better accessibility to foreign markets provides opportunities for U.S. agricultural producers to gain from trade. Gains can be greater for producers of exporting goods as they face greater reductions in tariffs for their products due to trade liberalization. On top of that, substantial spatial variations in cropping patterns and profitability across regions exist, and factors such as climate, market accessibility, and policy differences can contribute to the spatial variations. Thus, it is important to understand how export exposure affects crop profitability considering where and which crops benefit from better foreign market accessibility.

The literature explores the localized effects of trade, specifically focusing on the effects of an increase in imports on local labor markets (e.g., Autor, Dorn, and Hanson 2013; Dix-Carneiro and Kovak 2017; He 2020), but less attention has been paid to the impact of better access to foreign markets on the profitability of agriculture across states. One exception is Yu, Villoria, and Hendricks (2022), who showed that more export exposure improved the returns to U.S. agriculture using the farmland rental rate as an indicator of the agricultural returns. Their results indicate that the heterogenous export effects on returns may come from the changes in profitability of crops that are exposed to greater accessibility, yet the direct estimation of trade exposure on crop-specific profitability has not been documented.

The objective of this study is to provide direct estimates on the impact of better access to foreign markets on crop profitability. We focus our analysis on major field crops, corn, soybeans, wheat, cotton, and rice across the U.S. from 2000 to 2021. The primary datasets are U.S. state-level panel data on crop yield, price received, production cost, and state export values from USDA ERS and NASS. In addition, weather data (PRISM) is also utilized to account for the impact of climate change on crop production.

To identify the localized export effects on crop profits, we use the share of state exports by crop at a specific base year to localize the national level of crop-specific export volume. We utilize state-fixed effects to control for land productivity differences across states. The weather variables are also included because they influence production that could affect crop revenues and trade. Our results will provide an important implication in understanding trade policies and their impacts on the stability of the farm economy.

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200 The impact of the Russia-Ukrainian conflict on world grain markets

DAVID VANZETTI

University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

20. International Trade

25. Policy Analysis

Paper/Poster Abstract:

In response to the Russian invasion of Ukraine, grain shipments through the Black Sea were suspended, causing a sharp rise in grain prices. A UN sanctioned deal, the Black Sea Grain Initiative, allowed trade in food and fertiliser to continue from August 2022. However, that deal has been suspended, once again putting at risk food security in those countries dependent on grain imports.

While the short-term impacts appeared significant, it remains to be seen what the longer-term impacts might be. We use a CGE model to assess the trade impacts of the production shortfall in Ukraine plus the Black Sea blockade. We show that with time to adjust, the medium-term price impacts are relatively modest but the quantity impacts are more significant. Developing country importers are affected more by shortages of coarse grains than wheat or oilseeds. Implications for Australian and other grain exporters are estimated. The role of open international markets is critical to subdue food security concerns. This means that export restrictions need to be kept to a minimum if prices are to be kept down.

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316 Assessing Australian Wheat Exports: Analysis of Market and Product Structure

Nan Wang, Richard Culas

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Presentation Type:

3. Contributed Paper

Keywords:

20. International Trade

23. Market Design and Policy

Paper/Poster Abstract:

This study aims to provide an in-depth analysis and assessment of Australian wheat products' export market and product structure. Multiple indicators, including the HHI index, Lawrence index, Spearman rank coefficient, and BSCI index, are used to comprehensively understand the market concentration, the extent of change, and the matching degree between products and markets and global demand.

The study used data from the World Bank database from 2009 to 2021, covering 18 types of wheat export products, including wheat cereals, flours, and bread (according to HS 2002 code). We compared four other major wheat exporters: the United States, Russia, Canada, and France. Research results show that the export structure of Australian wheat products has the highest concentration among the five countries, with an average value of about

0.80. In comparison, the product concentration ratios of the other four countries are 0.48, 0.77, 0.37, and 0.37, respectively, implying that the types of wheat products exported by Australia are relatively single.

In addition, Australia's wheat product structure changed relatively little in the years investigated, with an average of 0.03. However, the trend showed signs of a gradual increase, which may signal that Australia is actively adjusting its wheat product structure to adapt to changes in market demand. However, it is worth noting that the matching degree between Australia's wheat product structure and global demand is relatively low, about 0.64; the other four major wheat exporters are 0.91, 0.74, 0.86, and 0.90, respectively, and the trend is downward, suggesting that the current structure of Australian wheat exports is deviating from world demand and the situation is further deteriorating.

In terms of market structure, compared with other types of products, by-products (bran HS 230230) have the highest market concentration for Australia with an average of 0.80 (which is 0.80, 0.78, 0.96 and 0.293 for others). This may be due to the lower trade value of such products and the transport cost. Unprocessed wheat cereals have the lowest market concentration because they have multiple uses and meet various consumer needs. The export market for Australian wheat products is relatively concentrated compared to the other four countries. However, the market structure has changed significantly, which shows that Australia is actively adjusting the market structure to adapt to different needs.

Comprehensive indicator analysis shows a diversified product structure may be crucial to Australia. Australia could consider investing in research and development of new wheat varieties better suited to the needs of different markets or improving wheat processing technology to create more value-added wheat products. Second, market diversification is critical to reducing risk. Reducing reliance on a few significant markets, actively seeking emerging markets, and strengthening partnerships with existing markets can help the Australian wheat industry better respond to market fluctuations. Additionally, it is crucial to monitor and study market dynamics continuously.

The Australian government and agricultural departments should continue to pay attention to changes in global market demand and flexibly adjust strategies according to market trends to ensure that the wheat export industry remains consistent with market demand.

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327 Competitiveness of Australia-Pakistan pulses export chains: a value chain perspective

Mukunda Bhusal[1], Saroj Amgai[2], Rajendra Adhikari[2]

[1]Ministry of Agricultural Development, Kathmandu, Nepal. [2]The University of Queensland, Gatton, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

This paper examines the factors of competitiveness and efficiency in the Australia-Pakistan pulses export value chains by analysing the relationships and trust between exporters in Australia and importers and other actors in Pakistan. Pakistan fulfills 90 percent of its net pulse import demand from Australian imports. However, whether or not existing Australian export value chains to Pakistan are operating to their optimum potential is not fully understood. Using semi-structured interview data, we analysed narratives of chain actors about the performance, efficiency and value-creating opportunities in existing chains. The qualitative textual data were analysed using thematic analysis and

the system dynamics approach. A thematic analysis identified a lack of holistic thinking, cultural differences and low level of trust and transactional relationships that existed in current operations contributed to some inefficiencies and wastages in the pulses value chains. In addition, a lack of alignment between the dynamic capability of upstream actors and resistance to change among downstream actors also contributed to the chain-level inefficiencies. A casual loop modelling of the value chain systems showed that the competitiveness of these chains could be enhanced and sustained through co-innovation, developing dynamic capability downstream, ensuring effective communication and sharing information, resources and knowledge within chains. While upstream actors already valued these drivers, downstream actors were still guided primarily by short-term profit motives. The paper identifies value-creating opportunities in the chains and suggests areas where actors in each stage of the chain should priorities their future commitments and investments in order to leverage the potential competitiveness of the chains.

Parallel 4G. Contributed Paper Session - Valuation 2

08:30 - 10:10 Thursday, 8th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre
Tim Clune

334 Attitude, subjective norms, control beliefs, and intention of the Indonesian land-based private sector to implement carbon trading

Iis Alviya, Md Sayed Iftekhar, Harsha Sarvaiya

Griffith University, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

7. Carbon and Nature Markets

8. Climate Change

Paper/Poster Abstract:

Attitude, subjective norms, control beliefs, and intention of the Indonesian land-based private sector to implement carbon trading

Iis Alviya, Md Sayed Iftekhar, Harsha Sarvaiya

Abstract

To anticipate the risks of global change, carbon trading has become an essential instrument to reduce greenhouse gas emissions globally, including in Indonesia. The land-based private sector is a critical factor in this instrument application in Indonesia to reduce greenhouse gas emissions besides governments and communities. However, fulfilling the national emission reduction targets and increasing its business feasibility is a big challenge for the sector. This study explores what attitudes, subjective norms, control beliefs and intentions of the land-based private sector to perform in carbon trading. A qualitative method was employed in this study using a semi-structured interview guide framed by the Theory of Planned Behaviour. Thematic analysis was used to resolve the meaning from participants' responses using NVivo 20 software. This study provides a novel on the land-based private sector's intention to implement carbon trading. First, carbon trading implementation provides new business opportunities, including profit and additional revenue, market demand and branding, national commitments to reducing emissions, benefits for the community and biodiversity, and insetting and greenwashing. Second, the roles of the land-based private sector in economic, environmental, social and political aspects through implementing carbon trading. Third, factors facilitate or impede the implementation of carbon trading in Indonesia. Some factors facilitate the behaviour covering firms' readiness, legal basis, and infrastructure development. Factors that impede the behaviour are regulation uncertainty, policy restriction of the voluntary carbon market, cost and administrative process. This study provides policy recommendations to support carbon trading in Indonesia by generating new ideas on how carbon trading could incentivise the private sector to increase business feasibility while achieving national emission reduction targets. It also provides theoretical guidance for future research and has practical implications for designing interventions promoting low-emission development initiatives.

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294 Assessment of the Resilience of Local Communities in the Face of Climate Change induced hazards: the role of social capital

Tsegaye Gatiso, Suzie Greenhalgh

Manaaki Whenua- Landcare Research, Auckland, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

10. Development Economics

14. Environmental Economics

Paper/Poster Abstract:

The relentless changes in global climate patterns, marked by increasing temperature and rising sea level, have triggered a broad spectrum of consequences, affecting communities worldwide. Small Island developing nations, such as Fiji, are notably at the forefront, grappling with the severe impacts of these transformative shifts. This study analyses the resilience of local communities in the face of climate-induced hazards and assesses their ability to cope with the effects of the hazards and bounce back when such adversities struck.

Drawing upon two comprehensive datasets, the Fijian Population and Household Census data for the period of 1996 to 2014 from IPUMS International (n=19,320 households) and a household survey conducted by Manaaki Whenua-Landcare research, New Zealand in 2012 (n=360 households), we undertake a robust analysis of the economic resilience capacity of households in Fiji, an archipelago in the South Pacific. To compute the households' economic

resilience capacity index (ERCI), we follow the FAO's Resilience Index Measurement and Analysis II (RIMA-II) methodology and modify it to account for the importance of social capital in our resilience analysis.

Our findings revealed a dynamic landscape of economic resilience in Fijian communities. In general, the economic resilience of Fijian households exhibited an improvement from 1996 to 2007, followed by a stagnation period between 2007 and 2014. Notably, iTaukei (indigenous Fijian) households demonstrated lower asset-based economic resilience compared to other ethnic groups across the two decades we analysed. Nonetheless, accounting for the role social capital in resilience capacity of households substantially reduced the gap between the resilience capacity of the ethnic groups. Hence, we argue that in societies such as those in Fiji where social networks play an indispensable role in times of emergencies and disaster, omitting social capital could lead to flawed policies. Hence, our findings call for policy caution, discouraging an exclusive reliance on asset-based resilience capacity analyses, and underscore the importance of a holistic approach. The other intriguing result was that households headed by women tend to exhibit significantly lower economic resilience. This gap is mainly driven by male headed households having higher adaptive capacity, household assets and higher ability to meet basic needs. Our results underline the importance of addressing the multifaceted challenges faced by women in Fiji to enhance the economic resilience of Fijian communities. Policy initiatives aimed at promoting gender equality, access to education and healthcare, land rights, and economic opportunities play a vital role in strengthening the economic resilience of female-headed households.

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342 Exploring Children's Attitudes towards Sustainable Agriculture: A Case Study of Primary School Students in Hanoi and Surrounding Areas

Hirotaka Matsuda

Tokyo University of Agriculture, Atsugi-shi, Kanagawa, Japan

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

11. Ecological Economics

14. Environmental Economics

21. Land and Natural Resource Management

26. Practice Change and Adoption

Paper/Poster Abstract:

Introduction: Over the past two decades, Vietnam has experienced a 19.8% decline in the agricultural sector's contribution to its GDP, following Petty-Clark's law. Identifying individuals who are inclined towards pursuing careers in agriculture and can contribute to the revitalization of rural communities has become increasingly critical. While quantitative studies have explored public behavior using the public goods game, limited research exists on understanding children's occupational aspirations as future farmers in developing countries. Moreover, there is a dearth of studies applying the Theory of Rational Action (TRA) or the Theory of Planned Behaviour (TPB) to foster interest in agriculture and rural development. This research aims to quantify children's willingness to contribute to public investments through a public goods game and explore how their attitudes change through an educational lecture, acknowledging children as potential future leaders in society.

Method: This study, conducted in November and December 2013, surveyed approximately 12-year-old children from two Vietnamese secondary schools. One school was located in Tan Mai Ward, Hanoi (UrbanH, 239 children), while the other was in Giao Thien Commune, Nam Dinh Province (RuralG, 88 children). In the public goods game, children, grouped in fours, were provided with 5 tokens (each worth 10,000 VND) and instructed to allocate them between a "public account" and a "private account" (0, 1, 2, 3, 4, or 5 tokens). The sum contributed to the "public account" was doubled and then redistributed among the four members. This process was repeated for five rounds with no communication allowed between the members. We analyzed the amount of money contributed over rounds and its relationship with individual characteristics. To assess attitude and behavioral change, a 40-minute lecture on improving agricultural production in Vietnam and the multifunctionality of agriculture was given to inspire children to take action in support of agriculture. A set of 10 questions based on attitude and behavioral modification theory was administered to the children before and after the lecture for scoring on a scale from 1 to 5.

Results: Both UrbanH and RuralG showed an increase in the "recognition of importance" score, with a slightly higher pre-lecture score in UrbanH. "Responsibility" and "Moral" scores increased marginally in RuralG but significantly in UrbanH after the lecture. "Execution of action" scores remained relatively low in both areas. In the public goods experiment, boys tended to increase their contributions from the 1st round to the 2nd round compared to girls. In RuralG, children from full-time farming backgrounds contributed significantly less in the 1st round compared to their part-time farming counterparts. However, children aspiring to be farmers contributed significantly more in the 2nd round. The relationship between the amount of contributed money and attitude change warrants further discussion.

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306 Do public perceptions of the environment align with objective measures?

Pamela Booth, Pike Stahlmann-Brown

Manaaki Whenua, Wellington, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

25. Policy Analysis

Paper/Poster Abstract:

Beliefs that the environment will always provide, that development is a zero-sum game with the environment, and that technology will boundlessly improve natural resource efficiency influence both how individuals interact with the environment and how decision makers manage the environment. However, if beliefs are based on perceptions of ecological states that differ from objective measures or expert opinion, the behaviours, policies and regulation on which these beliefs rely may perpetuate environmental degradation. Using a recent large-scale, nationally representative survey in Aotearoa New Zealand we explore how public perceptions of the environment and the available known state of the environment compare. We then discuss reasons why perceptions and the known science may diverge or align and the implications for regulation, policy, and environmental sustainability when perceptions diverge from the known science.

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18 Values Matter - Recognizing the ‘Intangible’ in Landscape Policy Decisions

Tim Clune

La Trobe Business School, La Trobe University, Melobourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

31. Water

Paper/Poster Abstract:

Community access to scarce resources such as water is mediated through the complexity of regulatory frameworks such as the Murray Darling Basin Plan, water markets and social constructs that constrain and silence interested voices.[1] In the last decade, the impacts of policy action to address a drier water future have not been equally shared with some communities fairing much worse than others. [2] The variance in outcome experienced by communities in the last decade runs deeper than the financial impacts of water ‘lost’ from the community. Rather it is reflected in the consideration of wellbeing, which is derived from an understanding of a broader suite of factors that can be resolved through structural adjustment. This paper reports on a participatory approach that considers the function of water in the context of its contribution to a future sustainable, multi-functional regional landscape,[3] which delivers outcomes for diverse interests. [4] In doing so, it seeks to change the tone of water conversations from one focussed on binary outcomes, ie environment versus consumption, to conversations that enable communities to envisage and design transitions that deliver broad-based outcomes that protect environmental, economic and social elements that are valued by and respect the diversity of values in the community. A key outcome of the research is to enhance community agency and engagement in water decision-making.

[1] Downey, H., & Clune, T. (2020). How does the discourse surrounding the Murray Darling Basin manage the concept of entitlement to water? Critical Social Policy, 40(1), 108–129. https://doi.org/10.1177/0261018319837206[2] Sefton, R., Peterson, D., Kassebaum, A., McKenzie, D., Simpson, B. & Ramsay, M (2020) Final report: Independent Assessment of Social and Economic Conditions in the Murray-Darling Basin, Melbourne[3] Wiggering, H., Muller, K., Werner, A., and Helming, K. (2003) The Concept of Multifunctionality in Sustainable Land Development, in Sustainable Development of Multifunctional Landscapes (Katharina Helming and Hubert Wiggering Eds), Springer-Verlag, berlin[4] Fry, G. (2001) Multifunctional Landscapes – towards transdisciplinary research, Landscape and Urban Planning, 57, 159-168

Parallel 4H. Contributed Paper Session - Environmental Economics 3

08:30 - 10:10 Thursday, 8th February, 2024
Location Room 6, (Level 5) Marie Reay Teaching Centre

Bernardo Cantone

308 Activating the Consumer Market for Soil Stewardship Practices

Mark Morrison[1,2], Jenni Greig[1,2], Kirsty Mackenzie[1,2], Felicity Small[1,2], Darla Hatton MacDonald[3,2], Tahmid Nayeem[4,2], Mark Tocock[5]

[1]Charles Sturt University, Bathurst, Australia. [2]Soils CRC, Callaghan, Australia. [3]University of Tasmania, Hobart, Australia. [4]Charles Sturt University, Albury, Australia. [5]CSIRO, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

7. Carbon and Nature Markets

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

In contrast to focusing on development of constructed markets for ecosystem services, this project focuses on how to influence and change the consumer market to better incentivise farmers for their use of soil stewardship practices. The project has investigated what Australian food consumers know about soil stewardship and the demand which currently and may potentially exist (after market activation) for its use. The project has developed and tested a range of different communication materials to educate and promote soil stewardship to consumers to determine whether it is possible to increase consumers' willingness to pay for its benefits so that farmers are better rewarded for implementing soil stewardship practices by higher farm-gate prices. The project has also engaged with value chain stakeholders to better understand their potential demand for information about consumer willingness to pay, perceived obstacles for its usage, and specific informational requirements for – and interest in – rewarding farmers for quality practice, though the focus fn this paper is on consumers.

Qualitative research was conducted with consumers (1) to explore their knowledge of soil and soil stewardship practices, (2) potential motives for paying extra for soil stewardship practices, and (3) to assist in developing and testing communications materials.

Quantitative research included the use of market segmentation techniques and discrete choice modelling to estimate consumer demand for soil stewardship practices and to test the efficacy of the communications materials.

From the first round of focus groups we found that most consumers have relatively limited knowledge about soil, and that there is confusion about the difference between organic and soil stewardship practices. However, they were interested to learn more about soil stewardship and various motives for choosing products with, or paying more for, products with soil stewardship features were identified. These includes good for me (ie. health), good food for the environment, and good farmers and their communities. From these findings, four consumer personas were developed that were used to describe the main consumer segments identified, including their motives for valuing soil stewardship. These profiles were used to help develop the fundamental ideas for the design of the communication materials.

The communications materials included a hypothetical brand and brand logo, two websites, eight television commercials), an advertorial for lifestyle magazines, packaging for five products (breakfast cereal, mince, sugar, potatoes and lentils), three infographics, and certification logos.

The quantitative analysis revealed that there were sizeable market segments willing to pay for (1) the hypothetical brand, (2) use of soil stewardship practices, and (3) alternative certifying bodies, though this varied across products. We observe meaningful differences in willingness to pay for soil stewardship versus organic practices across segments. The influence of various communications materials across segments was also found to differ. The findings suggest that there is potential to activate the consumer market for soil stewardship practices.

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226 ICT infrastructure and environmental efficiency in agriculture production in the ASEAN region

Giang NT, Bayu Rizkydunar

Kangwon National University, Chuncheon, Korea, Republic of

Presentation Type:

3. Contributed Paper

Keywords:

7. Carbon and Nature Markets

27. Productivity and Efficiency

Paper/Poster Abstract:

This paper aims to investigate the impact of ICT infrastructure on the environmental efficiency of agricultural production in the ASEAN region. The undesirable output from agriculture activities is greenhouse gas emissions, and directional distance function is used to measure environmental efficiency as the dependent variable. Data from World Bank Development Indicators (WDI) and Food and Agricultural Organization Data (FAOSTAT) from 1981 to 2021 covering ten (10) ASEAN nations is used to answer the research question. Because of long panel data (large T and small N), the research applies Modified Ordinary Least Squares (FMOLS) to study the impact of ICT infrastructure on environmental efficiency of agricultural production in the ASEAN region. The findings suggest that ICT infrastructure has a positive and significant impact on environmental efficiency in agriculture. it is the first study to examine the impact of ICT infrastructure on environmental efficiency in agriculture in the ASEAN region.

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167 Inter-temporal farm typologies for GHG mitigation in New Zealand's diverse dairy farms

Erandi I. U. K. Kalehe Kankanamge[1], Ramilan Thiagarajah[1], Peter R. Tozer[1], Cecile de Klein[2], Alvaro Romera[3]

[1]Massey University, Palmerston North, New Zealand. [2]AgResearch, Mosgiel, New Zealand. [3]AgResearch, Hamilton, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

8. Climate Change

Paper/Poster Abstract:

New Zealand's agriculture sector is pivotal in the nation's overall greenhouse gas (GHG) emissions landscape, contributing to more than 50% of the country's gross emissions. An overwhelming majority of these emissions, specifically 90%, can be directly attributed to ruminant livestock, including dairy cattle, making them a significant driver of the country's agricultural emissions.

When assessing GHG emission estimates from New Zealand farms associated with the production of milk, variations over time become evident. These fluctuations are highly sensitive to farm inputs, milk prices, and pasture yield. Furthermore, GHG mitigation potential is influenced by the heterogeneous nature of farms, driven by factors such as farm size, location, soil characteristics, forages, livestock mix, and management practices. Consequently, farm emissions exhibit significant variation from one farm to another and over time. These diversities present unique challenges and opportunities for mitigating GHG emissions, underscoring the need to explore this variability.

In this study, we aim to assess the diversity of dairy farms using production, economic and emission variables, identifying the main drivers deciding their system by classifying them into homogenous groups. Our analysis leverages panel data sourced from DairyBase. Our sample consists of longitudinal data from 276 dairy farms from 2011-12 to 2015-16 years. Using principal component analysis and cluster analysis, a number of temporal farm types are identified. This study underscores the importance of inter-temporal farm typologies in elucidating the complex and evolving GHG emission patterns within these diverse farm systems. These typologies help to evaluate the bioeconomic potential of various mitigation options.

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25 Are biofuels sustainable and can they help achieve the SDGs? Lessons from a systematic review of the Indian case

Prantika Das[1], Chandan Jha[2], Satyam Saxena[3], Ranjan Kumar Ghosh[1]

[1]Indian Institute of Management Ahmedabad, Ahmedabad, India. [2]Council on Energy, Environment and Water, New Delhi, India. [3]International Maize and Wheat Improvement Center (CIMMYT), New Delhi, India

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

5. Biodiversity

8. Climate Change

Paper/Poster Abstract:

Biofuels are expected to aid in the transition towards a net-zero emissions economy in developing countries, but promoting their use may have trade-offs with regards to food security, land use, livelihood and income, and biodiversity, all of which are directly linked to Sustainable Development Goals (SDGs). This study has two objectives: first, to identify the primary sustainability goals prioritized in India's biofuel policies, and secondly, to assess the sustainability performance of biofuels in relation to these policy goals and their implications for achieving SDGs

through a comprehensive literature review of published evidence. We examined the connections between biofuels and 8 SDGs, 21 targets, and 22 indicators. Sustainability effects of biofuels were found to be highly diverse when assessed at various spatial scales. Irrespective of biofuel type, negative sustainability performance was observed with respect to socio-economic indicators like food security, livelihood, and income, as well as environmental indicators such as land use. Positive sustainability effects were observed for environmental indicators such as water and soil quality, biodiversity, and ecosystem services. Addressing policy gaps is crucial to minimize negative localized effects and support a sustainable biofuel strategy that aligns with SDGs.

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27 Carbon farming diffusion in Australia

Bernardo Cantone[1], David Evans[1], Cara Stitzlein[2], Andrew Reeson[3]

[1]CSIRO, Brisbane, Australia. [2]CSIRO, Hobart, Australia. [3]CSIRO, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

7. Carbon and Nature Markets

12. Econometric Modelling

Paper/Poster Abstract:

Carbon farming is a promising approach for global emissions reduction and several governments have implemented programs to promote its adoption amongst landholders. Understanding the mechanisms driving the diffusion of carbon farming practices can inform the design of these programs to achieve desired outcomes. While previous studies have identified potential drivers of carbon farming adoption, the relative effects of these drivers on the diffusion process remain unclear. Here we develop a model of landholder adoption of carbon farming and fit the model to spatiotemporal data on the diffusion of registered carbon farming projects in Australia to estimate the effects of different factors on diffusion. We find that spatial proximity between registered carbon farming projects has a large positive effect on a landholder's participation in the registered carbon market, suggesting that local social learning /knowledge transfer from peers is a key mechanism driving market participation and adoption of carbon farming practices. We also find that the spatial dependency of the adoption process has led to high levels of spatial concentration in Australia's carbon supply, raising concerns regarding land use efficiency and carbon supply risk. We discuss how to design carbon farming schemes to support wider uptake and produce better outcomes.

Morning Tea [including viewing of Contributed Posters]

10:10 - 10:40 Thursday, 8th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

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29 Assessing the value of urban green space: a hedonic analysis in Shenzhen, China

Xun Li, Qingyu He

Beijing Normal University-Hong Kong Baptist University United International College, Zhuhai, China

Presentation Type:

4. Poster

Keywords:

9. Consumer Choice

29. Valuation

Paper/Poster Abstract:

Urban green space is crucial in the practice of building sustainable cities and plays a significant role in improving the urban environment and livability and enhancing the well-being of residents. However, due to the lack of an obvious market price, the value of urban green space is often ignored by urban planners and consumers, resulting in a large amount of urban green space being eroded by urban development such as real estate development, large shopping mall construction, cultural and entertainment construction. Based on the hedonic pricing model (HPM), this study takes Shenzhen, China as an example to construct and assess the value (revealed in terms of housing price) of the characteristics of green space in Shenzhen. Geographic Information System (GIS) and urban landscape metrics are used to determine hedonic price model variables. Our analytical results indicate that national forest parks contain higher ecological and economic value (national forest parks can increase the price of apartments by more than 40%, while city parks can increase the value of apartment prices by more than 10%). After interaction analysis with visibility and 300-m walking distance, the value gain of national forest parks and urban parks shows a hierarchical distribution that reflects the ecological economic value of different park types. The findings have important reference value for guiding the planning and construction of sustainable cities, optimizing the spatial allocation of public green resources, and improving the overall welfare of society.

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33 The Effectiveness of China’s Water Tax Reform on Groundwater Abstraction

Shujie Liang, Tiho Ancev, Maruge Zhao

University of Sydney, Sydney, Australia

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

31. Water

Paper/Poster Abstract:

Groundwater is a critical natural resource that supports human life, sustains ecosystems, and plays a crucial role in economic and environmental sustainability. In recent decades, China has experienced a rapid depletion of its groundwater reserves. In 2016, a pilot program to introduce a water resource taxation mechanism replacing the existing water resource fee system was implemented in Hebei province. The new taxation mechanism was subsequently extended to nine additional provinces/ administrative division, namely Beijing, Tianjin, Shanxi, Inner Mongolia, Shandong, Henan, Sichuan, Shaanxi and Ningxia, in 2017. The other provinces/administrative divisions in China have not yet implemented the new taxation mechanism. In this paper, we employ the heterogeneity of implementation of the new tax mechanism across provinces to test its effectiveness in conserving groundwater resources. We employ the Difference-in-Differences approach to assess the impact of the water tax reform on groundwater usage, utilizing panel data on 169 sub-provincial administrative divisions (so called 'cities') from 2012 to 2021. The data come from cities within provinces where the new taxation mechanism was implemented, and from cities within provinces where the new tax was not implemented. The findings reveal that the tax policy has had a significant reduction effect on the groundwater abstraction volume, indicating its effectiveness to decrease groundwater consumption. The paper sheds light on the efficacy of the tax policy in addressing China's groundwater challenges and underscores the importance of sustainable water resource governance.

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59 Expanding beyond case studies in postgraduate agribusiness teaching to enhance experiential benefits and student/teacher outcomes.

Alexandra Peralta, Craig Johns, Adam Loch

University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

Experiential teaching in postgraduate agribusiness education is crucial for bridging the gap between theoretical knowledge and practical application. While traditional methods often rely on case studies, this paper explores the potential benefits of expanding the range of industry experiences available to students. We present two examples of broader industry engagement: field trips to local agribusiness firms and industry internship opportunities. These approaches aim to provide students with a deeper understanding of how agribusinesses innovate, navigate industry challenges, and capitalize on opportunities.

Field trips offer students the chance to interact with senior managers from agribusiness firms who share their strategies, challenges, and opportunities, fostering interactive discussions. Meanwhile, industry internships provide direct interaction with various levels of agribusiness organizations and allow students to research relevant industry topics. These expanded materials have been integrated into the Master of Global Food and Agricultural Business (MGFAB) and Master of Agribusiness (MAB) programs.

This paper assesses how these enhanced teaching methods add value to agribusiness education using the Bell and Bell (2020) framework for experiential learning assessment. We also provide insights for educators and program

managers interested in incorporating similar approaches into their agribusiness teaching. By diversifying the educational experience and emphasizing practical engagement, we aim to equip students with the skills and knowledge needed to excel in the ever-evolving agribusiness sector.

Experiential learning is a well-established pedagogical approach in business and entrepreneurial programs, with case studies being a prominent tool. However, the modern agribusiness sector demands socially responsible managers who can navigate ethical and practical challenges. This necessitates a broader range of teaching materials and experiential opportunities. This paper explores the effectiveness of two such approaches: field trips to local agribusiness firms and industry internships.

We introduce the Bell and Bell (2020) framework, which guides our analysis. This framework draws from experiential pedagogy theories and serves as a foundation for evaluating the impact of expanded teaching materials in agribusiness education.

We present two key experiential learning activities:

a) Field Trips: These trips allow students to engage with senior managers who share insights into their business strategies, challenges, and opportunities. Interactive discussions enrich the learning experience.

b) Industry Internships: Students participate in internships with partner agribusiness firms, offering direct interaction across various organizational levels and the opportunity to conduct research on relevant industry topics.

We assess the impact of these expanded teaching methods using the Bell and Bell (2020) framework, focusing on key aspects such as student engagement, reflection, and the application of knowledge.

We discuss the insights gained from our assessment and their implications for agribusiness education. Our findings emphasize the value of diversifying teaching materials and incorporating practical engagement to better prepare students for the dynamic agribusiness landscape.

This paper advocates for the integration of field trips and industry internships in postgraduate agribusiness education to enhance experiential learning. By applying the Bell and Bell (2020) framework, we provide evidence of the benefits of these approaches and offer guidance for course coordinators, undergraduate and postgraduate program managers seeking to enrich their agribusiness teaching methodologies.

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69 Restoring wetlands on private lands: farm context, aspirations, incentives, and transaction costs

Geoff Kaine, Maksym Polyakov

Manaaki Whenua - Landcare Research, Hamilton, New Zealand

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

The aim of the project was to identify the costs associated with wetland restoration and conservation using farm context analysis and explore the landholder's potential interest and implications for the design of incentives. We conducted farmers' interviews to identify the key factors in the farm system that influence the costs of establishing wetlands and a survey to quantify and statistically test the findings from the interviews. The survey included a choice experiment to investigate farmers' willingness to enrol in programmes offering incentives for establishing wetlands. We found that while landowners may aspire to attract native birds to their properties and improve biodiversity and aesthetics, their interest in restoring and protecting wet areas depended primarily on their farm context, the biophysical characteristics of their properties and the wet areas. There was substantial diversity in farm contexts, meaning landholders will differ substantially in their interest in retiring wet areas and in seeking assistance to do so, irrespective of their aspirations. This diversity, through its effects on the feasibility and costs of retiring wet areas, means that landholders are likely to be quite sensitive to variations in the features of assistance programs. Consequently, while we found a high level of interest in programmes offering incentives for establishing wetlands among the respondents to the survey, these programmes would need to be customised to suit specific farm contexts and expectations about the success of assistance programmes tempered accordingly, for example, in terms of the number of properties with a specific farm context and difference in the sensitivity of landowners in that context to the features of programmes. Our statistical results are derived from a small sample of landowners who probably have a greater-than-average interest in wetlands. Consequently, our findings should be treated cautiously. Repeating the survey with a much larger, more heterogeneous sample would be valuable in building greater confidence in our findings.

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81 Farmers' pro-commons awareness, non-farm activities and effects on groundwater conservation: Experiences from India's wheat belt

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

31. Water

Paper/Poster Abstract:

Water conservation is key to future sustainability of smallholder farming systems. However, there is a grim trade-off between private use decisions such as groundwater extraction for irrigation and the common impacts such as depletion of basin level groundwater levels. This leads to an impending global 'tragedy of the water commons' which is more severe where crops are high value and commercial interests dominate the farmer's mind. Pricing water or quantity restrictions are the most discussed solutions without much attention given to farmers' own behaviour with respect to conservation. In this context, we tried to understand what drives farmers' preference for communal benefits from water conservation We conducted choice experiments with over 300 farmers in the dryland wheat belt in central India by offering variations to the following attributes of water saving options: visibility of water, installation and maintenance costs, self-use, and common use. Results revealed that despite sensitivity towards cost and visibility, farmers have a high preference for common use. However, it is the larger farmers with higher non-farm income sources who tend to value common use more than farmers who are smaller and with lower non-farm income sources.

The valuation for communal benefits of water conservation decreases as farmers become more educated, are older or have larger families. We conclude that commons awareness strategies and inducements for rural non-farm economy can be very effective in water conservation without having to exclusively rely on usage taxation or quantity rationing.

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83 Valuing Attributes of Forest Restoration Using a Choice Experiment

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Presentation Type:

4. Poster

Keywords:

5. Biodiversity

29. Valuation

Paper/Poster Abstract:

This choice experiment study investigates residents' preferences toward restoring forest ecosystem services and estimates willingness to pay for multiple attributes of forest ecosystems by function in the Republic of Korea. In 2021, we conducted face-to-face interviews with 500 respondents in the Republic of Korea. The attributes of forest ecosystem services in the Republic of Korea including biodiversity, prevention of natural disasters, carbon sequestration, and household tax have significant influences on individuals' preferences with regard to forest restoration. Among the four functional attributes of forest restoration, the prevention of natural disasters such as landslides and floods was the most crucial role of forest restoration in their choice of forest ecosystem services. In addition, we found that the preferences of functional attributes of forest ecosystem services can be significantly different depending on the location of forest restoration. The willingness-to-pay(WTP) of the biodiversity in forested areas is higher than in wetlands or residential areas, whereas the WTP for the prevention of natural disasters in residential areas is higher than that of other areas. To make forest restoration projects successful, we need to take not just the attributes of forest ecosystem services but also the regional characteristics of those restoration sites into account to improve the social welfare of residents.

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87 The importance of farmers' markets in the modern world: A bibliometric review

Áron Török[1], Zalán Márk Maró[1], Gréta Maró[1], Sándor Kovács[2]

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Presentation Type:

4. Poster

Keywords:

23. Market Design and Policy

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

With the appearance of modern food supply chains, there has been a clear decrease in consumer trust and an increase in information asymmetry. Short food supply chains, including farmers' markets, can represent a solution to such problems. Today, modern farmers' markets mainly exist in the United States and the European Union, and their impact on sustainability has been the focus of attention; however, the relevance of this traditional approach among modern supply chains is relatively unexplored. Therefore, this study reviews the current state of the literature on farmers' markets using bibliometric techniques applied to 1,765 documents from Scopus and Web of Science databases from 1955-2022. The paper tracks the research dynamics associated with farmers' markets by identifying the stages of evolution of major topics, articles, journals, author citations, and co-citation networks. The results illustrate the upward trend in publishing papers on the topic, identify five areas of related market research, and pave the way for further work by researchers and politicians by describing the main and specific research avenues.

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88 The taxonomy of Global Value Chains

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Presentation Type:

4. Poster

Keywords:

12. Econometric Modelling

20. International Trade

Paper/Poster Abstract:

Since the WWII, the role of global value chains (GVCs) has been continuously increasing as the main driver of global production and trade patterns. With the continuous rise of globalisation, at least until 2008, GVCs have brought increasing specialisation and vertical integration to the global economy, thereby connecting different parts of the world. Unbundling of tasks and business activities as well as functions has provided new opportunities for developing countries to continuously increase their participation in global production and trade flows without having to develop a completely new product or value chain.

GVC participation plays a crucial role in economic development as the ability of countries to prosper highly depends on their level of participation in the global economy. Even small countries with limited resources can benefit from global trade through GVC participation with significant variation across countries and sectors. As evident from the majority of the existing literature in the field, GVC participation represent a perfect opportunity for supporting local

agri-food markets to become more commercialised and productive, thereby increasing local incomes as well as their stability together with food security. It is also evident that agricultural sectors participate in value chains predominantly as suppliers of raw materials, whereas food sectors participate mainly in terms of sourcing inputs from global markets.

At the same time, many poorer countries faced serious challenges in integrating to these GVCs for a number of reasons, including low educated human capital, poor infrastructures, low capital endowments, versatile political and business climates or poor institutions. For local and regional as well as global policymakers, the question is therefore what the key determinants of developing countries in GVC participation are and how can targeted policies help fostering better integration.

This research provides an empirical analysis of the determinants of agri-food GVC participation of countries standing at different levels of economic development, especially focusing on developing countries. This analysis is particularly relevant for developing countries helping them to better understand the overall context and the key determinants of success and thereby increasing their involvement in global agri-food GVCs. The research starts with identifying the determinants of participation by descriptive statistics and economic models, followed by the analysis of how different kinds of shocks can affect the resilience of agriculture. The research then provides a taxonomy of global agri-food value chains, followed by policy recommendations to increase participation.

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97 Assessing Financial Inclusion of Digital Financial Services among Cambodian Farmers

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Presentation Type:

4. Poster

Keywords:

2. Agricultural Finance

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

Cambodia has demonstrated remarkable economic growth, boasting an average annual growth rate of 7.7% over the period spanning from 1998 to 2019, positioning itself as one of the world's fastest-growing economies (ADB, 2021). One of the significant driving forces behind this economic surge is the agricultural sector, which, in 2019, contributed a substantial 22.1% to the country's total GDP, marking the highest value-added share among lower-middle-income countries (ADB, 2021). However, despite these economic achievements, Cambodian farmers continue to grapple with substantial challenges when it comes to accessing crucial financial resources. Factors contributing to their limited financial access include stringent collateral requirements, high-interest rates on short-term loans, the absence of established credit histories, and a notable lack of financial literacy among farmers (ADB, 2021).

The introduction of digital financial services emerges as a promising avenue to alleviate these financial access limitations for farmers in Cambodia. To successfully adopt and utilise these digital financial services, several critical

prerequisites must be in place. These prerequisites encompass the availability of essential infrastructure components, such as widespread mobile phone coverage, robust network connectivity, and readily accessible internet connections (Ambler et al., 2022; Caron, 2022). Other important factors include financial and technological literacy levels of potential users, the affordability of these services, user preferences, and the relevance of such services in meeting the specific needs of the target users (Caron, 2022).

The overarching goal of this study is to provide a comprehensive and descriptive analysis of the financial inclusion landscape among agricultural households in Cambodia, taking into account the availability of essential infrastructure and the socioeconomic characteristics of these households. This analysis will offer valuable insights into both digital and non-digital dimensions of financial inclusion within this context. This study draws upon a diverse set of secondary datasets for Cambodia sourced from World Bank, including data from the 2021 Global Findex which features 1,000 individuals and one round of the High-frequency phone survey of the Living Standards Measurement Survey encompassing 1,666 households (Round 3). Various infrastructure-related datasets, such as those detailing cell phone tower availability, internet speed, and the presence of financial agents, are utilised in this research.

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Caron, L 2022, 'Empty digital wallets: new technologies and old inequalities in digital financial services among women', Oxford Open Economics, vol. 1, 2022/03/01/, p. odac001.

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99 Assessing ‘value for money’ for environmental project funding: An application to riverine recovery funding in Queensland Australia.

Amar Doshi[1], Steve Charlton-Henderson[1], Jim Binney[1], Paul Maxwell[2], Misko Ivezich[3]

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Presentation Type:

4. Poster

Keywords:

19. Impact Assessment

21. Land and Natural Resource Management

Paper/Poster Abstract:

Federal and State government agencies provide public funding for various environmental recovery and management projects. Assessing applications have typically focused on single benefit streams (e.g., water quality) using a cost-

effectiveness approach. However, improvements to the biophysical condition of a natural asset can provide multiple benefits across a range of ecosystem services. Only considering single benefit streams can result in sub-optimal outcomes for public funding. Prevailing approaches to assess multiple benefits, such as cost-benefit and multi-criteria analyses, are time, data and cost intensive. Agencies require a simple tool for considering the total benefits across broader ecosystem services that is also, evidence-based, transparent, repeatable, and efficient. This project, funded by the Queensland Reconstruction Authority, is purposed with developing a framework and tool to facilitate Queensland's Department of Environment and Science in assessing applications for the Disaster Recovery Funding Arrangements Riverine Recovery Program. The proposed framework prioritises projects based on the cost-effectiveness of delivering benefits to provisioning, regulating, supporting and social-cultural ecosystem services by utilising data that is either publicly available, applicants can readily provide, or already collected by the Department. Critically, the framework can be updated and refined over time based on new data and information, and different objectives of future funding programs.

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101 A conic version of a dairy sector model for New Zealand

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Presentation Type:

4. Poster

Keywords:

24. Mathematical Programming

25. Policy Analysis

Paper/Poster Abstract:

There is a growing need for a model suitable to assess the economic impacts and the adaptations of dairy farmers in response to policies or environmental changes. In this regard, programming models have proven relevant to represent resource-constrained inputs contractions and substitutions, which could be more challenging to capture in an econometric approach. Farmers' adaptation responses to policies involve a complex decision-making process that depends on various criteria, including profits, availability of mitigation options, and risks, which are also dependent on wider-scale processes.

Considering the significant contribution of the dairy sector to the economy of New Zealand, and the pipeline of agri-environmental policies coming into force in the next five years (e.g. He Waka Eke Noa -HWEN and other freshwater regulations), it is expected that dairy farms will go through dramatic changes on their economic and environmental context. Dairy farming has to meet water quality and emissions targets while remaining competitive in the international market, to plant-based alternatives and the potential introduction of synthetic milk. HWEN introduces prices on methane emissions and long-lived gases, while freshwater regulations limit N leaching. The combined operation of policies puts pressure on farming profitability, mainly when technology or advanced mitigation options are not readily available or at least not to scale up for a significant share of farms.

We propose a model based on conic programming to accommodate a PMP calibrated dairy-specific cost function that relate inputs (e.g. stocking rate, nitrogen fertilizer, feed) to milk production. This setup ensures obtaining a detailed understanding of the effects of policies or scenarios simulated (e.g. changing constraints, costs or even climate information) and avoiding inefficient adaptation measures, misinterpretation of climate signals or minimal adoption of technologies.

This note describes a dairy sector model prototype based on mathematical programming. We take the pricing of methane emissions as a case study to exemplify its performance and research potential.

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121 Balancing Conventional and Agro-Ecological Farming for Sustainable Agriculture and Food Security: Empirical Insights from Tanzania

Haji Msangi[1,2,3], Ntengua Mdoe[1], Katharina Löhr[2], Betty Waized[1], Stefan Sieber[2,4], Daniel Ndyetabula[1]

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Presentation Type:

4. Poster

Keywords:

8. Climate Change

11. Ecological Economics

Paper/Poster Abstract:

Climate change is one of the greatest global challenges of the 21st century, and it has adversely affected global agricultural production and food systems. As the global population continues to rapidly increase, agricultural production systems must produce sufficient food to meet the demands of an expanding global population projected to reach 9 billion by 2050. In Sub-Saharan Africa, the region faces significant challenges such as rapid population growth, poverty, and food insecurity. Conventional strategies to strengthen agricultural production systems face serious trade-offs, where efforts to increase food production generate significant amounts of greenhouse gases (GHG) that contribute to climate change. Adopting agro-ecological farming practices is widely accepted as a strategy to address climate change issues and ensure sustainability in agri-food systems. However, an emerging concern with agro-ecological farming is its ability to substitute conventional external input farming to meet productivity and food security objectives, especially in countries such as many Sub-Saharan African nations where agricultural productivity remains persistently low and food systems are unstable. This study aims to investigate the synergies between conventional and agro-ecological farming practices in Tanzania and how their joint adoption could improve farm productivity and resilient food systems in a more sustainable manner compared to their implementation separately. The study uses the Living Standard Measurement Study-Integrated Survey in Agriculture (LSMS-ISA) data for Tanzania's national panel survey (NPS) for the 2020/2021 cross-section. The study employs Multinomial Endogenous Treatment Effect (METE) regression to model the joint and exclusive effect of conventional and agro-ecological farming on farm productivity and food security in Tanzania. The study reveals that gender, farm size, access to extension services, credit, and social protection programs are important drivers of the adoption of conventional and agro-ecological farming practices. Furthermore, the study shows that combining conventional farming practices (inorganic fertilizer and agro-chemicals) with agro-ecological farming practices (organic manure and agro-forestry) can significantly enhance farm productivity and food security, indicating that the two approaches have a strong synergy. Interestingly, the study also finds that while exclusive adoption of conventional farming can improve farm productivity and food security, the magnitude of this effect is almost the same as that of the joint adoption of both approaches. In contrast, exclusive adoption of agroecological farming has a positive but insignificant effect on farm productivity and food security. These findings highlight the potential benefits of balancing the trade-offs of conventional high external input farming by adopting agroecological farming, which can help achieve both productivity and food security objectives while protecting the natural agroecology. Therefore, the study emphasizes the need for

promoting policies and initiatives that encourage the joint adoption of conventional and agro-ecological farming practices to achieve sustainable and resilient agricultural production and food systems in Tanzania. However, such policies and initiatives must be complemented by other measures like credit access, extension, and social protection to enhance their adoption and impacts.

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124 Political Economy of Environmental Policy under Trade

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

20. International Trade

Paper/Poster Abstract:

Concerns about global environment and more effective environmental stewardship have dominated policy arenas in the past three decades. In an increasingly interconnected and entangled world, the design of national and international environmental policies requires compromises among the conflicting interests of countries, politicians, producers, and consumers. The primary dilemma for any country is whether or not to cooperate with other countries in environmental policy arenas, such as limiting carbon dioxide (CO2) emissions, which to a large extent is determined by direct and indirect ecological-economic effects of a given environmental policy. Politicians, on the other hand, face a trade-off between enhancing social welfare and serving the interests of lobby groups in exchange for (prospective) campaign contributions. The link between environment and trade has also long been the subject of intense policy debate.

In this study, we first examine the state of the literature and then fill important gaps in this area. We develop a unified framework that embodies environmental externalities (local versus global), abatement, political competition, and trade. Our model illuminates how the incentives of producer and consumer/environmentalist lobby groups to influence the stringency of pollution control collide in environmental policy-making; how these incentives change with the nature and size of environmental externalities, environmental agreements (unilateral versus multilateral), and trade regimes; and the role of abatement and terms-of-trade effect in the equilibrium outcomes. In a large open economy, when countries cooperatively formulate their policies, the environmental regulation internalizes the costs of emission leakages resulting from lobbying activities, thus making cooperative policy more appealing than noncooperative one from the welfare standpoint. Producer and consumer lobbying generally have a counteracting effect, with the government's weight assigned to each group determining the influence of the groups on the policy. However, in a unilateral policy setting with emission leakages, producer and consumer interests may coincide in supporting lower pollution tax.

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144 Evaluating Farmers' Perspective and Economic Viability in Environmentally Sustainable Vegetable Cultivation: An Investigation in Bangladesh

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Presentation Type:

4. Poster

Keywords:

3. Agricultural Production

14. Environmental Economics

Paper/Poster Abstract:

To assess the perspectives of farmers and the economic viability of sustainable vegetable farming in Bangladesh, this study investigates the attitudes and economic sustainability of eco-friendly vegetable farming practices among 600 randomly selected farmers. The study utilized a pre-tested structured questionnaire, employing a five-point Likert Scale to assess farmers' attitudes toward eco-friendly vegetable farming, particularly focusing on profitability, and conducted profitability analysis to evaluate the economic viability of cultivating major vegetable crops. To determine the factors influencing farmers' attitudes toward eco-friendly vegetable farming, a Logit model was employed. Furthermore, a Problem Confrontation Index was used to identify and rank the key challenges associated with eco-friendly vegetable production. The study found that an overwhelming majority of farmers (81.43 percent) held favorable attitudes toward eco-friendly vegetable farming, while a minority (18.57 percent) expressed unfavorable sentiments. Significantly, the cultivation of major vegetables such as tomato, gourd, cauliflower, and cabbage was economically sustainable and profitable. Further analysis using a Logit model revealed that the respondent's age, years of formal schooling, livestock ownership, and prior training in eco-friendly vegetable farming significantly influenced farmers' receptivity to eco-friendly practices. Challenges faced by eco-friendly farmers, identified and ranked using the Problem Confrontation Index, including natural disasters, an increased incidence of insect pests and diseases in eco-friendly crops, and rising labor costs, were considered the most severe and thus required targeted interventions. Based on the study's findings, several policy recommendations are proposed, encompassing the implementation of regular motivation and training programs tailored to eco-friendly vegetable production, frequent on-site support visits by extension officers during production, and the provision of government-backed credit facilities with reduced interest rates to promote the widespread adoption of eco-friendly practices among farmers. This research provides valuable insights into the attitudes and economic viability of sustainable vegetable farming practices in Bangladesh, while also highlighting the challenges faced by eco-friendly farmers and proposing actionable policy measures to advance environmentally sustainable agriculture in the region.

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166 Timber and trails: the economic and well-being impacts of recreational mountain biking in New Zealand

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

19. Impact Assessment

21. Land and Natural Resource Management

29. Valuation

Paper/Poster Abstract:

Poster Abstract

New Zealand's planted forests have emerged as critical contributors to the global wood supply chain, offering substantial economic and environmental benefits, including carbon sequestration and water flow regulation. They also serve as hubs for recreational activities, with mountain biking experiencing a remarkable surge in popularity over the past two decades. Despite their significant contributions, the full extent of planted forests' value to New Zealand's economy and society remains underappreciated in decision-making processes.

This study builds upon previous research that focused on specific regions, aiming to comprehensively evaluate the economic and non-market values of mountain biking at both regional and national scales. To our knowledge, this study represents the first attempt in New Zealand to assess both market and non-market impacts of mountain biking.

Leveraging survey data from 2,073 New Zealand mountain bikers, we employed two established economic modelling approaches. We used an input-output model to assess economic impacts in key regions, subsequently extending our analysis to cover the entire country. Furthermore, a travel cost analysis was conducted to evaluate the welfare impacts of local and distant mountain biking visits, categorizing 'local' as travel within 120 minutes each way, and 'distant' as travel exceeding 120 minutes each way.

Our findings underscore the robust economic and social contributions of mountain biking in New Zealand. Planted forests emerge as pivotal locations for this activity, with over half of the economic benefits distributed across sectors including transport, accommodation, rental and hiring, food and beverage, and retail trade. Surprisingly, the forestry sector receives less than 1% of these benefits.

Moreover, our study reveals that mountain bikers derive substantial well-being benefits from planted forests, surpassing those from other ecosystems such as native forests, grasslands, and pastoral farms. Sites in distant planted forests provide notably higher well-being value compared to locations in native forests and tussock grasslands.

Considering the results highlighted above, there is a compelling case for exploring mechanisms to reallocate economic benefits towards enhancing planted forests with mountain biking sites. Collaboration between government agencies, businesses, mountain bikers, clubs, investors, and other stakeholders could yield mutually beneficial outcomes. Alternatively, managers of planted forests offering mountain biking amenities may explore joint ventures with key businesses that benefit from mountain biking visits.

By shedding light on the economic and well-being values associated with mountain biking, this study provides valuable insights for forest owners, government agencies, businesses, and users. These findings can inform policies and investment decision-making processes, advocating for an inclusive approach to resource allocation and conservation efforts.

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181 Coastal Hazard Adaptation Strategies: a multi-disciplinary approach to addressing coastal climate risks

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Natural Capital Economics, Melbourne, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

28. Uncertainty and Risk

Paper/Poster Abstract:

Coastal hazards like erosion, storm tide inundation and sea level rise, pose significant threats to adjacent communities, including loss of infrastructure, agriculture, natural environments, and local industries such as tourism and recreation. Local and regional councils have increasingly invested in developing a Coastal Hazard Adaptation Strategy (CHAS) to manage and proactively respond to the risks from these hazards. However, developing a CHAS is complex as it requires a multi-disciplinary approach that traverses a diverse range of information and data. Over the past five years, Alluvium Consulting Australia and NCEconomics developed and refined an approach to CHAS for councils affected by these hazards. The approach leverages expertise in climate modelling, biophysical sciences, hydrology, engineering, and economics to produce a science-based CHAS that is tailored to individual coastal hazard risks. Using a cost-benefit analysis framework, this CHAS approach involves developing a base case—illustrating long-term outcomes without adaptation—and assesses various options against this baseline, allowing councils to accurately assess risks, consider the potential return on investment of different options, and outline a plan for improving the region's resilience to coastal hazards.

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211 Barriers to the circular economy are diverse and business model-specific: evidence from the Australian cheese manufacturing sector

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Presentation Type:

4. Poster

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

The pursuit of Sustainable Development Goal 12.3, aimed at halving food waste by 2030, relies on a concerted effort from various stakeholders to engage in different practices that improve the utilisation of resources throughout the life cycle of a product. Circular business models (CBMs) have emerged as a promising avenue for achieving this goal by acknowledging there are multiple pathways that can contribute to the same outcome. CBMs can reduce the inputs

into and/or waste and emissions from supply chains via a range of management practices, organisational configurations and part of broader value networks.

This study seeks to contribute to the growing body of literature on CBMs by examining the diverse barriers across different types of business models. To explore these barriers in-depth, we thematically analysed semi-structured interview data from the Australian cheese manufacturing sector. Our research reveals that adopting various types of circular business models have, and can mitigate to an extent, different types of barriers. We find that when firms consider in-house management practices, they predominantly faced internal barriers. These internal hurdles include technological constraints; financial viability concerns; and organisational challenges, such as competing priorities and timing issues with the business cycle. The exploration of alternative business models, such as selling to or forming partnerships with other firms, offers a contrasting picture. In these scenarios, firms tend to report predominantly external barriers that are closely tied to supply chain dynamics. These external barriers include geographical remoteness, a lack of industry coordination, and ambiguity surrounding the distribution of costs, benefits, and responsibilities.

These findings have the potential to assist with decision-making within the cheese manufacturing sector and other industries facing similar issues. By highlighting the differences in barriers faced across various circular business models, our study underscores the importance of exploring multiple pathways to achieve the same goal, while also identifying residual issues that will need to be addressed – e.g., industry coordination, clear business plans, etc.

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212 The Effect of Farmer Discussion Groups on the Adoption of Technology by Dairy Farmers in West Java, Indonesia

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Presentation Type:

4. Poster

Keywords:

10. Development Economics

26. Practice Change and Adoption

Paper/Poster Abstract:

Agricultural extension plays an important role in enhancing the adoption of improved technologies and practices by acting as a bridge between scientists or researchers and farmers. In recent years, participatory approaches to extension have emerged as an alternative to the conventional top-down transfer of technology, where farmers actively engage in the acquisition of knowledge and the implementation of new practices. However, there is a dearth of studies investigating the impact of such participatory extension initiatives on dairy farming in Indonesia. This paper aims to assess whether participation in a farmer discussion group influenced change in the adoption of better dairy farming practices. These discussion groups were established as a component of a dairy project with the aim of promoting the uptake of improved dairy farming techniques in West Java, Indonesia. To analyse the influence, a two-period panel dataset encompassing 160 farmer-participants was used, and a combination of multinomial logit and ordered logit models was applied. The findings of the multinomial logit regression indicate that attendance at these discussion groups did not have a significant effect on the change in the number of practices adopted by the farmers. Instead, factors such as education, dairy-related assets, and milk prices emerged as significant influencers. On the other hand, the results of the ordered logit regression reveal that participation in a farmer discussion group during the

COVID-19 restrictions, coupled with dairy assets, played a role in determining the intensity with which dairy practices were utilized. While it may be observed that the discussion groups established within the project did not directly lead to changes in adoption practices, it is worth noting that the long-term benefits to farmers may still materialize if such participatory extension activities continue beyond the project's duration.

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228 Farmland Transaction under the Policy Change in Direct Payment Scheme for Collective Stewardship of Common Property Resources

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Presentation Type:

4. Poster

Keywords:

21. Land and Natural Resource Management

25. Policy Analysis

Paper/Poster Abstract:

This study examines the association of farmland transactions and a Japanese policy change from “Farmland, Water, and Environmental Conservation Improvement Scheme to “Payments for the Enhancement of Agricultural Multi-functionality” in 2014.

To examine this research objective, we used the micro-level data on farmland transactions from 2012 to 2016. Using this micro-level data, we constructed aggregated panel data at the municipality level, as well as panel data at the transaction level.

On the other hand, we construct the policy implementation status based on the statistics of policy implementations at the prefecture level after the recent policy change in 2014. According to this policy change, the levels of efforts in some prefectures have changed significantly. We categorized the prefectures as being in the “responder group” if the increase in the area of farmland covered by the policy payment from 2014 to 2016 surpasses the median for all of the prefectures or otherwise, the “non-responder group.”

Using this dataset, we estimate the association of farmland transactions and a Japanese policy change in 2014 on both the total area and the overall value of farmland transactions.

The result from municipality level analysis shows a significant negative association between the policy change and total transaction area at the municipality level. This suggests that transactions slowed down after the policy change in the municipalities of the responder group, which changed the level of effort on this policy. At the transaction level, however, there was a significant positive relationship between the policy change and the hectares of farmland per transaction. This indicates that farmers in the responder group were more likely to trade larger plots. These results imply that the municipalities in the prefectures that have increased their efforts by the policy change in 2014 are more likely to trade larger plots. On the other hand, the total hectare of the transacted, when aggregated at the municipality level, rather decreased. It can be pointed out that farmers may have increased the transactions before the policy change. The other interpretation is that after the policy change, the accumulation of better farmland has been promoted in the form of transactions with relatively larger plot units.

For further research, it is an issue that needs to be examined whether this phenomenon was a short-term shock or the result of a time-series structural change. Additionally, an analysis including leased land would be expected since the farmland consolidation is largely due to the leased farmland. Another perspective is the decomposition of the policy implementation status at the municipality level.

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229 Farmland Transaction under COVID-19-Related Non-Pharmaceutical Policy Intervention

Yuya Katafuchi[1], Takeru Kusudo[2]

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Presentation Type:

4. Poster

Keywords:

21. Land and Natural Resource Management

28. Uncertainty and Risk

Paper/Poster Abstract:

The COVID-19 pandemic ushered in an era of unprecedented public health challenges, prompting the implementation of non-pharmaceutical policy interventions globally. In Japan, we experienced 27 years of declining farmland prices, and enforcing these policies brought additional complexities, affecting various economic facets, particularly agriculture. The focal point of this study is how Japan's policies, the State Of Emergency (SOE), interplayed with the ongoing trend of declining farmland prices and transactions.

A previous study suggested that SOE enacted under COVID-19 to prevent infection spread might have lowered Japan's residential and commercial land prices. However, existing studies do not cover agricultural farmland. This study analyzes whether the potential decline in demand for farmland in areas where the additional SOE interventions related to COVID-19 were implemented manifested in the data as a decline in real estate transactions and farmland prices.

Japan's reliance on voluntary public cooperation rather than enforced mandates provided a nuanced landscape for evaluating additional SOE's efficacy. The inherent flexibility and reliance on public cooperation in Japan's approach added complexity to assessing its economic repercussions, particularly in the sensitive agricultural sector marked by a prolonged decline in farmland prices.

Using real estate transaction data in farmland with policy intervention data, we constituted a comprehensive dataset that facilitated an analysis at both aggregate and individual transaction levels. Our dataset, drawing from the resources of the Ministry of Land, Infrastructure, Transport, and Tourism, Japan, encapsulates the years 2018-2020, allowing us to evaluate the pre- and post-COVID-19 policy intervention and their effects on farmland transactions.

Our analysis employed a two-way error component model to discern associations between additional SOE and farmland transactions. We categorized prefectures into treatment and control groups based on the cumulative number of days the SOE - policies aimed at inducing behavioral change to mitigate COVID-19 spread - were implemented.

The data showed no significant association between the total area of farmland transactions and the additional SOE interventions. However, a stark contrast emerges when evaluating the transaction values. A statistically significant negative association between total transaction values and additional policy interventions was uncovered. This result indicates a deceleration in transaction values in areas where COVID-19 policies were additionally implemented.

This result suggests that the demand for farmland may have declined in the areas that received this treatment, which may have been directly related to the decline in farmland prices due to constraints in transaction opportunities for contact avoidance. Other possible explanations could be due to the decline in the demand for food triggered by policy interventions or labor shortages due to immigration restrictions. Whether this phenomenon was a short-term shock or a time-series structural change is an issue that needs to be examined to investigate the impact of policies that tackle the pandemic, taking food security into account.

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230 Uncovering Complex Technology Adoption Pathways for Smallholder Dairy Farmers in Indonesia

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Presentation Type:

4. Poster

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Many empirical studies commonly define adoption as a binary process, focusing solely on adoption and non-adoption. However, this simplistic approach fails to capture the intricate nature of adoption decisions, leading to potentially misleading conclusions and recommendations for increasing adoption rates. Intervention program is designed to boost adoption rates among farmers involves technology dissemination, providing information on technology usage and its benefits. Extensive resources have been invested in extension programs, particularly in developing countries, aimed at increasing adoption rates among smallholder farmers. However, little is known about farmers' decisions following the conclusion of these interventions—whether they continue to adopt or dis-adopt the introduced technologies.

This study investigates the adoption pathways of dairy farming technologies among smallholder dairy farmers in Indonesia. We adapt the adoption pathways framework developed by de Oca Munguia et al. (2021) to conceptualise

adoption as a complex process. Leveraging a panel dataset comprising 480 dairy farm households in West Java, Indonesia, spanning from 2017 to 2021, our research tracks adoption decisions from the baseline (2017-2019) to the endline (2021). This approach encompasses farmers' awareness, initial adoption (trial), and continued adoption statuses, resulting in diverse adoption status in the endline, including never aware, aware but never tried, dis-adoption after tryout, never re-adopt, dis-adopt, new adopters (continued adoption after tryout), re-adopt, and always adopt.

Between the baseline and endline, 38.3% of the sample participated in an intervention (beneficiaries) consisting of farmers' discussion groups aimed at increasing technology awareness and disseminating knowledge about technology benefits. This study examines how the adoption pathways of the beneficiaries differ from those who did not participate (non-beneficiaries) and compares the reasons for adoption and non-adoption. Additionally, we investigate the socio-economic characteristics of farmers in both sub-groups since these factors may also be associated with farmers' decisions. This study focuses on three dairy farming technologies that aims to increase milk production and hygiene including teat dipping after milking, high protein concentrates (16% protein content or higher), and forage conservation.

Preliminary results reveal that among beneficiaries, a higher proportion (46.2%) adopted the teat dipping technology after the intervention, compared to high-protein concentrates (17.4%) and forage conservation (13.6%). Interestingly, by the end of the study, 50-60% of beneficiaries who tried teat dipping and high-protein concentrates discontinued these practices, while the rest became new adopters. Conversely, for forage conservation, only 15% of those who tried the technology became new adopters. We explore the primary reasons for dis-adoption post-trial, identifying cost as a barrier for high-protein concentrates and forage conservation, while the complexity of teat dipping after milking deterred adoption.

This study provides valuable insights for promoting technology adoption by tailoring interventions based on the unique characteristics of each technology, whether in terms of information dissemination, capital provision, or input accessibility. The findings will offer practical implications for enhancing sustainable dairy farming practices among smallholder farmers in Indonesia and other developing economies seeking to increase the adoption of dairy farming technologies and practices among their smallholder dairy farmers.

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268 Climate econometrics

German Puga, Kym Anderson

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Presentation Type:

4. Poster

Keywords:

8. Climate Change

19. Impact Assessment

Paper/Poster Abstract:

Climate change adaptation strategies rely on assessments of expected climate impacts and risks. Therefore, it is important to use suitable methodological approaches when analysing the potential impact of climate change projections. This paper aims to provide recommendations on how best to use econometric methods to quantify climate impacts.

We first compare what can be done with three types of data: cross-sectional, time series, and panel data. Panel data methods are usually preferred due to their strong identification properties. They allow one to estimate the impact of weather on an economic output, and in a subsequent step, to use these estimates to quantify the potential impact of climate change projections. We explain the advantages and potential use of this framework, as well as its challenges. These challenges include possible model specification issues and the way of dealing with the limitation of using short-run estimates of weather shocks (the model's estimates) to quantify long-run impacts of changes in climates.

Then, we compare the strengths and weaknesses of econometric methods to those of other methods, such as modern machine learning models, methods based on expert opinion, and biophysical models. We argue that it is usually possible to get a better understanding of climate risks when combining studies that use a variety of these methods.

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280 Well-being and life satisfaction in New Zealand's primary industry

Pike Stahlmann-Brown

Manaaki Whenua - Landcare Research, Wellington, New Zealand

Presentation Type:

4. Poster

Keywords:

11. Ecological Economics

14. Environmental Economics

Paper/Poster Abstract:

During winter 2023, the representative Survey of Rural Decision Makers collected information on well-being (via the widely used WHO-5 wellbeing index) and life satisfaction (via Cantril's Ladder) for approximately 5,000 New Zealanders engaged in primary industry. In this paper/poster, I describe well-being and life satisfaction by industry, highlighting the deleterious effects of dairy farming these outcomes. I then use the 2021 wave of the same survey to show that rural well-being has deteriorated somewhat over these two years. Next, I used a representative survey of 2,000 urban residents (also collected during winter 2023) to show that well-being and life satisfaction are higher in rural areas than in urban areas.

The 2023 Survey of Rural Decision Makers also recorded measures of self-efficacy and connectedness to nature using standard psychological inventories. I show that farmers, foresters, and growers with higher self-efficacy and connectedness to nature report both higher well-being and higher life satisfaction. Moreover, whereas most survey participants project higher life satisfaction five years into the future, survey respondents with higher self-efficacy and connectedness to nature anticipate disproportionately higher life satisfaction in the future. All of these results are robust to controls for age, gender, ethnicity, education, location, and profitability as well as industry.

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291 Economic Impact of Climate Change Adaptation Strategies in Australian Agriculture

Abdulrasheed Zakari

University of Wollongong, Wollongong, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

12. Econometric Modelling

14. Environmental Economics

Paper/Poster Abstract:

Climate change is reshaping the agricultural landscape, posing substantial challenges to farmers worldwide. In the context of Australian agriculture, a sector particularly vulnerable to climate variability, this empirical study aims to comprehensively investigate the economic impact of various climate change adaptation strategies. Grounded in real-world data and employing rigorous econometric methods, the research provides valuable insights into the effectiveness of adaptation measures, their economic viability, and the factors influencing their adoption.

The study leverages a robust dataset encompassing diverse agricultural regions across Australia, spanning multiple years. Using advanced statistical models, including regression analysis and econometric simulations, the research evaluates the economic performance of farmers implementing different adaptation strategies. These strategies range from precision agriculture technologies, drought-resistant crop varieties, and improved water management practices to altered planting schedules and diversified cropping systems.

Key indicators such as crop yield, production costs, farm revenue, and overall profitability serve as metrics to assess the economic impact. By comparing these parameters between farms employing climate change adaptation strategies and those following conventional practices, the research quantifies the financial benefits and risks associated with adaptation. Additionally, the study delves into the socio-economic factors influencing the adoption of these strategies, exploring the role of government policies, access to financial resources, and farmers' perceptions of climate change.

Furthermore, the research scrutinizes the long-term economic sustainability of these adaptation strategies. By incorporating climate projections and economic forecasts, the study models future scenarios to predict the financial resilience of farms under changing climate conditions. This forward-looking approach provides valuable insights for policymakers, enabling them to formulate adaptive agricultural policies that are not only effective in the present but also resilient to future climate challenges.

The findings of this empirical study hold significant implications for both farmers and policymakers. For farmers, the research offers evidence-based guidance on choosing adaptation strategies that align with their specific contexts, optimizing their economic outcomes while mitigating climate risks. Policymakers can utilize the results to design targeted support programs, subsidies, and incentives, fostering the widespread adoption of climate-smart agricultural practices. Ultimately, this study contributes to the empirical understanding of climate change adaptation in agriculture, serving as a foundation for evidence-based decision-making and sustainable agricultural development in the face of a changing climate.

329 Climate Change, Agricultural Prices and Civil Conflict: Evidence from Cloud Cover

Hemant Pullabhotla, Prasad Sankar Bhattacharya

Department of Economics, Deakin University, Melbourne, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

10. Development Economics

Paper/Poster Abstract:

In this paper, we investigate how climate change events could incite civil strife through abrupt changes in agricultural prices across a number of countries in the world. To measure the climate change, we exploit a novel geo-referenced dataset on the magnitude of cloud cover which provides very detailed (every hour each day) information of cloud cover and other relevant temperature gauge data at the observation station level spanning over 15000 weather stations across the world. The cloud cover data is sourced from the Integrated Surface Dataset of the National Oceanic and Atmospheric Administration, USA. The conflict event data is also geo-referenced from the well-respected Armed Conflict Location & Event Data (ACLED) Project. The agricultural prices data are downloaded from the FAO Food and Agriculture Statistics.

Our paper complements extant studies like Hsiang, Burke and Miguel (2013) which establishes that a standard deviation increase in temperature towards warmer weather or more extreme rainfall leads to the rise of frequency of civil conflict by 14% (median value). The magnitude of cloud cover has been employed by Cortes, Duchin and Sosyura (2016) and Chhaochharia, Kim, Corniotis and Kumar (2019), amongst others, to discern behavioural pattern in financial decision making. However, we are the first in analysing how changes in cloud cover could be linked to changes of temperature or rainfall, thus providing a more nuanced measure of climate change events.

In another strand of literature, papers such as Bazzi and Blattman (2014) finds that export price shocks have no statistically significant bearing on conflict onset in developing countries but argues that rising prices could explain the continuation of conflict. In individual country setting, Dube and Vargas (2013) and Angrist and Kugler (2009) finds that fluctuations in prices of coffee and cocoa, have causal impact on civil violence in Colombia. In these studies, the price fluctuations were exogenous. We provide evidence that the agricultural price fluctuations are linked to changes in cloud cover. Thus, focusing on the cloud cover helps us to pinpoint one casual mechanism.

In Africa and Iraq, the extant research also shows that extreme weather events increased the likelihood of joining rebel forces due to decline in economic productivity (Hsiang, Burke and Miguel, 2013). Our study explicitly links how changes in cloud cover is exacerbating such extreme weather events.

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338 The assessment of climate change policies through a general equilibrium model: An application to Uruguay

Francisco Rosas

Universidad ORT Uruguay, Montevideo, Uruguay

Presentation Type:

4. Poster

Keywords:

7. Carbon and Nature Markets

8. Climate Change

25. Policy Analysis

Paper/Poster Abstract:

Countries present their Climate Change Long Term Strategies (LTS) before the United Nations Framework Convention on Climate Change (UNFCCC), which consist of projecting a set of long-term scenarios of CO2 emissions mitigation aligned with global and domestic targets, in particular, those stated in their Nationally Determined Contributions (NDC). Uruguay submitted its 2050 LTS including a CO2-neutral scenario, which involves the objective of achieving a CO2 net-zero emissions by 2050, requiring a significant mitigation and sink effort in different areas of the economy. It requires a sharp reduction in fossil fuels demand, an increase of electricity demand, a moderate increase in forestry area driving CO2 sinks, and a moderate increase in livestock productivity reducing the CO2 emissions per unit of output.

The objective of this study is to analyze the impacts of this scenario on some key macroeconomic variables. We use a general equilibrium model including agriculture and energy which are the most relevant sectors for the LTS. We follow the model by Fullerton and Ta (2019) who show that this model generates comparable results to those yielded by a large computable general equilibrium model. Importantly, we propose some extensions relevant for climate policy analysis, i.e., the specification of an additional sector (timber production) and input (agricultural land). We solve the model analytically and compute the impact on GDP, prices and quantities of inputs and outputs by sector, quantities and prices in the labor market, welfare, and CO2 emissions by sector.

Our model has five sectors (households, electricity, fossil fuels, timber, and a composite good representing the remaining goods and services of the economy). Inputs are the factors capital, labor and agricultural land, as well as outputs from the electricity, fossil fuels and timber sectors that are used as inputs in the remaining sectors. Households maximize a Cobb-Douglas utility function subject to a budget restriction. Electricity, fossil fuels, timber and the composite good sector maximize profits given a Cobb-Douglas production function and taking output and inputs prices as exogenous. Government net revenues come from taxes or subsidies on labor, fossil fuels, electricity purchases and forestry land purchases in the timber sector. Except from labor, all these taxes or subsidies are linked to the CO2 emissions from the corresponding activity.

We calibrate the model to the Uruguayan economy in 2019. We implement the LTS CO2 neutral scenario by specifying a carbon tax on fossil fuel purchases, a subsidy on electricity purchases, a subsidy on land purchases for the timber sector, and a positive shock in the total factor productivity of the composite good sector to replicate the livestock productivity increase. Results show that the LTS CO2 neutral scenario implies a cumulative impact on GDP level though 2050 of -0.01%. If we assume it is equally distributed over time, it implies that the GDP growth rate remains almost the same than in the business-as-usual the scenario. Therefore, this LTS, which implies drastic changes in the energy supply composition, implies mild changes in GDP but strong reductions on CO2 emissions.

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350 Comparing Climate Pledges and Eco-Taxation in a Networked Agricultural Supply Chain Organization

Arnaud Dragicevic[1,2], Jean-Christophe Pereau[3]

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

24. Mathematical Programming

Paper/Poster Abstract:

This paper examines the effectiveness of climate pledges and eco-taxation as strategies for mitigating climate change within a networked agricultural supply chain organization. We utilize variational inequality techniques within a multicriteria decision-making framework and validate our theoretical findings through numerical simulations using a machine learning augmented algorithm. By employing this approach, we are able to situate a climate pledge initiative, such as the Agricultural Sector Roadmap to limit global warming to 1.5 degrees Celsius, within the broader context of the entire agricultural sector. Our results demonstrate that environmental taxation emerges as the most effective approach for addressing climate change. Eco-taxation leads to a 57.87% reduction in global emissions, whereas climate pledges only account for a 20.59% reduction at the same level of production. Furthermore, eco-taxation results in a 45.68% greater reduction in emission intensity compared to climate pledges. In contrast to climate commitments, an eco-fiscal policy is capable of achieving the objectives established by the European Union.

Australian Centre for International Agricultural Research (ACIAR) Invited Session - "Falling Short or Forging Ahead? Assessing Economics and Policy Research to Address Escalating Agricultural and Food System Challenges in the Asia-Pacific"

10:40 - 12:10 Thursday, 8th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Wendy Umberger, Wahida Maghraby, Silinthone Sacklokham, Prabhu Pingali, Todd Sanderson

Overview: In the Asia-Pacific region, where agricultural development is fundamental to economic growth and food security, a pressing question emerges: Is economics and policy research keeping pace with the growing challenges facing agricultural and food systems? This thought-provoking panel session aims to critically evaluate the effectiveness of economics and policy research and capacity building in addressing the increasingly intricate challenges facing agricultural development in the Asia-Pacific. Drawing insights from a distinguished panel of experts and thought leaders, this session seeks to stimulate an open dialogue on research and capacity deficiencies, prospects, and avenues to enhance impact.

Sponsored by the Australian Centre for International Agricultural Research (ACIAR), the panel will conduct an in-depth examination of the mounting challenges confronting agricultural development in the Asia-Pacific. These challenges are expansive, ranging from food security and resource management to climate resilience and equitable growth. The session will consider whether current research paradigms adequately address these multifaceted challenges, or if a paradigm shift in economics and policy research is required.

Distinguished keynote speakers, including ACIAR CEO Professor Wendy Umberger, Dr. Wahida Maghraby from the Indonesian Centre for Agricultural Socio-Economic and Policy Studies, Professor Silinthone Sacklokham from the Ministry of Education and Sports and the National University of Laos, and Professor Prabhu Pingali from Cornell University's Charles H. Dyson School of Applied Economics and Management, will share their insights. Collectively, they will explore potential research gaps and areas where policy recommendations may fall short in addressing the pressing issues that affect agricultural development.

Following these presentations, participants will have the opportunity to directly engage with the panellists in a dynamic discussion. This interactive segment will provide a platform for attendees to express their viewpoints, share experiences, and collaborate in identifying strategies to strengthen the role of economics and policy research in addressing the escalating challenges in agricultural development across the Asia-Pacific.

This panel session invites critical reflection, insightful discourse, and a collaborative exploration of how economics and policy research can serve as a more effective catalyst for positive change in the region's agricultural sector. It is a call to action, inviting all stakeholders to collectively navigate the complexities of agricultural development and strive towards a sustainable and resilient future in the Asia-Pacific.

Presenter details:

Professor Prabhu Pingali is a Professor in the Charles H. Dyson School of Applied Economics and Management at Cornell University, with a joint appointment in the Department of Global Development, and the Founding Director of the Tata-Cornell Institute for Agriculture and Nutrition (TCI). He is also the Chair of the Governing Board of ICRISAT. Prior to joining Cornell, he was the Deputy Director, Agricultural Development Division of the Bill & Melinda Gates Foundation, from 2008–May 2013. He was director of the UN Food and Agriculture Organization’s Agriculture and Development Economics Division from 2002-2007. In addition, he worked with the CGIAR for 15 years from 1987-2002, first with IRRI in the Philippines and then with CIMMYT in Mexico. Dr. Pingali is a Fellow of the American Association for the Advancement of Science (AAAS), a member in the U.S. National Academy of Sciences, a Fellow of the American Agricultural Economics Association (AAEA), and a former President of the

International Association of Agricultural Economists. Pingali has written 14 books and over 200 refereed journal articles and book chapters on agriculture and food & nutrition policy.

Dr Wahida Maghraby is an agriculture policy analyst at the Indonesian Center for Agriculture Socio Economics and Policy Studies (ICASEPS), Ministry of Agriculture. Prior to this position, from 2016 to 2020 Wahida was assigned as the Agricultural Attaché to the European Union based at the Embassy of the Republic of Indonesia in Brussels, Belgium. From 2021-2022, Wahida participated in two ACIAR Small Research Activities, namely 1) Agricultural research and innovation In Indonesia: Assessment of constraints, challenges, and opportunities and 2) Digital Ag-tech in Indonesia's Transforming Small Holder Agriculture Sector: Potential and Policy Options. Her daily responsibilities consist of analysing agriculture policy-related issues and providing policy briefs for the Ministry.

Professor Silinthone Sacklokham holds a PhD Degree in Agricultural Economics (2003) from AgroParisTech, France. Currently she holds several positions notably the Director General of International Cooperation Department of the Ministry of Education and Sports. Dr. Silinthone is a member of the Council of the National University of Laos and she also serves as visiting lecturer and researcher of the National University of Laos in Agricultural Policies, Agrarian System and Agricultural Products Value Chain. Assoc. Prof. Dr. Silinthone Sacklokham has published and co-edited a number of journal articles in the field of Agriculture and Education development significantly are "Land Policy and Farming Practices in Laos"; "Agricultural Development and Deforestation in Lao PDR; "White Gold", the Commercialization of Rice Farming in the Lower Mekong Basin.

Professor Wendy Umberger is the CEO of the Australian Centre for International Agricultural Research (ACIAR). She has played influential roles in sustainable agriculture for over 20 years. She founded and led the Centre for Global Food and Resources at the University of Adelaide, which engaged with policymakers and industry to make positive changes in agriculture, food, and resource systems. She has worked on food system issues across the Indo-Pacific region and led interdisciplinary value chain research projects in Asia, Australia, North America, the Pacific Islands and South Africa. Her research has explored opportunities for smallholder agricultural households to produce high-value (horticulture, dairy, beef) food products and adopt new technology to access modern food value chains. Professor Umberger is also a Director of the International Association of Agricultural Economists, a board member of Food Bank SA, an Honorary Fellow of Food Standards Australia New Zealand, a Distinguished Fellow of the Australasian Agricultural and Resource Economics Society and served as an Independent Director of Grain Producers South Australia (GPSA) for six years.

Chair: Dr Todd Sanderson

Agricultural and Applied Economics Association (AAEA) Invited Session - "Climate Change"

10:40 - 12:10 Thursday, 8th February, 2024

Location Cinema, Kambri Cultural Centre
Daniel Scheitrum, Rudy Nayga, Sarah Smith, Scott Swinton

Climate change will increasingly affect all aspects of agricultural production, supply, demand and trade. This special session organised by the Agricultural and Applied Economics Association (AAEA) covers a diverse range of issues related to climate change and its influence on agriculture and food. It spans adaptation to climate change by farmers, the effect of climate change on agricultural trade, its effect on product prices and quality, and consumers' demand for "climate-friendly" foods. This session is part of an ongoing multi-pronged partnership between AARES and AAEA. Speakers include the current AAEA President (Professor Nayga) and a Past President (Professor Swinton).

Scott Swinton (Michigan State University) (with co-author Natalie Loduca):

How Farmer Risk Preferences Shape Perceptions of Changing Crop Yield Distributions that Influence Climate Change Adaptation

Abstract: How farmers respond to a changing climate depends upon their risk attitudes and the changes they perceive in the probability distribution of crop yields. We elicited risk preferences via both general and agricultural investment lotteries for farmers from Michigan, USA. Constant relative risk aversion best described their risk attitudes for agricultural investment decisions. We further elicited triangular probability distributions of corn yields for the past and next ten years, assuming constant technology. The farmers anticipate future rises in both mean and variance of yield. More risk averse farmers perceive greater yield variance. Farmers are investing more actively in technologies that will increase mean while reducing variance (e.g., irrigation, drainage tile) than in drought-resistant seed, which only reduces variance.

Daniel Scheitrum (Department of Agribusiness, California Polytechnic State University) (with co-authors Matthew Gammans, Kjersti Nes, K. Aleks Schaefer):

Extreme Weather Events, Climate Expectations, and Agricultural Export Dynamics

Abstract: Rising temperatures and shifting precipitation patterns threaten agricultural yields in many key global production regions. This paper assesses the impact of growing-season extreme weather events on agricultural export outcomes in the short-run, as well as the trade implications of long-run shifts in climate expectations and variance. Our analysis matches information on bilateral trade flows with high-resolution, geospatial data on growing area, planting and harvest dates, and weather for three highly traded staple crops---maize, soybeans, and rice---which together account for almost half of global calorie consumption. We use an econometric gravity model to estimate the short-run effects of weather volatility and a non-parametric series regression to infer long-run climate effects. We then use our estimates to simulate the effects of various climate and weather counterfactuals on the agricultural export landscape. We find that 2-standard-deviation extreme weather events (measured using the water balance deficit) reduce maize, rice, and soybean export values by 17.7%, 13.7%, and 21.7%, respectively. Our long-run results imply that increases in the standard deviation of weather are associated with lower export values across all three crops. An increase in the frequency of extreme events, alongside rising mean temperatures, has the potential to greatly shift current commodity export

patterns. Understanding these shifting patterns of trade is necessary to implement trade policy that enables countries to leverage their evolving comparative advantages and ensure the effectiveness of trade as a smoothing tool to mitigate the negative production effect of climate change.

Sarah Smith (University of California Davis) (with co-author Julian Alston):

Climate, Weather, and Collective Reputation: Implications for California's Wine Prices and Quality

Abstract: Wine is the most differentiated of all farm products, with much of the differentiation based on the combination of wine grape varieties and so-called "terroir"—reflecting the soil type, topography, and climate in particular. Reflecting this product differentiation, prices of wine and the grapes used to produce it vary considerably, even within California. In 1980 the U.S. Government created American Viticultural Areas (AVAs) as a mechanism for producers to signal quality and better capture the benefits from collective reputation associated with the location of production. AVAs are defined geographic areas that may be quite large and cross state or county lines, or may be quite small and lie within a county or, in some cases, another AVA. California, which produces about 90% of U.S. wine, has 142 AVAs of which 16 are located within the Napa Valley AVA. The objective of this study is to develop an improved understanding of the role of AVAs in conjunction with climate and vintage weather as they affect the quality and prices of varietal wines. Our analysis is based on a sample of premium wines rated by Wine Spectator magazine between 1994 and 2022. We use spatially detailed weather data from PRISM (800m grids) to represent the relevant concepts of weather and climate accurately and reduce the risk of measurement error. We (1) derive estimates of the location- and variety-specific relationship between prices (and ratings) and weather and climate, and (2) explore the role of adaptive responses by producers in the vineyard and winery seeking to mitigate the undesired effects of short-run weather shocks and longer-run climate drift on the quality and price of premium wine.

Rudy Nayga (Texas A&M University):

The Market for Climate Friendly Novel Food Products: The Case of Lab Meat

Abstract: Continuing growth in world population, incomes, and urbanization has significantly increased the demand for meat products. Meat production can cause relatively large greenhouse emissions, and it extensively uses land, energy and water. There are also increasing societal concerns about food safety and animal welfare. For these reasons, there is increasing interest towards innovative alternatives to conventional meat (i.e., plant-based meat, insects, etc.). One of the emerging, novel alternatives to conventional meat is the so-called lab meat, which is the result of recent scientific advances in regenerative medicine techniques where muscle-specific stem cells are taken from an animal and then grown in large numbers until they form muscle tissues that can be considered edible meat. In this presentation, I will discuss the sustainability and animal welfare issues related to this emerging technology as well as policy and consumer perspectives.

Chair: David Pannell (UWA)

Presenter details:

Rodolfo M. Nayga, Jr. is currently Professor and Head of the Department of Agricultural Economics at Texas A&M University. Dr. Nayga's research interests include the economics of food valuation,

consumption, policy, and health. Prior to rejoining Texas A&M University in 2021, Dr. Nayga was Distinguished Professor and Tyson Endowed Chair in Food Policy Economics at the University of Arkansas. He also was a faculty member at Rutgers University and at Massey University, New Zealand. He has been a Fulbright Senior Scholar at Wageningen University, The Netherlands, adjunct professor at Korea University and Norwegian Institute for Bioeconomy Research, NBER research economist, and senior research fellow of the Waseda Institute for Advanced Study in Tokyo. He also was executive board member of the Agricultural and Applied Economics Association and member of the International Scientific Advisory Board of the Institute for Global Food Security at Queen's University Belfast. He is a Fellow of the Agricultural and Applied Economics Association (AAEA), and currently serving as AAEA's President and editor of the American Journal of Agricultural Economics.

Sarah Smith is a postdoctoral scholar in the Department of Agricultural and Resource Economics at the University of California, Davis where she recently obtained her PhD. Originally from Australia, Sarah earned her Bachelors Degree in Resource Economics from the University of Sydney, and spent several years as a researcher with the Australian Bureau of Agricultural and Resource Economics and Sciences. Her research looks at the effects of extreme weather and climate change on agricultural production, and how producers make decisions and adapt to these challenges.

Scott M. Swinton is a University Distinguished Professor and past chairperson in the Department of Agricultural, Food, and Resource Economics at Michigan State University. His research examines the economics of agricultural production and environmental management. Often working on multidisciplinary teams, his work aims to make agriculture more sustainable via improved technology, information, and incentives. Swinton is a past president of the Agricultural and Applied Economics Association (AAEA), which named him a Fellow in 2020.

Dan Scheitrum is an Assistant Professor of Agribusiness at Cal Poly San Luis Obispo. His research examines the economic, trade, and financial impacts of agricultural and energy policy. Recent projects include examining the impacts of approvals of GMO products on cultivation and international trade, estimating the price impact of animal welfare legislation, and estimating the extent and consequences of market concentration in the meatpacking industry. Currently, Dr. Scheitrum is examining weather shocks in global growing regios for staple crops and how international trade reacts and its potential to serve as a climate change adaptation mechanism. Dr. Scheitrum's research has been featured in the Washington Post, Forbes, the San Francisco Chronicle, KCBS.

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353 How Farmer Risk Preferences Shape Perceptions of Changing Crop Yield Distributions that Influence Climate Change Adaptation

Natalie Loduca, Scott M. Swinton

Michigan State University, Michigan, USA

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

28. Uncertainty and Risk

Paper/Poster Abstract:

How farmers respond to a changing climate depends upon their risk attitudes and the changes they perceive in the probability distribution of crop yields. We elicited risk preferences via both general and agricultural investment lotteries for farmers from Michigan, USA. Constant relative risk aversion best described their risk attitudes for agricultural investment decisions. We further elicited triangular probability distributions of corn yields for the past and next ten years, assuming constant technology. The farmers anticipate future rises in both mean and variance of yield. More risk averse farmers perceive greater yield variance. Farmers are investing more actively in technologies that will increase mean while reducing variance (e.g., irrigation, drainage tile) than in drought-resistant seed, which only reduces variance.

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354 Extreme Weather Events, Climate Expectations, and Agricultural Export Dynamics

Daniel Scheitrum

California Polytechnic State University, California, USA

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

20. International Trade

Paper/Poster Abstract:

Rising temperatures and shifting precipitation patterns threaten agricultural yields in many key global production regions. This paper assesses the impact of growing-season extreme weather events on agricultural export outcomes in the short-run, as well as the trade implications of long-run shifts in climate expectations and variance. Our analysis matches information on bilateral trade flows with high-resolution, geospatial data on growing area, planting and harvest dates, and weather for three highly traded staple crops---maize, soybeans, and rice---which together account for almost half of global calorie consumption. We use an econometric gravity model to estimate the short-run effects of weather volatility and a non-parametric series regression to infer long-run climate effects. We then use our estimates to simulate the effects of various climate and weather counterfactuals on the agricultural export landscape. We find that 2-standard-deviation extreme weather events (measured using the water balance deficit) reduce maize, rice, and soybean export values by 17.7%, 13.7%, and 21.7%, respectively. Our long-run results imply that increases in the standard deviation of weather are associated with lower export values across all three crops. An increase in the frequency of extreme events, alongside rising mean temperatures, has the potential to greatly shift current commodity export patterns. Understanding these shifting patterns of trade is necessary to implement trade policy that enables countries to leverage their evolving comparative advantages and ensure the effectiveness of trade as a smoothing tool to mitigate the negative production effect of climate change.

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355 Climate, Weather, and Collective Reputation: Implications for California's Wine Prices and Quality

Sarah Smith, Julian M. Alston

University of California, Davis, California, USA

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

32. Wine and Horticultural Systems

Paper/Poster Abstract:

Wine is the most differentiated of all farm products, with much of the differentiation based on the combination of wine grape varieties and so-called "terroir"—reflecting the soil type, topography, and climate in particular. Reflecting this product differentiation, prices of wine and the grapes used to produce it vary considerably, even within California. In 1980 the U.S. Government created American Viticultural Areas (AVAs) as a mechanism for producers to signal quality and better capture the benefits from collective reputation associated with the location of production. AVAs are defined geographic areas that may be quite large and cross state or county lines, or may be quite small and lie within a county or, in some cases, another AVA. California, which produces about 90% of U.S. wine, has 142 AVAs of which 16 are located within the Napa Valley AVA. The objective of this study is to develop an improved understanding of the role of AVAs in conjunction with climate and vintage weather as they affect the quality and prices of varietal wines. Our analysis is based on a sample of premium wines rated by Wine Spectator magazine between 1994 and 2022. We use spatially detailed weather data from PRISM (800m grids) to represent the relevant concepts of weather and climate accurately and reduce the risk of measurement error. We (1) derive estimates of the location- and variety-specific relationship between prices (and ratings) and weather and climate, and (2) explore the role of adaptive responses by producers in the vineyard and winery seeking to mitigate the undesired effects of short-run weather shocks and longer-run climate drift on the quality and price of premium wine.

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356 The Market for Climate Friendly Novel Food Products: The Case of Lab Meat

Rudy Nayga

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

4. Agricultural Technology and Innovation

17. Food, Health and Nutrition

22. Livestock Systems

Paper/Poster Abstract:

Continuing growth in world population, incomes, and urbanization has significantly increased the demand for meat products. Meat production can cause relatively large greenhouse emissions, and it extensively uses land, energy and water. There are also increasing societal concerns about food safety and animal welfare. For these reasons, there is increasing interest towards innovative alternatives to conventional meat (i.e., plant-based meat, insects, etc.). One of the emerging, novel alternatives to conventional meat is the so-called lab meat, which is the result of recent scientific advances in regenerative medicine techniques where muscle-specific stem cells are taken from an animal and then grown in large numbers until they form muscle tissues that can be considered edible meat. In this presentation, I will discuss the sustainability and animal welfare issues related to this emerging technology as well as policy and consumer perspectives.

European Association of Agricultural Economists (EAAE) Invited Session - “Economic experiments supporting public policies towards the provision of Ecosystem Services by the agri-food sector”

10:40 - 12:10 Thursday, 8th February, 2024

Location Room 1, (Level 4) Marie Reay Teaching Centre

Francisco Alcon, Anastasio Villanueva, Chema Gil

Overview: Increasing food demand while coping with the environmental global challenges (climate adaptation and mitigation, biodiversity loss, etc.) urge agri-food stakeholders to ensure a sustainable food production. Economic experiments can provide useful information about how stakeholders along the food value chain may behave in achieving sustainability, from the analysis of land managers’ preferences for policies aiming at that objective to the valuation of benefits for the society related sustainability innovations along that chain. In this context, this special session aims to discuss about how economic experiments can support public policies towards the provision of Ecosystem Services by agroecosystems.

The session is organized in with three interrelated topics that would be further discussed for policy purposes. The first presentation, carried out by Francisco Alcón, will set up a conceptual framework for ecosystem services and ecosystem dis-services valuation and an empirical application to a water scarcity area in south-east Spain. Secondly, Anastasio J. Villanueva would present the importance of the results-based policies to improve the ecosystem services provided by the famers and thirdly the presentation of

José M. Gil would go throughout the food value chain to show the European demand of public goods associated with Sustainable Innovations in the Agri-food Industry.

The titles of the presentations are: (1) Valuing ecosystem services and dis-services of agroecosystems to inform public policies, (2) Land managers' preferences for innovative results-based payments for ecosystem services: effects of remote- monitoring and collective participation, and (3) How are European Citizens Willing to Pay Differently for Public Goods Associated with Sustainable Innovations in the Agri-food Industry?

Presenter details:

Professor José M. Gil is a Professor of Agricultural Economics at the Technical University of Catalonia (UPC) and Director of the Centre for Agro-food and Development Economics (CREDA). He is responsible for the Food Chain Analysis and Consumer Behaviour Team. His current research focuses on the economics of food quality and safety and related policy issues with respect to consumers, the food industry and trade.

Professor Francisco Alcón is a professor in agricultural economics at Universidad Politécnica de Cartagena (Murcia, Spain). He is a trained Agricultural Engineer with a specialisation in Agricultural Economics, specifically, the economics of agricultural and natural resource management. His has also worked on topics including agricultural technology adoption, non-market valuation, agricultural resources management and natural resource management policy and planning. His current research is focused on the valuation of ecosystem services and disservices of agroecosystems and the economics of agricultural practices to mitigate the climate change impact.

Associate Professor Anastasio J. Villanueva is a Senior Researcher in agricultural and environmental economics and policy in the Department of Agri-food Economics in the Institute of Agricultural and Fisheries Research and Training (IFAPA) in Granada (Spain). He is also an Adjunct Professor at the University of Córdoba (Spain). Most of his research concerns interdisciplinary analyses involving economic, social, and environmental sciences, with a particular focus on the economic valuation of non-market services associated with agri-food production, including both supply- and demand-side assessments. He routinely collaborates in EU, national and regional research projects, which have been recognised at an international level, producing scientific publications in renown journals (incl. ERAE, JAE, CJAE, EE, LUP, JEM, among others) in which he also has regular review activity.

Chair: Alan Renwick

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358 How are European Citizens Willing to Pay Differently for Public Goods Associated with Sustainable Innovations in the Agri-food Industry?

José María Gil

Technical University of Catalonia, Barcelona, Spain

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

29. Valuation

Paper/Poster Abstract:

Innovations in the agri-food industry targeting at strengthening sustainability have recently become trendy in compliance with the Sustainable Development Goals (SDGs). In the H2020 CO-FRESH project, seven sustainable innovations have been implemented by seven local farms and companies covering various areas in six European countries with diversified formats, including e.g., a smart irrigation system, reutilizing water usage in processing, sensors for precisely applying fertilizers and new packaging technology for reducing plastic usage and food waste. Previous studies mainly focus on the innovations in agricultural products in one country, but few at the processing level or at the pan-European level. In this study, we adopt a discrete choice experiment to assess citizen's willingness to pay for the public goods associated with sustainable innovations in the agri-food industry across Europe. The common attributes derived from different innovations enable the cross-country comparison of the willingness to pay of citizens living nearby the innovation sites for the carbon dioxide emission, biodiversity and local employment. We hypothesize that there exists regional heterogeneity among European citizens as well as the preference heterogeneity for the public goods within each innovation. The study has policy implications for various stakeholders in the agri-food value chain, as well as policy makers when deciding an optimal allocation of resources or implementing policy incentives for enhancing sustainability, to avoid “one-size-fits-all” applications considering the heterogeneity in Europe.

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357 Valuing ecosystem services and dis-services of agroecosystems to inform public policies

Francisco Alcon

Universidad Politécnica de Cartagena, Cartagena, Spain

Presentation Type:

3. Contributed Paper

Keywords:

29. Valuation

31. Water

Paper/Poster Abstract:

Agroecosystems are anthropised ecosystems where human activities, mainly agricultural practices, affect the innate functioning, leading to the provision of agroecosystem services (AES) and disservices (AEDS). This study presents a novel and integrated economic valuation of the AES and AEDS provided in a water-scarce Mediterranean area (south-eastern Spain), using tow discrete choice experiments, one based on experts and another one based on consumers. The results reveal the social demand for AES and the disutility of AEDS, as well as the non-linearity in marginal utility for some of these AES and AEDS. Food provision, temperature regulation, leisure and recreation and biodiversity are socially perceived as AES. The water supply for irrigation switches between AES and AEDS depending on its provision level, while groundwater pollution is conceived as one of the AEDS. The integrated non-

market value of AES and AEDS reaches 794 €/ha/year for the entire agroecosystem. This work provides guidelines for policy makers in the design of socially supported agricultural policies.

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359 Land managers' preferences for innovative results-based payments for ecosystem services: effects of remote-sensing monitoring and collective participation

Anastasio J. Villanueva

Universidad de Córdoba, Cordoba, Spain

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

29. Valuation

Paper/Poster Abstract:

Results-based payments (RBP) represent a paradigm change, from a prescription-type policy to instruments more directly targeting the ecosystem services (ES) provided by land managers. The implementation of RBP may provide substantial benefits, with land managers more easily integrating the function of ES provision as another aim of their agribusiness management, by changing from a passive, practice-taker role to a more proactive, practice-developer role. Due to the voluntary nature of the policy instrument, information on land managers' preferences toward RBP is utterly needed, especially on innovative designs incorporating remote-sensing monitoring (to reduce monitoring costs) or collective participation (enhancing the environmental performance by better matching the landscape scale). The present study contributes to better understand such a preferences in comparison to those for practice-based payments (PBP), using labelled discrete choice experiments (DCE) and two noteworthy Mediterranean agricultural systems (oak savannahs and woody crops) as case studies. Results indicate that land managers' preferences for RBP compared to PBP are contingent to the practices considered. In addition, preferences depend on the environmental objective and the related indicators (e.g. organic carbon sequestered vs the number of bird species), the type of monitoring (remote sensing-based vs. in-field), the targeted level of environmental provision, and the capacity to reduce the farmers' uncertainty about whether or not they will be able to accomplish the expected outcomes. A subsequent DCE focusing on collective RBP show that land managers would be willing to accept participating in such a schemes at much higher compensation levels as compared to individual participation, with the number of members of the collective significantly influencing preferences. Relevant policy implications stem from the results.

Lunch

12:10 - 13:10 Thursday, 8th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Lunchtime session - "A History of AARES"

12:20 - 13:00 Thursday, 8th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

David Pannell, Bill Malcolm

We both joined the Society in the early 1980s, when it was still called the Australian Agricultural Economics Society (AAES). AAES was formed in 1956, with the first conference happening in Sydney in February 1957. The AARES web site includes an outline of the “History of AARES”, written by Keith Campbell, who was professor of Agricultural Economics at the University of Sydney, and Foundation President of AARES. His history focuses largely on the early years of the Society, with little coverage of events from the 1980s on. In this paper we will extend and expand on that history, with a relative focus on the past four decades. This time has seen a lot of changes, including a broadening of the subjects covered by AARES member, the merger of the two original journals into one broader one, the decline of all but one of the university departments of agricultural economics, the coming of the internet and all that has followed from that, a wide range of initiatives for members, improved professionalism of the Society’s management, the internationalisation of the discipline, slow but steady progress on gender balance in the Society, and the passing of almost all of the early AAES identities.

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47 A history of AARES

David Pannell[1], Bill Malcolm[2]

[1]University of Western Australia, Perth, Australia. [2]University of Melbourne, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

19. Impact Assessment

25. Policy Analysis

Paper/Poster Abstract:

We both joined the Society in the early 1980s, when it was still called the Australian Agricultural Economics Society (AAES). AAES was formed in 1956, with the first conference happening in Sydney in February 1957. The AARES web site includes an outline of the “History of AARES”, written by Keith Campbell, who was professor of Agricultural Economics at the University of Sydney, and Foundation President of AARES. His history focuses largely on the early years of the Society, with little coverage of events from the 1980s on. In this paper we will extend and expand on that history, with a relative focus on the past four decades. This time has seen a lot of changes, including a broadening of the subjects covered by AARES member, the merger of the two original journals into one broader one, the decline of all but one of the university departments of agricultural economics, the coming of the internet and all that has followed from that, a wide range of initiatives for members, improved professionalism of the Society’s management, the internationalisation of the discipline, slow but steady progress on gender balance in the Society, and the passing of almost all of the early AAES identities.

CSIRO Keynote: "Maximising utilisation of crop residues in the food system with circular business models"

13:10 - 14:10 Thursday, 8th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

Pablo Juliano

Abstract: The global demand for plant-based ingredients is booming to an estimated $8.6B in 2025. At present, the Australian food industry is almost completely dependent on plant-based ingredient imports from China, Europe, and the USA. On the other hand, Australia is producing 7.6M tonnes of food waste annually, which translates into a $36B loss to the economy. While there is some level of circularity, with food waste being diverted into compost, animal feed and fibre, there is significant scope to further maximise the full utilisation of our crops and crop by-products. For instance, 20-40% of fruit and vegetables grown in Australia (1.5M tonnes), are lost on-farm, in packing houses and during processing. Legume crops are mainly exported as a commodity or used for nitrogen fixing in soil with little post-harvest processing to enable high value addition. All this represents major losses to the agriculture sector that could otherwise bring much higher returns to growers and to regions. This presentation will showcase the opportunities for using circular business models with a case for specialty plant-based ingredient hubs processing crops such as hemp, soybean, and mungbean that repurpose plant-based edible waste from growers, transforming them into value added products. Other whole of crop utilisation opportunities for upcycling fruit and vegetables into consumer food products will also be highlighted, together with complementary company creation and commercialisation success stories.

Dr Pablo Juliano is a supply chain transformation leader with strong background in innovation in food processing and food waste upcycling. He currently leads the Processing and Supply Chains Group, which delivers science innovation to the food industry as part of CSIRO's Food Program. His research focuses on reducing and value capturing on food losses and waste across the supply chain by upcycling into co-products using CSIRO platform technologies. Over 20 years of service to the food industry in 7 countries. He is the CSIRO representative on the National Food Waste Strategy and Implementation steering committee together with industry peak bodies, the federal and state governments and is working nationally with food clusters towards the implementation of horticultural ingredient hubs for regional development.

Chair: Dr Nikki Dumbrell

The Crawford Fund Keynote: "The food system – measuring and managing the positive and negative externalities?"

13:10 - 14:10 Thursday, 8th February, 2024

Location Cinema, Kambri Cultural Centre

Jonathan Rushton

Abstract: The food system has never been so successful when measured in terms of providing adequate and safe food at a reasonable price for a rapidly growing population. The roots of this success have been a mix of advances in agricultural practice, increasingly sophisticated processing, marketing and retail systems and government policies on science, education and business. Yet the underlying mantra of this success has been “food at any cost”, creating problems of the food system mining natural resources, affecting water and air quality and producing an obesogenic environment for consumers. How do we start to rebalance our food systems and bring them back into an ecological and regenerative form? The presentation will explore this through the negative environmental and public health externalities the food system creates, questioning whether these problems are adequately addressed in food pricing. Examples will be presented on the application of true cost accounting of food to explore these issues. The paper will argue that by replacing the current policy of “food at any cost” with a One Health approach it will be possible to shift the food system towards a more sustainable foundation.

Professor Jonathan Rushton is an agricultural economist who specialises in the economics of animal health and food systems. His principal research interests are the: Global Burden of Animal Diseases (GBADs) where he directs a global programme with WOAH (founded as OIE); economics of antimicrobial use and resistance in livestock; and assessment of the multidimensionality of food quality and public health. He is involved in the EU funded projects: ROADMAP on the economics and social sciences of antimicrobial use in livestock; and DECIDE on data-driven approached for the prioritisation and control of non-regulated diseases. Jonathan embraces One Health approaches in the search for solutions to society’s health problems. Jonathan is professor of animal health and food systems economics at the Institute of Infection, Veterinary and Ecological Sciences, University of Liverpool, leads a University Centre of Excellence for Sustainable Food Systems and is part of the N8 Agrifood programme. He is also adjunct Professor in the School of Behavioural, Cognitive & Social Sciences of the University of New England, Australia and founding president of the International Society for Economics and Social Sciences of Animal Health. In 2020 he became a Senior IIAD Fellow in Epidemiology at Texas A&M.

Chair: ***Rosemary Deininger***, Member of the Crawford Fund Board and former Deputy Secretary, Department of Agriculture, Fisheries and Forestry

10 minute break to move rooms

14:10 - 14:20 Thursday, 8th February, 2024

Presidential Address: Thilak Mallawaarachchi "Green transition: issues in public policy making"

14:20 - 15:20 Thursday, 8th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Thilak Mallawaarachchi

Abstract: Transitioning global economies to reduce the environmental impact of economic growth has been an ongoing project. Recent global agreements towards transitioning energy systems to net zero by 2050 is widely seen as a pivot to align policies for socially desirable economic growth—to ensure that natural assets continue to provide the resources and environmental services on which well-being depends. This presentation will explore the conditions for effective coordination, aiming to rectify the failure of two mechanisms that supported post-war economic and social gains: democracy and markets.

Key words: well-being, the choice problem, needs and aspirations; private and social utility, uncertainty, adaptation, state-contingent theory, beliefs and values, opportunity cost, value of information.

Chair: Dr Sorada Tapsuwan

Afternoon Tea

15:20 - 15:50 Thursday, 8th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

AARES Annual General Meeting

15:50 - 17:00 Thursday, 8th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre

Social evening on Lake Burley Griffin at "The Jetty" Bar and Restaurant

18:00 - 21:00 Thursday, 8th February, 2024
Location "The Jetty" Bar and Restaurant, Queen Elizabeth Terrace, Parkes ACT

Please join other conference participants for a casual evening by the lake at The Jetty, a seasonal beer garden and year-round café on the shores of Lake Burley Griffin. This is an informal, un-ticketed event where participants will be able to socialise and network with other conference participants. Participants will be able to purchase their own food and drink options from the venue (https://thejettycbr.com/menu/).

Location: The Jetty (https://thejettycbr.com/); Google Maps: https://maps.app.goo.gl/oDkce2biiZZuvn1r5 (Queen Elizabeth Terrace, Parkes ACT 2600)

How to get there: The organising committee will help coordinate travel by Uber or participants can make their own way. It's approximately 15 minutes by car or electric scooter.

AARES Conference Registration Desk Open [7:30AM to 4:30PM]

07:30 - 08:00 Friday, 9th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Tea and Coffee on arrival

08:00 - 08:30 Friday, 9th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Parallel 5A. Special Session - "Carbon farming on pastoral and forest land, science, policy and economics" (Part A)

08:30 - 10:10 Friday, 9th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Jeff Connor

Growing recognition of climate change continues to spawn diverse national, sub-national and industry GHG emissions reductions initiatives. The broad array of schemes includes cap and trade, payment for emissions reductions and hybrid systems. offset credits that allow above cap emission from one source by paying another source for and equal amount of emissions reduction or sequestration feature in several schemes (e.g. Australian, Russian, and Californian emissions reductions policies and national GHG accounts). Methods for land use change projects that increase forest cover and carbon storage are the largest single source of offsets in all these countries and in voluntary credit registers. This includes avoided deforestations, plantation timber forest management, active forest planting and assisted natural regeneration methods. Whilst forest offsets play a big role in emissions reductions policies both peer reviewed journal and grey literature paint a bifurcated picture of their effectiveness and benefit. Some studies extoll benefits such as environmental co-benefits and farm income diversification. In contrast, a number of critics question whether forest offset achieve abatement equivalent to the above cap emissions that they allow.

This extended special session includes presentations on latest science, policy and economics evaluating carbon offsets for Australian pastoral and farmland.

Presentations include: 4 x 25 minute presentations inclusive one minute intro – 2 minutes for questions

- 8:30-8:55 - Systematic review of forest offset method integrity risks and remedies, Prof. Jeff Connor, University of South Australia

- 8:55-9:20 - Unlocking the carbon farming potential of mixed farms: an optimisation approach, Prof Oscar Cacho, University of New England

- 9:20-9:45 - Can Australian Plantation Forest Offset methods increase carbon storage and timber supply? Dr Courtney Regan, CSIRO Agriculture and Food

- 9:45-10:10 - The new ERF Integrated farm method, Brett Kerr – Land, Forest and Blue Carbon Methods Team, Carbon Crediting Branch, DCCEEW

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242 Carbon farming on pastoral and forest land, science, policy and economics

jeffery connor[1], Courtney Regan[2], Tim Moore[3], Oscar Cacho[4], Yuan Gao[1], Cathleen Water[5], Don Butler[6], megan Megan Surawski[7]

[1]University of South Australia, Adelaide, Australia. [2]CSIRO, Adelaide, Australia. [3]Regenco, Adelaide, Australia. [4]University of New England, Armidale, Australia. [5]DPI, dubbo, Australia. [6]ANU, Canberra, Australia. [7]Emissions Reduction Fund, Canberra, Australia

Presentation Type:

2. Special Session

Keywords:

7. Carbon and Nature Markets

21. Land and Natural Resource Management

Parallel 5B. Special Session - "Sri Lanka Economic crisis: challenges and opportunities in recovery and rebuilding"

08:30 - 10:10 Friday, 9th February, 2024

Location Cinema, Kambri Cultural Centre

Thilak Mallawaarachchi

The unfolding crisis in Sri Lanka has attracted international attention as 'the canary in the coal mine' for what could become a global 'development' crisis. The Sri Lankan crisis is considered a 'warning sign' for policy strains faced by 'countries with high debt levels and limited policy space' (Georgieva 2022) and an illustrative case of how 'postponing a reckoning through various piecemeal measures will ... make matters worse in the end' (Krueger 2022). The economy contracted by 7.8 percent in 2022 and 7.9 percent in the first half of 2023. Construction, manufacturing, real estate, and financial services suffered the most amid shrinking private credit, shortages of inputs, and supply chain disruptions. Agriculture holds a pivotal position in the economy with a large rural population, principally engaged in agriculture-linked activities, with low and unreliable incomes. This has exacerbated the worsening negative welfare impacts of income contractions and job losses registered in 2022 (World Bank 2023).

This special session will follow a mini-symposia format, and feature researchers working on Sri Lanka economic development issues encompassing farm/firm to national policy interface and international development engagement. It will include short presentations and a facilitated multi-panel discussion in a question-and-answer (Q&A) session between the panellists and the audience. It will share insights from research investigating precursors to economic crisis including the debt and deficit trap, external economic environment, and the context for staging a recovery assisted by an Extended Fund Facility of the International Monetary Fund (IMF). It will highlight challenges for policymakers and development partners and consider pathways to creating an environment conducive for trade and investment, improving productivity, and meeting consumption needs of the vulnerable population during this transition.

Presenters:

- Prema-Chandra Athukorala (Australian National University and University of Peradeniya, Sri Lanka). Sri Lanka's Sovereign Debt Crisis: Anatomy, IMF Programme and debt sustainability

- Athula Naranpanawa (Griffith University), Nihal Pitigala (Senior Fellow and Director, Trade and Development at InReach Global) and Jay Bandaralage (Griffith University). The Economic Effects of Potential Sri Lanka-ASEAN Free Trade Agreement: A Multi-Regional Computable General Equilibrium (CGE) Analysis.

- Clevo Wilson and (Queensland University of Technology) and Thilak Mallawaarachchi (The University of Queensland). Improving economic governance: policy and regulatory reform for enhancing agricultural productivity in Sri Lanka.

- Saliya Bandara Jayathilaka (Sri Lanka Administrative Service) and Thilak Mallawaarachchi (The University of Queensland). Income support for the poor in Sri Lanka: overcoming dependency and promoting self-reliance.

- Prof Frank Scrimgeour, Waikato University will chair and facilitate the session.

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227 Sri Lanka Economic crisis: challenges and opportunities in recovery and rebuilding

Thilak Mallawaarachchi[1,2], Prema-Chandra Athukorala[3,4], Athula Naranpanawa[5], Saliya Bandara Jayathilaka[6], Frank Scrimgeour[7], Clevo Wilson[8], Will Martin[9]

[1]The University of Queensland, Brisbane, Australia. [2]Mallawa Insights, Jerrabomberra, Australia. [3]Australian National University, Canberra, Australia. [4]University of Peradeniya, Peradeniya, Sri Lanka. [5]Grifth University, Brisbane, Australia. [6]Sri Lanka Administrative Service, Colombo, Sri Lanka. [7]University of Waikato, Hamilton, New Zealand. [8]Queensland University of Technology, Brisbane, Australia. [9]International Food Policy Research Institute, Washington DC, USA

Presentation Type:

2. Special Session

Keywords:

10. Development Economics

20. International Trade

23. Market Design and Policy

Parallel 5C. Contributed Paper Session - Development Economics 4

08:30 - 10:10 Friday, 9th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre Yun Shen

263 Can credit promote rural transformation?": Evidence from regional-level data in Bangladesh

Subrata Saha[1], Al Amin Al Abbasi[1], Ismat Ara Begum[1], Maria Fay Rola-Rubzen[2], Mohammad Jahangir Alam[3]

[1]Bangladesh Agricultural University, Mymensingh, Bangladesh. [2]University of Western Australia, Perth, Australia. [3]Bngladesh Agricultural University, Mymensingh, Bangladesh

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

10. Development Economics

Paper/Poster Abstract:

This paper assesses the impact of credit on rural transformation using the share of high-value agricultural commodities and the share of rural non-farm employment at the district level in Bangladesh as indicators. Data from three waves of the nationally representative Household Income and Expenditure Survey (HIES) are analyzed using appropriate quantitative methods, including ordinary least squares and fixed effect panel regression analysis. The findings indicate that an increase in household credit from US $189.08 in 2005 to US $351.63 in 2016 played a significant role in stimulating the production of high-value agricultural commodities and expanding opportunities for non-farm employment in rural areas. Robustness analysis using access to credit as a variable instead of average household credit confirmed a positive impact on rural transformation at the regional level in Bangladesh. Access to education and electricity had a positive effect on rural transformation, and on the other hand, the decline in land per capita enhanced rural non-agricultural employment opportunities. The main policy implication of our findings is the need to enhance credit accessibility, strengthen capacity-building, and implement financial literacy programmes for an inclusive, sustainable rural transformation in Bangladesh.

265 Rural Transformation and its Impacts on Rural Income and Poverty Incidence in Bangladesh: A moments-quantile regression approach with fixed-effects models

Al Amin Al Abbasi[1], Subrata Saha[1], Ismat Ara Begum[1], Maria Fay Rola-Rubzen[2], Mohammad Jahangir Alam[1]

[1]Bangladesh Agricultural University, Mymensingh, Bangladesh. [2]University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

10. Development Economics

Paper/Poster Abstract:

This study investigates rural transformation in Bangladesh and its consequences on rural income and poverty incidence. Using longitudinal data from five (1995, 2000, 2005, 2010 and 2016) national Household Income and Expenditure Surveys, we use the share of high-value agriculture and the share of rural labor non-farm employment as rural transformation indicators, and per capita rural income and rural poverty incidence as rural transformation outcomes. This study revealed that in all of the districts, the share of high-value agriculture and rural non-farm employment increased over time. Over the same period, per capita rural income of households increased and poverty incidence decreased. While all districts have experienced moderate rural transformation, the extent and speed of rural transformation vary significantly by district. Moments-quantile regression with fixed effects also reveals significant positive relationships between both indicators of rural transformation and rural income per capita, and significant negative relationships between both indicators of rural transformation and poverty incidence. Overall, the results of this study show that rural transformation in Bangladesh has a significant impact on rural income and poverty incidence, which is partly stimulated by government policies such as agricultural modernization programs, rural development projects, investments in education and healthcare, and the establishment of microfinance institutions. This study posits that in order to sustain the growth of income and reduction of poverty in rural areas, it is imperative to address several challenges associated with this transition, including but not limited to agriculture, education, infrastructure, and access to essential services.

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267 Impact of irrigation on rural transformation and income at the district level in Bangladesh

Subrata Saha[1], Al Amin Al Abbasi[1], Ismat Ara Begum[1], Maria Fay Rola-Rubzen[2], Rezaul Karim Talukder[1], Mohammad Jahangir Alam[1]

[1]Bangladesh Agricultural University, Mymensingh, Bangladesh. [2]University of Western Australia, Perth, Bangladesh

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

10. Development Economics

Paper/Poster Abstract:

The study assesses the effect of investment in irrigation on rural transformation (RT) and rural income with data from four rounds of the Household Income and Expenditure Survey in 32 districts in Bangladesh. We use the share of irrigated land as a measure of investment in irrigation. The study employs ordinary least squares and fixed effects regression models. It presents several notable findings. Firstly, the share of irrigated land had a positive effect on two indicators of RT: the share of high-value agricultural commodities and the share of rural non-farm employment. In addition, the share of irrigated land has a positive effect on rural income. Secondly, using a group of stage dummies to determine the irrigation effect on the stages of rural transformation at the regional level reveals that the impact of irrigation is greater at higher stages of rural transformation for the share of high-value agricultural commodities but

inconclusive for the share of rural non-farm employment and rural income. The key policy implication of our findings is that the government should prioritize the construction of irrigation infrastructure and encourage the private sector to invest in irrigation to increase high-value agricultural production, rural non-farm employment, and rural income.

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270 Impact of Rural Transformation on Food Security at Regional Level in Bangladesh: Evidence from Panel Data

Md. Imran Omar[1], Ismat Ara Begum[1], M. Kamruzzaman[2], Mohammad Jahangir Alam[1]

[1]Bangladesh Agricultural University, Mymensingh, Bangladesh. [2]Hajee Mohammad Danesh Science and Technology University, Dinjapur, Bangladesh

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

10. Development Economics

Paper/Poster Abstract:

The process of urbanization in rural areas is an inherent and indispensable outcome of societal advancement. This article provides an empirical assessment of the effect of rural transformation in Bangladesh on regional food security by looking at two indicators: the share of high-value agricultural commodities (RT1) and the share of non-farm employment (RT2). The goals of the research analysis were achieved by applying a fixed effect panel regression model and a nationally representative household survey, as well as relevant quantitative approaches such as ordinary least squares. The goals of the research analysis were achieved by applying a fixed effect panel regression model and a nationally representative household survey, as well as relevant quantitative approaches such as ordinary least squares. This study provides evidence that rural transformation has a positive impact on food security. The findings suggest that high-value agricultural products and expanding non-agricultural employment opportunities in rural areas can play a crucial role in promoting production and enhancing food security for households at the regional level in Bangladesh. These results have significant implications for policymakers, financial institutions, and rural development practitioners. For an inclusive and sustainable rural transformation, policymakers might take into account putting in place measures to improve agribusiness growth in rural regions. The empirical analysis using balanced panel data reveals that, when examining the regional context in Bangladesh, the process of rural transformation has a statistically significant and positive impact on the food security of some people within farm households at the regional level in Bangladesh.

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262 Has Digital Inclusive Finance Alleviated Vulnerability to Poverty in Rural China?

Yun Shen[1], Di Zeng[2], Alec Zuo[2]

[1]Sichuan Agricultural University, Chengdu, China. [2]University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

2. Agricultural Finance

10. Development Economics

Paper/Poster Abstract:

Digital inclusive finance (DIF) is an emerging alleviator of poverty in developing countries, yet household-level evidence is still limited. This article empirically investigates this issue through micro econometric analysis using the China Family Panel Survey (2014-2020) as well as the Digital Inclusive Finance Index published annually by Peking University. The empirical analysis employs panel data fixed effects model and mediation model to identify both the overall impact of DIF and possible mechanisms of how it helps reduce rural households' vulnerability to poverty.

Empirical results confirm the positive role DIF plays, which is statistically significant and robust across alternative poverty lines. Heterogeneous impacts are found across demographic and socioeconomic characteristics. Mediation analysis further reveals that DIF is positively associated with physical, social, human, financial, and natural capital, all of which in turn can reduce vulnerability to poverty. These findings point to the importance of promoting DIF participation among rural residents and alleviating their vulnerability to poverty through multidimensional livelihood capital improvements.

Parallel 5D. The Grains Research Development Corporation (GRDC) Contributed Paper Session - Grains

08:30 - 10:10 Friday, 9th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre
Mikayla Bruce

114 Economic benefits of plant genetic resistance in crop protection: empirical evidence from Australian wheat-rust production systems

Abebayehu Geffersa[1], Luke Barrett[2], Susie Sprague[1]

[1]CSIRO Agriculture and Food, Canberra, Australia. [2]CISRO Agriculture and Food, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

17. Food, Health and Nutrition

18. Grains and Cropping Systems

Paper/Poster Abstract:

Protecting crops against microbial pathogens is pivotal for global food security. Protection against pathogens may be provided by a range of mechanisms, including chemical pesticides, biological control, and plant genetic resistance. While genetic resistance, especially in low-input cropping systems, reduces reliance on fungicides and fosters sustainable disease management, the heavy reliance on chemical pesticides persists in many farming practices. This paper aims to examine the economic benefits of adopting plant genetic resistance in cropping systems. We start by introducing a flexible economic framework to understand the potential benefits of durable genetic resistance in agriculture. Leveraging empirical data—over 5,000 observations from the Australian wheat-rust systems—we analyze the adoption of rust-resistant wheat cultivars and shed light on the trade-offs between resistance and fungicide application decisions. Using alternative econometric techniques, we identify gaps in the adoption of resistant wheat cultivars across diverse Australian cropping systems and examine the socio-economic and environmental factors influencing these variations in adoption. By pinpointing these factors, we emphasize the necessity of strong institutional support. Such support is crucial for fostering widespread adoption of resistant cultivars, ensuring a sustainable and resilient agricultural future.

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109 Spatial Differences in Australian Export Grain Supply Chain Velocities and their Implications.

Hemali Kanthilanka[1], Ross Kingwell[1,2,3]

[1]Australian Export Grains Innovation Centre, Perth, Australia. [2]School of Agriculture and Environment, University of Western Australia, Perth, Australia. [3]Western Australian Department of Primary Industries and Regional Development, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

20. International Trade

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

Australian grain exporters and farmers often benefit from having more of the Australian grain harvest delivered to international customers in the months prior to the availability of the Northern Hemisphere grain harvest. To expedite these international sales of Australian grains, owners and operators of export grain supply chains in Australia have increased their investment in the velocity and capacity of Australia's export grain supply chains. As a result, larger volumes of Australian grain are now more rapidly exported. But what are the likely ramifications of these investments in Australian grain supply chains? Drawing on historical datasets of grain production, domestic consumption and exports in each Australian state, this paper explores the national impacts and distributional impacts for each state of the enhanced investments in Australia's export grain supply chains. The implications for Australian farmers, domestic consumers and the owners of grain supply chain infrastructure are discussed. Although farmers benefit from the enhanced capacity and velocity of grain flows in Australia's grain supply chains, nonetheless, in some states and in some years in Australia, food security issues are poised to arise as more grain more quickly leaves Australia's

shores. Resultant concerns about domestic food security and food price inflation will likely lead to social and political pressure for grain export, grain import and grain monitoring policy changes in Australia.

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286 The cost of losing access to agri-chemicals: the case of herbicides in the Australian grains industry

Rick Llewellyn, Jackie Ouzman

CSIRO, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

18. Grains and Cropping Systems

Paper/Poster Abstract:

There is a rapidly growing number of international studies on the effects of reduced pesticide use on crop production, profitability and environmental outcomes. The motivation often stems from European situations relating to EU pesticide reduction targets and particular concerns about glyphosate. Whether through direct changes in herbicide availability or market access requirements, there is the possibility that Australian grain growers will face reduced access to herbicide types that are currently widely relied upon.

This study focuses on the potential economic impact of four herbicide loss scenarios: A) all use of glyphosate, B) all knockdown (non-selective) herbicides, C) all post-emergence (in-crop) herbicides and D) pre-emergence (soil residual) herbicides. The scenarios were evaluated independently and applied to all Australian grain growing regions and grain crops.

To do this we adapted the national weed impact bio-economic model developed in 2016. The model updates included management practices, land use and crop type distribution based on 2019-21 regional figures. Costs for each AEZ were updated using available practice survey data and regional budgeting guides. This study assumed that growers did not use and would not return to extensive tillage-based systems.

Using weed-free crop yield potentials for each AEZ and crop type, the cost of weeds in crop and in prior fallows to crop yield were calculated using yield damage functions based on major in-crop and fallow weed types in each region. Consistent with grower and random field surveys, weeds were generally assumed to be well controlled (<10/m2 and most commonly <1/m2 mature weeds), with interventions used to maintain control of weed seedbanks rather than continuing cropping with increasingly dense weed loads and high yield damage. In the baseline scenario (2021 current practice) the overall cost of weeds was $4.1B ($196/ha), with 89% of that attributable to expenditure on control. Herbicide costs had approximately doubled since the earlier study which was based on 2014 price and usage assumptions. This is consistent with increases in APVMA and ABARES figures for this period and the need to manage increasing forms of herbicide resistance.

The loss of all non-selective herbicides (including glyphosate) was found to have the highest cost, leading to an extra $98/ha ($2.0B); followed by loss of glyphosate alone ($73/ha; $1.6B), with control in fallow an important factor in total costs. Loss of pre-emergence herbicides ($30/ha; $0.6B) was next most costly, with the assumed availability of alternative selective herbicide options as well as ongoing glyphosate availability an important factor in limiting the cost of pre-emergence and post-emergence herbicide loss, at least for the short term.

The results highlight the value of non-selective herbicides and glyphosate in particular in terms of value to both cropping season and fallow season management, with water conservation in fallow an increasingly important adaptation to a changing climate. Increasing use of weed seed control technologies are shown to be important, particularly for southern and western weed management, but critically, the scenarios allowed for shifts to other effective herbicide types and the sustainability of this can be questioned.

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32 Climate impacts on Australian wheat heterogeneity and value

Ross Kingwell

Australian Export Grains Innovation Centre, Perth, Australia. University of Western Australia, Nedlands, Australia. Department of Primary Industries and Regional Development, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

3. Agricultural Production

Paper/Poster Abstract:

In 2022 Australia was the world's leading exporter of wheat. But wheat is not a homogeneous product. For decades Australia has produced various classes of wheat to support the production of a wide range of wheat-based foods and feeds. Yet the Australian wheat industry is projected to experience further adverse climate change. This study uses representative farm modelling and a state contingent framework to investigate how future climate will not only affect the volume of wheat produced by farms but also its heterogeneity. We report how projected climate change will likely affect the spatial variation in the main classes of wheat production and, due to price differences between wheat classes, affect the net revenue of wheat production for representative farms in two main wheat-producing regions of Australia. The study's findings are consistent with other studies that reveal the adverse economic impacts for farm businesses of projected adverse climate change. However, uniquely, this study reveals how the state contingent nature of wheat production and projected climate change jointly affect the heterogeneity and profitability of wheat production for representative farms.

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302 Addressing innovation gaps in the Australian grains industry with alternative investment vehicles

Mikayla Bruce

GRDC, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

18. Grains and Cropping Systems

19. Impact Assessment

Paper/Poster Abstract:

A preliminary impact assessment of the Grains Research and Development Corporations use of an alternative investment vehicle to address innovation gaps.

Innovation gaps occur when innovative product and service providers are not viable to commercial financiers due to higher levels of risk including experience with new products of services or experience in the agricultural sector.

This study examines the use of an alternative investment vehicle (AIV) to address innovation gaps and boost capability in the Australian grains industry. The Grains Research and Development Corporation (GRDC) is a corporate commonwealth entity 'responsible for planning, investing in and overseeing research, development and extension (RD&E)'. Over the period of 2018/19 to 2023/24, five accelerator programs received funding through an AIV established by GRDC - Grains Innovation Program. To evaluate the success of the AIV, an ex-post Benefit Cost Analysis was conducted for each of the five accelerator programs. Results from the five BCAs were weighted by funding amount to generate a weighted average BCA for the AIV. Success of the individual accelerators and the AIV was dictated by meeting a 4:1 benefit cost ratio (BCR) in line with GRDC's Key Performance Indicator (KPI). Findings indicated all five accelerators were successful, and hence the AIV. This is a preliminary analysis due to data and literature limitations regarding time to benefit realisation and attribution of accelerators to innovation outcomes in the agricultural sector. Initial findings indicate GRDC's use of an AIV has and will continue to deliver enduring profitability to Australian grain growers.

Parallel 5E. Contributed Paper Session - Uncertainty and Risk

08:30 - 10:10 Friday, 9th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre
Greg Hertzler

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248 Assessing the dynamic farm resilience and sustainability: Evidence from the cereal sector in Catalonia

Mahdieh Khezrinejadgharaei, Bouali Guesmi, Jose Maria Gil

CREDA, Barcelona, Spain

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

19. Impact Assessment

Paper/Poster Abstract:

The European agricultural sector is facing complex and growing economic, environmental, institutional, and social challenges. Policymakers recognize the urgent need to address the increasing challenges related to market volatility, climate change along with unexpected crises (e.g., the COVID-19 pandemic), which may affect farm's viability and sustainability. To adapt and thrive in this evolving landscape, there is a growing call for the operationalization of farm resilience as a dynamic concept. In spite of the relevance of this policy goal, knowledge about the current state of resilience of farming systems in the European Union is very limited to a few empirical studies and still unknown for Catalan farms. Therefore, this empirical focus aims at assessing the dynamic farm resilience in cereal sector in Catalonia. Drawing from multidisciplinary research in agriculture, economics, and environmental science, this framework integrates both quantitative and qualitative indicators to capture the multifaceted nature of farm resilience. Using Structural Equation Modeling (SEM), the relationships between social, economic and environmental sustainability pillars and farm resilience is examined. The empirical analysis relies on a sample of farms specializing in cereal production in Catalonia over the period 2016-2021. The final sample composed of contains 250 observations on 50 farms. In general, we find that interaction between three dimension of sustainability leads to complexity in farm resilience. This study would provide a systematic approach for policymakers to evaluate and enhance resilience strategies, facilitating the sustainable development of Catalan farming systems in a changing world.

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283 Price risk research in Australian broadacre cropping – what does price risk look like today and how might future grain, oilseed and pulse prices evolve under climate change?

Paul Deane[1], Bill Malcolm[1], Alex Sinnett[1], Garry Griffith[1], Ross Kingwell[2]

[1]The University of Melbourne, Melbourne, Australia. [2]The University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

28. Uncertainty and Risk

Paper/Poster Abstract:

Despite an era of prolific information across commodity markets – research relating to the current state of Australian agriculture price risk remains scant. There may be many well-developed models of price behaviour that exist in the agricultural economics literature, but appropriate characterisation and estimation of the probability distributions of commodity prices remains elusive. This is even more the case for Australian agriculture where numerous obstacles exist. What constitutes price 'risk' or the preferred measure of price risk can also be ambiguous.

One challenge for price risk research in Australia is the availability and reliability of historical price data at both an adequate temporal and spatial scale. This research analyses a comprehensive price data set starting since the deregulation of the Australian wheat export market to June 2023 for Australian wheat, barley, canola and pulse crop prices across multiple regions. The research presented in this paper addresses a lack of empirical research on the recent past characteristics of price risk by key crops specific to an Australian grain farming region. The research uses a statistical exploratory approach, with results providing inputs into the formulation of subjective probabilities for risk research and decision-making specific to the Australian grain and oilseed markets.

The results presented in the paper provide numerous examples of differences in risk characteristics spatially, which in turn justify a regional or case study approach when incorporating risk analysis into broadacre cropping. The results of the research provide guidance, along with other agricultural price risk literature, in characterising price risk for analysis in risky decision-making in an Australian context.

While this research provides an important starting point in objectively quantify price risk in Australian broadacre cropping, the next step is to incorporate future price expectations and risk characteristics, adding a further complexity in decision-making for farmers and agricultural economic research. The author discusses some of the factors which make conceptualizing how future prices may evolve for different grain growing regions in Australia difficult. Capturing 'local' climate change influences on future Australian prices and risk characteristics (spatial and temporal) is challenging enough, without the added complexity of how climate change influences supply and demand of grains and oilseeds in other larger producing (and exporting) regions.

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149 Adaptations in a Sunburnt Country prone to Bushfires Droughts and Floods

Thomas Nordblom

Gulbali Institute, Charles Sturt University, Wagga Wagga, NSW, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

28. Uncertainty and Risk

Paper/Poster Abstract:

The challenges of bushfires, droughts and floods, presented in relentless variation, have long been faced by First Nation (indigenous) Australians. Only in the recent two centuries have European settlers taken control of this land. It has now become obvious that managing for sustainable land use requires a readiness to adapt to frequent ups and downs in local weather. The latter is uncorrelated with international commodity prices set in northern markets. This combination subjects Australian farmers to wild swings of fortune.

When the explorers 'discovered' Australia, they observed smoke rising from multiple fires near the ocean and further inland. Of course, the indigenous people had reasons to set those fires, being familiar with the nature of vegetation in this climate. Cool burning of certain wooded areas, when conditions were right, served to open patches of land for hunting while spurring regeneration of plant species that require fire, incidentally limiting high levels of fuel accumulation and destructive wildfires.

Other lands with cool, wet Winters and hot, dry Summers are likewise prone to dangerous bushfires, droughts and floods. Countries around the Mediterranean basin: Chili, South Africa, and California are examples.

A Yosemite Park ranger in California, explained to August 1993 campers (including my family) that we needn't be alarmed to see smoke rising from fires back in the distant mountain forests; these were closely monitored by rangers, preventing threats to buildings or camps. Over the Park's first 100 years, from 1864 when established by Lincoln, any lightning-sparked fire sent rangers rushing to suppress it.

Consequently, enormous accumulations of fuel, in the form of fallen branches meant fires gradually became unstoppable and dangerous. The new policy recognises that many of the native plant species, including the giant sequoia, require fire to reproduce. Lightning fires and fuel-reduction burns are managed to look after nature this way: a lesson, learned a half century ago in California, but likely understood by indigenous Australians many millennia earlier.

Due to the press of population and expansion of towns today, wildfires are naturally feared. One way to avoid the danger of fuel reduction burns near built infrastructure is deliberate physical clearing; with care for minimum soil disturbance, and woodchips possibly used for power generation.

European settlers building houses on the flat floodplain at Gundagai, NSW, ignored warnings by local indigenous people that it's not a safe place for houses. A flash flood in 1852 surprised the newcomers, destroying their new houses and killing many. Building on floodplains puts people in harm's way. Easiest and lowest cost places to build are where level, good soil and water are found. Unless designed with likely local floods in mind, safest builds will be on elevated grounds.

Droughts are frequently observed in Australia, rewarding those prepared to store water and reduce livestock numbers to allow grazing that leaves sufficient groundcover to pastures to regrow when good rains return. It is remarkable that losses of life and property attributed to anthropogenic climate change, may actually be due to poor management of fire-prone and flooding lands.

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108 Is Bigger Always Better? A Rethink of Water Infrastructure

John Kandulu, Sarah Wheeler

University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

28. Uncertainty and Risk

31. Water

Paper/Poster Abstract:

Water scarcity is becoming more severe in arid and semi-arid regions, which are experiencing reduced and highly variable rainfall and more frequent droughts. Water planners are increasingly considering investing in infrastructure to improve water security, but water augmentation is expensive and requires careful planning. This study retrospectively examines the decision to invest in a 270km pipeline from the Murray River at Wentworth to Broken Hill, a mining town

in regional New South Wales, Australia. The pipeline cost $491 million to build and was designed to secure water supply for Broken Hill and surrounding communities, which were facing severe water shortages. In 2016, a benefit-cost analysis (BCA) was conducted to support the business case for the pipeline, which found that the pipeline option outperformed all other alternative options. However, the decision to invest in the pipeline has been controversial, with some groups arguing that it was motivated by the government's desire to avoid buying back water entitlements from upstream irrigators. We use an alternative analytical framework to evaluate the pipeline option against different scenarios of demand and supply management options, including Lake Menindee, purchasing water entitlements from upstream irrigators, managed aquifer recharge, and demand management. Our framework uses multi-objective stochastic optimization techniques with Monte Carlo simulations to account for the uncertainty that is typical of future water planning problems, considering system operating rules. We use this method to identify the most cost-effective alternative for meeting service delivery level and reliability requirements. We found that traditional BCA approaches that only consider large infrastructure investments and use evaluation measures of central tendency, such as the average NPV and BCR values, and ignore the high variability of water supply can be a limited way to understand the trade-offs involved in augmentation investments. This is because they may not adequately quantify the uncertainty associated with climate change and the benefits of diversifying options to reduce risk. To avoid irreversible environmental damage and excessive capital costs, public water infrastructure projects should be comprehensively evaluated, considering uncertainty and alternative combinations of small- and medium-scale green and grey infrastructure.

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202 Are we there yet? The uncertainty of time.

Greg Hertzler[1], Tim Capon[1], Todd Sanderson[2]

[1]CSIRO, Canberra, Australia. [2]ACIAR, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

28. Uncertainty and Risk

Paper/Poster Abstract:

During the COVID pandemic, governments based their decisions on the number of cases. But business wanted certainty. Or, perhaps, what business wanted was an estimate of when they might be able to get back to business. Border security is vital, but porous. What is the chance of varroa mite, blackleg, lumpy skin, or any number of other diseases invading Australia and how much time do we have to prepare? Farmers monitor the profitability of alternative farming regimes, but policymakers want to know when farmers might adopt and how to speed up adoption. Climate scientists are warning of catastrophic climate change and governments are enacting policies to reach targets by dates in the future. Drought tolerant varieties are being developed. Will they be ready in time? Heat tolerant coral for the Great Barrier Reef is being studied. How much time do we have? Coal-fired power plants are being decommissioned. Will replacements be online in time?

Monitoring the states of nature is the natural way to make decisions over time and under uncertainty. Be we also need to know when—when will we be there—when will we cross a threshold. Unfortunately, we know very little about the probability of time. We know the survival, first passage time and visiting time probabilities for Arithmetic Brownian Motion and Geometric Brownian Motion. These are explosive stochastic processes, ill-suited to modeling natural and economic systems. The Ornstein-Uhlenbeck Process is convergent and more suited to the task.

This paper expands our knowledge of the uncertainty of time by deriving the survival and passage time probabilities of the Ornstein-Uhlenbeck Process. It calculates the probabilities and expected times to cross porous and non-

porous thresholds and demonstrates how to interpret and apply the results to natural and economic systems. The software for the calculations, Real Options for Adaptation and Resilience (ROAR), is introduced. Then policies to speed up research, development and adaptation are discussed.

Parallel 5F. Contributed Paper Session - Climate Change

08:30 - 10:10 Friday, 9th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre
Chris Fleming

43 Economic impact of consecutive drought years under future climate at three agricultural locations in Western Australia

Sud Kharel[1], Kevin Foster[1], Ross Kingwell[1,2,3]

[1]Department of Primary Industry and Regional Development, Perth, Australia. [2]AEGIC, Perth, Australia. [3]University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

8. Climate Change

Paper/Poster Abstract:

Climate change has heightened farming business uncertainty, particularly regarding climate extremes with projections of increased rainfall variability which could entail more very wet or very dry years, including droughts and consecutive droughts. Consecutive droughts are historically uncommon in the agricultural region of Western Australia (WA), but projected climate change indicates an increase in their probability. Using 2050 climate scenarios this study examines the economic repercussions of consecutive droughts at three locations in the wheat and sheep belt of WA. Merredin (low rainfall), Wagin (medium-high rainfall) and Kojonup (high rainfall) were chosen to study the impact of consecutive drought on mixed farming enterprises. Agricultural Production Systems sIMulator (APSIM), GrassGro and Economic Valuation of Alternative Land Use Sequence (EVALUS™) models underpinned the analyses. Across a 20-year period at each location, a decile 1 drought was assumed to occur in year 2 and 3. A sensitivity analysis of initial farm equity, livestock prices and growth in crop yields was included. The findings indicate declining profitability under future climate scenarios at all locations, even with crop yield improvement. Notably, the low rainfall location experienced

greater economic impacts from consecutive droughts compared to the high rainfall location, with a heightened risk of farm equity falling below 50% after consecutive drought. Starting equity significantly influenced farm profitability. Additionally, reduced livestock prices during drought exacerbated economic losses.

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105 Does Age Matter for Adaptation to Extreme Temperature Effects on Crop Yields?

Yi-Chun Ko[1], Shinsuke Uchida[2], Akira Hibiki[3]

[1]Asian Growth Research Institute, Kitakyushu, Japan. [2]Nagoya City University, Nagoya, Japan. [3]Tohoku University, Sendai, Japan

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

8. Climate Change

Paper/Poster Abstract:

This study examines how farmer's age influences the crop yield response function to temperatures. Aging at an early stage positively impacts production as farmers accumulate more experiences and knowledge from learning–by–doing, while it gradually lowers cognitive and physical skills and consequently reduces productivity (Tauer 1984 North Central J. of Agri. Econ.). Additionally, farmers approaching retirement age are less prone to adopt new technology (Barnes et al. 2019 Land Use Policy). We apply this inverted U–shaped relationship to the context of crop response function to extreme temperatures. Most crops such as corn, soybeans, and rice have a certain threshold of temperatures for growing, beyond which yields significantly decline. We submit that the degree to which yields decline can be explained by farmer's age. That is, aging at an early stage can mitigate the negative temperature effects on crop yields while aging at a later stage causes the opposite result.

We further delve into two potential mechanisms that can minimize the adverse age effect on the temperature–yield relationship: the presence of successors and the participation of local communities. The presence of successors plays a key role in incentivizing elderly farmers to adapt to changing conditions. When elder farmers have a committed successor, they are more likely to take steps to ensure the long–term sustainability of their operations. Active participation of local communities can facilitate farmers' access to valuable social support networks, information resources, learning opportunities, and market insights, encouraging farmers to adapt and modernize their farming practices.

We use Japanese rice paddy production as a case study. Japan is well known as an aging society, and this is also true for the agricultural population. We employ a rich dataset at the municipality level, covering the years 2000 to 2018, which encompasses specific information on rice yields and farm characteristics across Japanese municipalities. This dataset is augmented with daily records of average temperatures, precipitation, and global solar radiation for all Japanese municipalities over the same period. Our baseline fixed effect specification uses growing degree days (GDD) as a measure of heat.

We confirm the nonlinear (inverted U–shaped) impact of farmers' age on the temperature–yield relationship. Farmers in their early 60s demonstrate the highest resilience to extreme temperatures, experiencing minimal yield loss, while those below/above this age threshold suffer more pronounced declines due to negative temperature effects. These findings hold across various specifications. In addition, our study suggests that the presence of

successors and the active involvement of local communities can serve as effective strategies for retiring and inexperienced farmers to mitigate yield losses caused by extreme temperatures.

These findings hold significant policy implications, especially in aging farming communities. A successful transition to the younger generation is an ideal scenario but is challenging in societies with low birth rates. In such situation, communication and knowledge spillover should emerge as key strategies to enhance adaptation capabilities. Engagement in the local community can promote knowledge sharing and collaboration among farmers, benefiting both older and inexperienced farmers.

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209 Agriculture, Food, and Nutrition Security of India under Changing Climate: Foresight Analysis

Nedumaran Swamikannu, Jyosthnaa Padmanaban

International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

8. Climate Change

19. Impact Assessment

25. Policy Analysis

Paper/Poster Abstract:

Strategic foresight is a pivotal instrument that public and private research organizations, donor agencies, and civil society can collectively employ to comprehend future challenges and opportunities within agri-food systems, inform decision-making, and track food systems transformation and their contributions to development goals and sustainability. Climate change, agriculture, and food systems are closely interconnected. Employing a partial equilibrium global agricultural model, the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), we assess the likely impacts of climate change and socioeconomic factors on India's food and nutrition security, which heavily relies on the agriculture sector for its food security. The model employs a suite of interconnected modules, climate, and biophysical process-based models (crop and water) and systematically integrates them to assess the combined impacts on key food security indicators such as changes in malnutrition and population at risk of hunger. The results show that climate change on agricultural productivity of major food crops in India is likely to be negative and seen to decline by varying levels affecting the food production in India. Under pessimistic climate scenarios (hot wet conditions; RCP8.5), cereal crop production in 2050 is negatively impacted (rice by 11%, maize by 8%, wheat by 6%, sorghum by 7%, and millets by 5%) compared to the baseline scenario. Among pulses, the projected production of beans and lentils is likely to decline by 5% and 7%, respectively. Besides, the consumer price of staples is projected to experience a steep increase, impacting the affordability of food, which also affects food utilization. Consequent to the projected impacts on food availability and affordability, the number of malnourished children and the population in poverty is expected to increase in a pessimistic scenario. The number of undernourished increases by 2% relative to baseline levels in pessimistic socioeconomic scenarios (SSP4), further

widening the inequality in the global burden of malnourishment and poverty. The study also shows that corresponding impacts on food security are relatively lower under the optimistic scenario (cool-wet conditions; RCP8.5). The analysis demonstrates the negative effects of climate change on all dimensions of food security in India. Findings from the study can provide valuable insights to the policymakers and development agencies to identify the strategic shortfalls in food production the country is likely to face due to climate change and formulate policies that could build the resilience of the food systems and preparedness for the uncertainties and challenges posed by climate change in ensuring food and nutrition security in the future.

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126 Adaptation to weather in the agricultural sector

Shuo Wang[1], Yu Sheng[2]

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Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

8. Climate Change

Paper/Poster Abstract:

Evaluating the effects of weather shocks on agricultural production and the adaptive capacity of farmers is crucial for policymakers in devising suitable relief policies to address changing climate conditions. Extensive research has been conducted to assess the overall impact of weather shocks by analyzing the relationships between performance indicators of interest and observed weather conditions. However, there is limited knowledge regarding the microeconomic mechanisms through which farmers adapt to weather shocks by adjusting their usage of inputs and outputs.

We enhance existing reduced-form models by proposing a structural model to analyze farmers' adaptation behaviors. Specifically, we decompose weather impacts on output supply into two components: an *output transformation effect* and an *input adaptation effect.* The output transformation effect measures the direct impact of weather on farmers' output supplies while keeping input usage constant. The input adaptation effect examines

how weather affects output supplies via input adjustments. We demonstrate the practical application of this model using longitudinal farm-level data for 1200 broadacre farms throughout 32 ecological zones in Australia for the period of 1978-2007, with weather variables such as rainfall and temperature matched.

Our estimates indicate that high temperatures and low rainfall not only lead to a decrease in farm output but also reduce farmers' engagement with crop production compared to livestock production. In response to weather shocks, farmers adapt their input usage to mitigate the negative effects, taking into account the availability of different types of inputs. We find that farmers tend to make relatively more significant adjustments in labor and intermediate inputs, while the adjustments in land and capital usage are relatively smaller. Furthermore, we quantify how climate-induced input adjustments affect output supplies. We find that weather-induced input adjustments significantly reduce output supplies, suggesting that broadacre farmers prioritize cost-saving over yield enhancement. These findings shed light on the adaptive strategies employed by farmers in response to changing climate conditions.

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107 ESRAM: a mixed method approach for Identifying and prioritizing ecosystem-based adaptations to climate change in the Pacific

Andrew Buckwell[1], Amanda Wheatley[2], Mark Ariki[1], Christopher Fleming[1]

[1]Griffith University, Brisbane, Australia. [2]SPREP, Apia, Samoa

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

10. Development Economics

14. Environmental Economics

Paper/Poster Abstract:

Ecosystem and socio-economic resilience and mapping (ESRAM) is an emerging methodology developed by the Secretariat of the Pacific Regional Environment Programme (SPREP). An ESRAM aims to (i) generate robust ecosystem and socio-economic planning baselines; (ii) build the knowledge, evidence, and economic case for prioritising and implementing ecosystem-based adaptations and community resilience projects, and (iii) inform policy in the Pacific region. Griffith University has partnered with SPREP to undertake three ESRAMSs, for Tanna island, Pentecost and Malekula islands (all in Vanuatu) and in four provinces in the Solomon Islands. The ESRAM methodology draws upon several lines of evidence, including climate change and sea level rise projections, spatial analysis of mapped habitats and land uses, informed by ecosystem accounting, economic valuation of ecosystem services, and on-the-ground research, including community mapping of 'hard' and 'soft' assets, an analysis of governance structures, subjective walk-through surveys, household surveying, and valuation and prioritization of socio-ecological-economic issues. In evaluating the evidence, an ESRAM uses tools such as cost-benefit analysis, multi-criteria assessment and a hybrid approach Griffith University has developed. In this presentation we will describe the ESRAM method and explain the findings of our efforts to-date. Our findings consistently point to solving 'upstream' livelihood issues, such as economic and land use pressures on key habitats are the key to securing conservation objectives and that the ESRAM methodology provides an invaluable and context-responsive method in achieving its objectives.

Parallel 5G. Contributed Paper Session - Valuation 3

08:30 - 10:10 Friday, 9th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre Emilio Morales

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141 Animal versus consumer welfare: is there a trade-off? The case of eggs in New Zealand

Harold Mayaba[1], Kathryn Bicknell[2], Sharon Lucock[2], Bruce Greig[2]

[1]Nelson, Nelson, New Zealand. [2]Lincoln University, Christchurch, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

12. Econometric Modelling

25. Policy Analysis

Paper/Poster Abstract:

As animal welfare concerns have increased in many countries, there has been a shift in consumers' attitudes and awareness towards the treatment of farmed animals. These concerns have led to increased public scrutiny of animal welfare issues, focusing on improving welfare outcomes in many production systems. New Zealand is one of the countries that responded to this shift in public awareness by formally recognising the sentience of animals in legislation and banning the use of conventional cages in the egg industry. However, more needs to be discovered about consumer preferences towards egg production in New Zealand and which animal welfare-enhancing attributes they perceive as particularly valuable. Phasing out cages resulted in farmers switching to other, higher-cost production systems, triggering price increases that imply a trade-off between hen welfare and consumer welfare. At a time when food prices are increasing at an unprecedented rate, there is a need to understand the economic impact that animal welfare legislation has on consumers as they switch to other types of eggs from different production systems.

Our study investigated consumer preferences for eggs, with a focus on housing systems. The twin objectives were to examine underlying consumer preferences towards egg attributes related to hen housing and estimate the (consumer) welfare impact of a ban on conventional

Nationwide data was collected using a discrete choice experiment. A latent class model was specified to accommodate preference heterogeneity and estimated with NLogit software. WTP values and welfare impacts were estimated using the latent class model parameter estimates.

The results show that most consumers in New Zealand prefer eggs from cage-free systems to those from cages. Four latent classes were identified: class 1 for the free-range price premium group (45.84%), class 2 for animal welfare attribute conscious (15.07%), class 3 representing the cages indifferent group (12.49%), and class 4 for the free-range price conscious (26.59%). The heterogeneity of consumer preferences results in diverse WTP values for various egg attributes and correspondingly diverse welfare impacts from restrictions on housing systems involving cages.

Keywords: animal welfare; consumer welfare

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289 Cultivating Choices: Unravelling Producer Preferences for Agricultural Policies in Coastal Bangladesh using Best and Worst Scaling

Jaba Rani Sarker[1,2], John Rolfe[3], Jayanath Ananda[1], Darshana Rajapaksa Dewage[3]

[1]Central Queensland University, Melbourne, Australia. [2]Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh. [3]Central Queensland University, Rockhampton, Australia

Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

25. Policy Analysis

Paper/Poster Abstract:

Improving the sustainability of Bangladeshi coastal farming is an important policy goal of the government to tackle adverse production environments due to climate change and salinity. This study uses the best-worst scaling (BWS) method to analyse the preferences of Bangladesh coastal farmers towards the agricultural policy options identified in Bangladesh 'Agricultural National Policy 2018'. From this policy document, twenty coastal agriculture-related policies were selected for the BWS questions. Relevant policy areas were classified into four groups: technology support, productivity enhancement, irrigation management, and other strategies. Using an orthogonal experimental design, we have collected primary survey data from 200 farmers from coastal Bangladesh. In this design each farmer did five BWS tasks from a random block, and thus viewed 20 statements in total.

Two approaches, the counting approach and the modeling approach, were employed for analysing the responses. Findings from the counting approach suggest that technology support policies such as providing better salt-tolerant rice varieties, adopting high-yielding rice varieties, pest-resistant rice varieties, farm mechanization, and increased levels of organic and bio-fertilizer are the most preferred policies of farmers. The technology support policies and irrigation management policies have positive BW average scores, whereas the other two categories have negative BW average scores. The average standardised BWS score for technology support policies (0.058) is much higher than that of irrigation management policies (0.006), followed by other policies (-0.012) and productivity-enhancing policies (-0.051). More specifically, among the twenty policy options, nine options have positive BW scores, whereas others have negative scores.

The conditional logit model confirms that 15 out of 20 statements are significant considering the base attribute (fair output price). Among the 15 attributes, 6 attributes have positive coefficients while others have negative coefficients, indicating importance relative to the fair output price reference statement. The findings also indicate that the adoption of improved rice varieties is the most preferred policy relative to fair output price. Farm mechanization, receiving brackish water warnings, and organic and bio-fertilizer are the next important policy options on average for coastal farmers. The analysis also showed that farmers who preferred the 'salt tolerant rice variety' were risk averse in nature. In contrast, risk-neutral farmers were more willing to adopt the 'increased cultivated land' policy but were less willing to adopt 'integrated floating farming' or 'better access to agricultural credit' policies. Socioeconomic variables such as age, and education level, also have positive and negative impacts on different policy adoptions. The results from the study are particularly important for policymakers seeking to promote more effective policy options in salinity-affected areas in Bangladesh. More research is needed on policy design and how to encourage greater adoption of the identified policies over time.

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91 Economic perspectives and willingness to pay: A case study in understanding mango consumption in Europe and the United Kingdom

Robin Roberts[1], Alec Zuo[2], Sara Thaichon[3], Park Thaichon[4]

[1]Griffith Asia Institute, Griffith University, South Bank, Australia. [2]GFAR, The University of Adelaide, Adelaide, Australia. [3]Griffith Asia Institute, Griffith University, Gold Coast, Australia. [4]University of Southern Queensland, Toowoomba, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

9. Consumer Choice

Paper/Poster Abstract:

The 18th and 19th centuries witnessed the emergence of ethical consumption in Europe and America, which paved the way for fair-trade products to go mainstream of ethical consumption in the 20th century (Yen et al., 2017). Fair trade is defined as trade partnerships fostering the sustainable linkages between producers and consumers (Jaffee et al., 2004), benefitting producers in the long-term while offering consumers an ethical choice to exercise (Lee et al., 2015).

Few studies pay heed to the economic perspectives and consumers' willingness to pay ethical premia for FT products or the concept of consumer identity from sociological approaches (Andorfer & Liebe, 2012). To date, this conclusion holds with scant attention to understanding consumers' willingness to pay a premium for FT products, particularly via consumers' identity building.

Recent ethical consumption studies recommend the usefulness of product attributes in reflecting values upheld by consumers (Khare, 2019, 2020), which, in turn, predict consumption behaviours (Khare, 2019). Indeed, having an ethical brand is not sufficient to attract consumers to the fair-trade market; companies must ensure a product of good quality and appealing appearance (Lee et al., 2015). During the decision-making process, consumers rely on different attributes or cues before deciding what to buy and whether to buy it (Ragaert et al., 2004). Since attributes are evaluative criteria based on which consumers form beliefs and develop attitudes and intentions, insights into attributes' perceived importance and evaluation are pivotal to elucidating consumer behaviours (Ragaert et al., 2004).

Study Focus

The important role of identity on willingness to pay for fair-trade products has been proven in literature; however, to date, consumers' identity building and its mechanism of impact on willingness to pay have received scant attention. Drawn from Identity theory, this study investigates the formation of consumers' multiple identities pinpointed from product attributes as cues to extricate the mechanism of impacts.

Research Design

Data was collected from a total of 3,020 participants from the UK (1,009), France (1002), and Germany (1012) using an online survey. Structural equation modelling was employed to analyse the data.

Findings

This study confirmed the positive impact of self-identity on willingness to pay indicating that consumers are willing to pay extra when the product matches their self-identity. Self-gratification significantly influences self-identity and willingness to pay a premium for fair-trade products. Safety and ethical cues influenced self-identity significantly. The association between self-identity and willingness to pay is stronger with the presence of organoleptic characteristics and grade but decrease when safety and ethical cue becomes more important.

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161 Consumers' preference and willingness to pay (WTP) for mandarin attributes: Evidence from a choice experiment in Nepal

Khem Raj Joshi, Dr Rajendra Adhikari, Dr. Ammar Abdul Aziz

The University of Queensland, Gatton (4343), Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

9. Consumer Choice

Paper/Poster Abstract:

Mandarin production constitutes a significant source of livelihood and nutritional benefits for smallholder farmers in Nepal. While the volume of production, consumption, and trade of mandarin have increased in Nepal, a comprehensive understanding of consumers' preferences for mandarin attributes is considered lacking among the farmers. This paper examines Nepalese consumers' willingness to pay (WTP) for mandarin attributes. Using a discrete choice experiment (DCE), we assess consumers' preferences towards key attributes. A total of 3,160 observations were generated from a random sample of 395 respondents from four major markets in Nepal, namely Kathmandu, Pokhara, Butwal, and Narayanghat. Preference parameters and heterogeneities in choice were estimated using multinomial logit (MNL) and random parameter logit (RPL) models respectively. Results from MNL indicate that large-sized mandarins with full orange peel colour, 1-2 green leaf stalks attached and thin peel (skin) were the most preferred attributes among the Nepalese consumers. While peel colour is the highly preferred attribute followed by peel thickness, price is less determining factor in their choice behaviour. Meanwhile, RPL results suggest heterogeneity in consumers' preferences for attributes like peel colour, peel thickness, freshness, and price. Controlling factors for the differences in preferences were age, gender, education, family income, and frequency of consumption. The significance of this study lies in its ability to provide insight to research, extension, and adoption decisions that eventually could ensure attributes as preferred by consumers. Its findings could be used to develop and promote the most suitable mandarin varieties that have attributes preferred by consumers. It also guides the activities and functions of chain actors to create added value.

Keywords: attributes; value; choice; preference, willingness

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70 Ethnic identity, gender, education, income and Willingness to Pay (WTP) premiums for Organic Peruvian Quinoa towards a post-COVID era

Angie Higuchi[1], L. Emilio Morales[2], Alejandro Aybar-Flores[1], Rocío Maehara[1]

[1]Universidad del Pacifico, Lima, Peru. [2]University of New England, Armidale, Australia

Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

17. Food, Health and Nutrition

Paper/Poster Abstract:

The COVID-19 pandemic has increased the perceived importance of health-conscious food consumption. Consumers in developing countries are becoming concerned about organic products due to the improvement of life quality. Nonetheless, especially in Peru, few consumers regularly buy organic food due to low confidence in fresh produce

safety and lax regulations in emerging markets. Studying the WTP for Peruvian organic quinoa and identifying factors that impact on the propensity to purchase this product during the pandemic is considered a contribution to the current literature, even more in the case of a country where quinoa is considered a national food product that is regularly consumed. Therefore, this study seeks to analyze the willingness to pay (WTP) premiums for organic quinoa in Peru under the influence of the COVID pandemic. Primary data was collected in Metropolitan Lima, Peru between 2020 and 2021. Confirmatory factor analysis, binomial logistic model, a probit analysis and a gamma model were conducted. The main outcomes identified of the logit and probit models of this study showed that (i) ethnic identity and (ii) women and people with higher education have more probability of being WTP premiums for organic quinoa. Regarding their WTP premiums, monthly family expenditure in quinoa consumption has a significant effect. Contrarily, the monthly consumption of quinoa in the interviewee's household has a negative effect on the WTP premiums. The outcomes of this study can shed some light on consumers' expectations and perceptions regarding organic quinoa consumption behavior during COVID-19.

Parallel 5H. Contributed Paper Session - Water 1

08:30 - 10:10 Friday, 9th February, 2024
Location Room 6, (Level 5) Marie Reay Teaching Centre Quentin Grafton

125 Climate adaptive policy making in Australia's Murray-Darling Basin: Key attributes of adaptation principles assessed against current governance archetypes.

Nadeem Samnakay, Jason Alexandra, Carina Wyborn, Isobel Bender

Australian National University, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

31. Water

Paper/Poster Abstract:

Climate change is intrinsically associated with changes in water cycles and thus understanding governance archetypes is a critical element of climate adaptive water governance. In this presentation, we examine current water governance arrangements in Australia's Murray-Darling Basin, evaluating their attributes and adequacy for fostering climate adaptation. We synthesise data from published Murray-Darling Basin policy evaluations and review water and climate policies, analysing their framing, logics, and dominant discourses. Our analysis indicates that prescriptive top-down planning and administratively rational approaches constrain climate adaptive water governance. Current

governance regimes inhibit innovation due to dominant governance approaches that are centralist and managerial. In the Murray-Darling Basin, reforms to policy settings and institutional arrangements are needed to mobilise industries and communities in exploring alternative water futures that support transformations. We offer two contrasting archetypes for climate-adaptive water policy based on foundationally different assumptions about what builds adaptive capacities.

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303 Water Affordability, Bill Delinquency, and Low-Income Rate Assistance: A Southern California Perspective

Kurt Schwabe, Mehdi Nemati

University of California Riverside, Riverside, USA

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

31. Water

Paper/Poster Abstract:

With rising drinking water rates and low, if not stagnant income growth, local, state, and federal agencies are considering alternative means to assist low-income ratepayers in affording water for essential needs. Two issues confronting policymakers when it comes to water affordability are (i) how to identify households who confront water affordability and (ii) how to develop effective programs that assist ratepayers in their efforts to afford water for essential needs. This research addresses both these issues using household-level monthly water use data from nearly 200,000 households in Southern California from 2010 to 2020. After a discussion of different metrics used to measure water affordability, we analyze – using panel difference-in-difference methods – whether there is any relationship between a potential outcome associated with “unaffordable” water–bill delinquency-- and alternative metrics for water affordability. Bill delinquency rather than the widely used affordability ratio seems a more tangible measure of whether water is affordable or not relative to using commonly used water affordability ratios in the literature. In addition, while there is robust conceptual literature on affordability interventions, the empirical evidence on their effectiveness remains scarce. With a tangible measure of affordability, i.e., bill delinquency, we evaluate an affordability intervention with a measure that is well-defined, measurable in the short-run, and provides what we feel is a much more reasonable outcome of the consequences of water affordability challenges.

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58 Managed aquifer recharge in Australian water legislation, regulation and policy: an anticommons problem?

Constantin Seidl[1], Sarah Ann Wheeler[1], Declan Page[2]

[1]University of Adelaide, Adelaide, Australia. [2]CSIRO, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

25. Policy Analysis

31. Water

Paper/Poster Abstract:

Managed aquifer recharge (MAR – also called groundwater banking) is widely regarded as a promising nature-based water management and water supply/storage tool. However, implementation of MAR has been slow, both globally and in Australia, with economic and legislative drivers identified as main impediments. Despite the Australian government viewing MAR for agricultural purposes as a key element in its efforts to tackle water scarcity and drought mitigation, there are only a few operational MAR schemes in Australia, mostly in municipal and urban settings. This paper explores whether legislation is an impediment to MAR implementation in Australia by reviewing state and Commonwealth water legislation, regulation and policy. We draw on more than 30 characteristics (e.g. does banked water become part of the wider groundwater resource pool?) to score MAR regulation and legislation across the three domains of: 1) legislative conflicts, definitions and stand-alone MAR legislation; 2) licence characteristics; and 3) licence applications and conditions.

We find that stand-alone MAR legislation, regulation and policy is either non-existent or in its infancy in all states but South Australia (SA) and Western Australia (WA). WA provides for a detailed MAR policy but awards little safeguards against regulatory change as operation is managed under existing groundwater licence regimes. Despite SA legislating a dedicated MAR operation permit, separate water extraction licences are needed for recharge and recovery, adding administrative complexity. Generally, water licence regimes in Australia prevent MAR as, although water physically changes from surface to groundwater, there is no legal way to convert recharged surface water to groundwater using existing transfer/trade or allocation mechanisms. Instead, the same volume would count as surface and groundwater extraction. Even where legally possible, depending on state, MAR type and location, scheme operation may require multiple different permits and licences. This imposes significant transaction costs through assessments and documentation for the approval process.

We argue a tragedy of the anticommons problem is present: too many permits/licences are needed for scheme operation with associated complexity and transaction costs leading to an underutilisation of MAR. To encourage future MAR implementation across Australia through increased legal certainty and lower transaction costs, we propose: 1) additional research on economic benefits of MAR storage; 2) enshrine specific MAR licences in water acts and legislation; 3) simplify and make processes more transparent; 4) change existing permits to better reflect operations; and 5) remove legislative barriers to account for recharge and recovery volumes and to prevent double counting.

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9 Pricing Farm Electricity, Water Use and Efficiency: The Case of Paddy Cultivation in Punjab, India

Disha Gupta

Indira Gandhi Institute of Development Research, Mumbai, India

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

31. Water

Paper/Poster Abstract:

There has been a declining trend in groundwater depths in India and subsidies on farm electricity is seen as one of a key factors contributing to over-extraction of groundwater resources in the country raising concerns about its sustainability for irrigation. In this paper, we estimate the reduction in groundwater pumping under volumetric pricing of farm electricity for the state of Punjab where farm electricity is free. Further, we quantify gains in efficiency in terms of reduction of the deadweight loss under this pricing regime. We use parcel-level cost of cultivation data from the Ministry of Agriculture for the block period of 2011-12 to 2013-14 combined with data on groundwater depth and rainfall to estimate the production function for paddy using instrumental variable approach. This is used to get the estimates of the marginal product of water to compute the optimal level of water use at different levels of electricity price. We also quantify change in other inputs and paddy yields due to unit-price induced reduction in groundwater pumping. We find that the estimated marginal product of water at the irrigation volumes chosen by the farmers is very low. The average marginal product of water is estimated to be 34 kilograms for additional thousand cubic meters of water per hectare. Simulations show that increasing the price of electricity from current level of zero to the true cost of electricity supply leads to sharp cutbacks in water extraction using electric pumps. We show welfare gains in terms of reduction of the deadweight loss as a result of pricing agricultural electricity at the margin. We quantify average lump-sum subsidy that can be given to farmers as Direct Benefit Transfers into their bank accounts to keep their surplus unchanged.

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76 Economic, Hydrological and Ecological Impacts of Water Withdrawals and Meteorological Trends on Stream Flow in the Northern Murray Darling Basin, Australia 1981-2020

Quentin Grafton, Long Chu, Ana Manero, John Williams

The ANU, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

14. Environmental Economics

Paper/Poster Abstract:

Increasing water withdrawals and climate change have led to declines in river streamflow with associated ecological consequences in many rivers in arid and semi-arid locations. In this study, we estimated the impacts of meteorological trends on stream flows for each catchment in the Northern Murray Darling Basin (NMDBA), Australia and the gross value of irrigated agriculture (GVIA) associated with water withdrawals. We found that meteorological trends over the 1981-2020 period alone cannot explain the observed decline in streamflow within catchments with substantial water withdrawals for irrigation. If the increase in water withdrawals for irrigation over the 2006-2020 period relative to 1981-2000 had, instead, been reallocated to mitigate declines in stream flow over the 1981-2000 period then average annual GVIA in the NMDBA would have been reduced by 9% and 14%.

Morning Tea [including viewing of Contributed Posters]

10:10 - 10:40 Friday, 9th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

29 Assessing the value of urban green space: a hedonic analysis in Shenzhen, China

Xun Li, Qingyu He

Beijing Normal University-Hong Kong Baptist University United International College, Zhuhai, China

Presentation Type:

4. Poster

Keywords:

9. Consumer Choice

29. Valuation

Paper/Poster Abstract:

Urban green space is crucial in the practice of building sustainable cities and plays a significant role in improving the urban environment and livability and enhancing the well-being of residents. However, due to the lack of an obvious market price, the value of urban green space is often ignored by urban planners and consumers, resulting in a large amount of urban green space being eroded by urban development such as real estate development, large shopping mall construction, cultural and entertainment construction. Based on the hedonic pricing model (HPM), this study takes Shenzhen, China as an example to construct and assess the value (revealed in terms of housing price) of the characteristics of green space in Shenzhen. Geographic Information System (GIS) and urban landscape metrics are used to determine hedonic price model variables. Our analytical results indicate that national forest parks contain higher ecological and economic value (national forest parks can increase the price of apartments by more than 40%, while city parks can increase the value of apartment prices by more than 10%). After interaction analysis with visibility and 300-m walking distance, the value gain of national forest parks and urban parks shows a hierarchical distribution that reflects the ecological economic value of different park types. The findings have important reference value for guiding the planning and construction of sustainable cities, optimizing the spatial allocation of public green resources, and improving the overall welfare of society.

33 The Effectiveness of China’s Water Tax Reform on Groundwater Abstraction

Shujie Liang, Tiho Ancev, Maruge Zhao

University of Sydney, Sydney, Australia

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

31. Water

Paper/Poster Abstract:

Groundwater is a critical natural resource that supports human life, sustains ecosystems, and plays a crucial role in economic and environmental sustainability. In recent decades, China has experienced a rapid depletion of its groundwater reserves. In 2016, a pilot program to introduce a water resource taxation mechanism replacing the existing water resource fee system was implemented in Hebei province. The new taxation mechanism was subsequently extended to nine additional provinces/ administrative division, namely Beijing, Tianjin, Shanxi, Inner Mongolia, Shandong, Henan, Sichuan, Shaanxi and Ningxia, in 2017. The other provinces/administrative divisions in China have not yet implemented the new taxation mechanism. In this paper, we employ the heterogeneity of implementation of the new tax mechanism across provinces to test its effectiveness in conserving groundwater resources. We employ the Difference-in-Differences approach to assess the impact of the water tax reform on groundwater usage, utilizing panel data on 169 sub-provincial administrative divisions (so called ‘cities’) from 2012 to 2021. The data come from cities within provinces where the new taxation mechanism was implemented, and from cities within provinces where the new tax was not implemented. The findings reveal that the tax policy has had a significant reduction effect on the groundwater abstraction volume, indicating its effectiveness to decrease groundwater consumption. The paper sheds light on the efficacy of the tax policy in addressing China's groundwater challenges and underscores the importance of sustainable water resource governance.

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59 Expanding beyond case studies in postgraduate agribusiness teaching to enhance experiential benefits and student/teacher outcomes.

Alexandra Peralta, Craig Johns, Adam Loch

University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

Experiential teaching in postgraduate agribusiness education is crucial for bridging the gap between theoretical knowledge and practical application. While traditional methods often rely on case studies, this paper explores the potential benefits of expanding the range of industry experiences available to students. We present two examples of broader industry engagement: field trips to local agribusiness firms and industry internship opportunities. These approaches aim to provide students with a deeper understanding of how agribusinesses innovate, navigate industry challenges, and capitalize on opportunities.

Field trips offer students the chance to interact with senior managers from agribusiness firms who share their strategies, challenges, and opportunities, fostering interactive discussions. Meanwhile, industry internships provide direct interaction with various levels of agribusiness organizations and allow students to research relevant industry topics. These expanded materials have been integrated into the Master of Global Food and Agricultural Business (MGFAB) and Master of Agribusiness (MAB) programs.

This paper assesses how these enhanced teaching methods add value to agribusiness education using the Bell and Bell (2020) framework for experiential learning assessment. We also provide insights for educators and program managers interested in incorporating similar approaches into their agribusiness teaching. By diversifying the educational experience and emphasizing practical engagement, we aim to equip students with the skills and knowledge needed to excel in the ever-evolving agribusiness sector.

Experiential learning is a well-established pedagogical approach in business and entrepreneurial programs, with case studies being a prominent tool. However, the modern agribusiness sector demands socially responsible managers who can navigate ethical and practical challenges. This necessitates a broader range of teaching materials and experiential opportunities. This paper explores the effectiveness of two such approaches: field trips to local agribusiness firms and industry internships.

We introduce the Bell and Bell (2020) framework, which guides our analysis. This framework draws from experiential pedagogy theories and serves as a foundation for evaluating the impact of expanded teaching materials in agribusiness education.

We present two key experiential learning activities:

a) Field Trips: These trips allow students to engage with senior managers who share insights into their business strategies, challenges, and opportunities. Interactive discussions enrich the learning experience.

b) Industry Internships: Students participate in internships with partner agribusiness firms, offering direct interaction across various organizational levels and the opportunity to conduct research on relevant industry topics.

We assess the impact of these expanded teaching methods using the Bell and Bell (2020) framework, focusing on key aspects such as student engagement, reflection, and the application of knowledge.

We discuss the insights gained from our assessment and their implications for agribusiness education. Our findings emphasize the value of diversifying teaching materials and incorporating practical engagement to better prepare students for the dynamic agribusiness landscape.

This paper advocates for the integration of field trips and industry internships in postgraduate agribusiness education to enhance experiential learning. By applying the Bell and Bell (2020) framework, we provide evidence of the benefits of these approaches and offer guidance for course coordinators, undergraduate and postgraduate program managers seeking to enrich their agribusiness teaching methodologies.

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69 Restoring wetlands on private lands: farm context, aspirations, incentives, and transaction costs

Geoff Kaine, Maksym Polyakov

Manaaki Whenua - Landcare Research, Hamilton, New Zealand

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

Paper/Poster Abstract:

The aim of the project was to identify the costs associated with wetland restoration and conservation using farm context analysis and explore the landholder's potential interest and implications for the design of incentives. We conducted farmers' interviews to identify the key factors in the farm system that influence the costs of establishing wetlands and a survey to quantify and statistically test the findings from the interviews. The survey included a choice experiment to investigate farmers' willingness to enrol in programmes offering incentives for establishing wetlands. We found that while landowners may aspire to attract native birds to their properties and improve biodiversity and aesthetics, their interest in restoring and protecting wet areas depended primarily on their farm context, the biophysical characteristics of their properties and the wet areas. There was substantial diversity in farm contexts, meaning landholders will differ substantially in their interest in retiring wet areas and in seeking assistance to do so, irrespective of their aspirations. This diversity, through its effects on the feasibility and costs of retiring wet areas, means that landholders are likely to be quite sensitive to variations in the features of assistance programs. Consequently, while we found a high level of interest in programmes offering incentives for establishing wetlands among the respondents to the survey, these programmes would need to be customised to suit specific farm contexts and expectations about the success of assistance programmes tempered accordingly, for example, in terms of the number of properties with a specific farm context and difference in the sensitivity of landowners in that context to the features of programmes. Our statistical results are derived from a small sample of landowners who probably have a greater-than-average interest in wetlands. Consequently, our findings should be treated cautiously. Repeating the survey with a much larger, more heterogeneous sample would be valuable in building greater confidence in our findings.

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81 Farmers’ pro-commons awareness, non-farm activities and effects on groundwater conservation: Experiences from India’s wheat belt

Ranjan Ghosh, Ankit Saha, Vidya Vemireddy

Indian Institute of Management, Ahmedabad, Ahmedabad, India

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

21. Land and Natural Resource Management

31. Water

Paper/Poster Abstract:

Water conservation is key to future sustainability of smallholder farming systems. However, there is a grim trade-off between private use decisions such as groundwater extraction for irrigation and the common impacts such as depletion of basin level groundwater levels. This leads to an impending global ‘tragedy of the water commons’ which is more severe where crops are high value and commercial interests dominate the farmer’s mind. Pricing water or quantity restrictions are the most discussed solutions without much attention given to farmers’ own behaviour with respect to conservation. In this context, we tried to understand what drives farmers’ preference for communal benefits from water conservation We conducted choice experiments with over 300 farmers in the dryland wheat belt in central India by offering variations to the following attributes of water saving options: visibility of water, installation and maintenance costs, self-use, and common use. Results revealed that despite sensitivity towards cost and visibility, farmers have a high preference for common use. However, it is the larger farmers with higher non-farm income sources who tend to value common use more than farmers who are smaller and with lower non-farm income sources. The valuation for communal benefits of water conservation decreases as farmers become more educated, are older or have larger families. We conclude that commons awareness strategies and inducements for rural non-farm economy can be very effective in water conservation without having to exclusively rely on usage taxation or quantity rationing.

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83 Valuing Attributes of Forest Restoration Using a Choice Experiment

Yohan Lee[1], Jae Bong Chang[2]

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Presentation Type:

4. Poster

Keywords:

5. Biodiversity

29. Valuation

Paper/Poster Abstract:

This choice experiment study investigates residents’ preferences toward restoring forest ecosystem services and estimates willingness to pay for multiple attributes of forest ecosystems by function in the Republic of Korea. In 2021, we conducted face-to-face interviews with 500 respondents in the Republic of Korea. The attributes of forest ecosystem services in the Republic of Korea including biodiversity, prevention of natural disasters, carbon sequestration, and household tax have significant influences on individuals' preferences with regard to forest restoration. Among the four functional attributes of forest restoration, the prevention of natural disasters such as landslides and floods was the most crucial role of forest restoration in their choice of forest ecosystem services. In addition, we found that the preferences of functional attributes of forest ecosystem services can be significantly different depending on the location of forest restoration. The willingness-to-pay(WTP) of the biodiversity in forested areas is higher than in wetlands or residential areas, whereas the WTP for the prevention of natural disasters in residential areas is higher than that of other areas. To make forest restoration projects successful, we need to take not just the attributes of forest ecosystem services but also the regional characteristics of those restoration sites into account to improve the social welfare of residents.

87 The importance of farmers' markets in the modern world: A bibliometric review

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Presentation Type:

4. Poster

Keywords:

23. Market Design and Policy

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

With the appearance of modern food supply chains, there has been a clear decrease in consumer trust and an increase in information asymmetry. Short food supply chains, including farmers' markets, can represent a solution to such problems. Today, modern farmers' markets mainly exist in the United States and the European Union, and their impact on sustainability has been the focus of attention; however, the relevance of this traditional approach among modern supply chains is relatively unexplored. Therefore, this study reviews the current state of the literature on farmers' markets using bibliometric techniques applied to 1,765 documents from Scopus and Web of Science databases from 1955-2022. The paper tracks the research dynamics associated with farmers' markets by identifying the stages of evolution of major topics, articles, journals, author citations, and co-citation networks. The results illustrate the upward trend in publishing papers on the topic, identify five areas of related market research, and pave the way for further work by researchers and politicians by describing the main and specific research avenues.

88 The taxonomy of Global Value Chains

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Presentation Type:

4. Poster

Keywords:

12. Econometric Modelling

20. International Trade

Paper/Poster Abstract:

Since the WWII, the role of global value chains (GVCs) has been continuously increasing as the main driver of global production and trade patterns. With the continuous rise of globalisation, at least until 2008, GVCs have brought increasing specialisation and vertical integration to the global economy, thereby connecting different parts of the world. Unbundling of tasks and business activities as well as functions has provided new opportunities for developing countries to continuously increase their participation in global production and trade flows without having to develop a completely new product or value chain.

GVC participation plays a crucial role in economic development as the ability of countries to prosper highly depends on their level of participation in the global economy. Even small countries with limited resources can benefit from global trade through GVC participation with significant variation across countries and sectors. As evident from the majority of the existing literature in the field, GVC participation represent a perfect opportunity for supporting local agri-food markets to become more commercialised and productive, thereby increasing local incomes as well as their stability together with food security. It is also evident that agricultural sectors participate in value chains predominantly as suppliers of raw materials, whereas food sectors participate mainly in terms of sourcing inputs from global markets.

At the same time, many poorer countries faced serious challenges in integrating to these GVCs for a number of reasons, including low educated human capital, poor infrastructures, low capital endowments, versatile political and business climates or poor institutions. For local and regional as well as global policymakers, the question is therefore what the key determinants of developing countries in GVC participation are and how can targeted policies help fostering better integration.

This research provides an empirical analysis of the determinants of agri-food GVC participation of countries standing at different levels of economic development, especially focusing on developing countries. This analysis is particularly relevant for developing countries helping them to better understand the overall context and the key determinants of success and thereby increasing their involvement in global agri-food GVCs. The research starts with identifying the determinants of participation by descriptive statistics and economic models, followed by the analysis of how different kinds of shocks can affect the resilience of agriculture. The research then provides a taxonomy of global agri-food value chains, followed by policy recommendations to increase participation.

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97 Assessing Financial Inclusion of Digital Financial Services among Cambodian Farmers

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Presentation Type:

4. Poster

Keywords:

2. Agricultural Finance

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

Cambodia has demonstrated remarkable economic growth, boasting an average annual growth rate of 7.7% over the period spanning from 1998 to 2019, positioning itself as one of the world's fastest-growing economies (ADB, 2021). One of the significant driving forces behind this economic surge is the agricultural sector, which, in 2019, contributed a substantial 22.1% to the country's total GDP, marking the highest value-added share among lower-middle-income countries (ADB, 2021). However, despite these economic achievements, Cambodian farmers continue to grapple with substantial challenges when it comes to accessing crucial financial resources. Factors contributing to their limited financial access include stringent collateral requirements, high-interest rates on short-term loans, the absence of established credit histories, and a notable lack of financial literacy among farmers (ADB, 2021).

The introduction of digital financial services emerges as a promising avenue to alleviate these financial access limitations for farmers in Cambodia. To successfully adopt and utilise these digital financial services, several critical prerequisites must be in place. These prerequisites encompass the availability of essential infrastructure components, such as widespread mobile phone coverage, robust network connectivity, and readily accessible internet connections (Ambler et al., 2022; Caron, 2022). Other important factors include financial and technological literacy levels of potential users, the affordability of these services, user preferences, and the relevance of such services in meeting the specific needs of the target users (Caron, 2022).

The overarching goal of this study is to provide a comprehensive and descriptive analysis of the financial inclusion landscape among agricultural households in Cambodia, taking into account the availability of essential infrastructure and the socioeconomic characteristics of these households. This analysis will offer valuable insights into both digital and non-digital dimensions of financial inclusion within this context. This study draws upon a diverse set of secondary datasets for Cambodia sourced from World Bank, including data from the 2021 Global Findex which features 1,000 individuals and one round of the High-frequency phone survey of the Living Standards Measurement Survey encompassing 1,666 households (Round 3). Various infrastructure-related datasets, such as those detailing cell phone tower availability, internet speed, and the presence of financial agents, are utilised in this research.

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Caron, L 2022, 'Empty digital wallets: new technologies and old inequalities in digital financial services among women', Oxford Open Economics, vol. 1, 2022/03/01/, p. odac001.

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99 Assessing ‘value for money’ for environmental project funding: An application to riverine recovery funding in Queensland Australia.

Amar Doshi[1], Steve Charlton-Henderson[1], Jim Binney[1], Paul Maxwell[2], Misko Ivezich[3]

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Presentation Type:

4. Poster

Keywords:

19. Impact Assessment

21. Land and Natural Resource Management

Paper/Poster Abstract:

Federal and State government agencies provide public funding for various environmental recovery and management projects. Assessing applications have typically focused on single benefit streams (e.g., water quality) using a cost-effectiveness approach. However, improvements to the biophysical condition of a natural asset can provide multiple benefits across a range of ecosystem services. Only considering single benefit streams can result in sub-optimal outcomes for public funding. Prevailing approaches to assess multiple benefits, such as cost-benefit and multi-criteria analyses, are time, data and cost intensive. Agencies require a simple tool for considering the total benefits across broader ecosystem services that is also, evidence-based, transparent, repeatable, and efficient. This project, funded by the Queensland Reconstruction Authority, is purposed with developing a framework and tool to facilitate Queensland's Department of Environment and Science in assessing applications for the Disaster Recovery Funding Arrangements Riverine Recovery Program. The proposed framework prioritises projects based on the cost-effectiveness of delivering benefits to provisioning, regulating, supporting and social-cultural ecosystem services by utilising data that is either publicly available, applicants can readily provide, or already collected by the Department. Critically, the framework can be updated and refined over time based on new data and information, and different objectives of future funding programs.

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101 A conic version of a dairy sector model for New Zealand

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Presentation Type:

4. Poster

Keywords:

24. Mathematical Programming

25. Policy Analysis

Paper/Poster Abstract:

There is a growing need for a model suitable to assess the economic impacts and the adaptations of dairy farmers in response to policies or environmental changes. In this regard, programming models have proven relevant to represent resource-constrained inputs contractions and substitutions, which could be more challenging to capture in an econometric approach. Farmers' adaptation responses to policies involve a complex decision-making process that depends on various criteria, including profits, availability of mitigation options, and risks, which are also dependent on wider-scale processes.

Considering the significant contribution of the dairy sector to the economy of New Zealand, and the pipeline of agri-environmental policies coming into force in the next five years (e.g. He Waka Eke Noa -HWEN and other freshwater regulations), it is expected that dairy farms will go through dramatic changes on their economic and environmental

context. Dairy farming has to meet water quality and emissions targets while remaining competitive in the international market, to plant-based alternatives and the potential introduction of synthetic milk. HWEN introduces prices on methane emissions and long-lived gases, while freshwater regulations limit N leaching. The combined operation of policies puts pressure on farming profitability, mainly when technology or advanced mitigation options are not readily available or at least not to scale up for a significant share of farms.

We propose a model based on conic programming to accommodate a PMP calibrated dairy-specific cost function that relate inputs (e.g. stocking rate, nitrogen fertilizer, feed) to milk production. This setup ensures obtaining a detailed understanding of the effects of policies or scenarios simulated (e.g. changing constraints, costs or even climate information) and avoiding inefficient adaptation measures, misinterpretation of climate signals or minimal adoption of technologies.

This note describes a dairy sector model prototype based on mathematical programming. We take the pricing of methane emissions as a case study to exemplify its performance and research potential.

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121 Balancing Conventional and Agro-Ecological Farming for Sustainable Agriculture and Food Security: Empirical Insights from Tanzania

Haji Msangi[1,2,3], Ntengua Mdoe[1], Katharina Löhr[2], Betty Waized[1], Stefan Sieber[2,4], Daniel Ndyetabula[1]

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Presentation Type:

4. Poster

Keywords:

8. Climate Change

11. Ecological Economics

Paper/Poster Abstract:

Climate change is one of the greatest global challenges of the 21st century, and it has adversely affected global agricultural production and food systems. As the global population continues to rapidly increase, agricultural production systems must produce sufficient food to meet the demands of an expanding global population projected to reach 9 billion by 2050. In Sub-Saharan Africa, the region faces significant challenges such as rapid population growth, poverty, and food insecurity. Conventional strategies to strengthen agricultural production systems face serious trade-offs, where efforts to increase food production generate significant amounts of greenhouse gases (GHG) that contribute to climate change. Adopting agro-ecological farming practices is widely accepted as a strategy to address climate change issues and ensure sustainability in agri-food systems. However, an emerging concern with agro-ecological farming is its ability to substitute conventional external input farming to meet productivity and food security objectives, especially in countries such as many Sub-Saharan African nations where agricultural productivity remains persistently low and food systems are unstable. This study aims to investigate the synergies between conventional and agro-ecological farming practices in Tanzania and how their joint adoption could improve farm productivity and resilient food systems in a more sustainable manner compared to their implementation separately. The study uses the Living Standard Measurement Study-Integrated Survey in Agriculture (LSMS-ISA) data for

Tanzania's national panel survey (NPS) for the 2020/2021 cross-section. The study employs Multinomial Endogenous Treatment Effect (METE) regression to model the joint and exclusive effect of conventional and agro-ecological farming on farm productivity and food security in Tanzania. The study reveals that gender, farm size, access to extension services, credit, and social protection programs are important drivers of the adoption of conventional and agro-ecological farming practices. Furthermore, the study shows that combining conventional farming practices (inorganic fertilizer and agro-chemicals) with agro-ecological farming practices (organic manure and agro-forestry) can significantly enhance farm productivity and food security, indicating that the two approaches have a strong synergy. Interestingly, the study also finds that while exclusive adoption of conventional farming can improve farm productivity and food security, the magnitude of this effect is almost the same as that of the joint adoption of both approaches. In contrast, exclusive adoption of agroecological farming has a positive but insignificant effect on farm productivity and food security. These findings highlight the potential benefits of balancing the trade-offs of conventional high external input farming by adopting agroecological farming, which can help achieve both productivity and food security objectives while protecting the natural agroecology. Therefore, the study emphasizes the need for promoting policies and initiatives that encourage the joint adoption of conventional and agro-ecological farming practices to achieve sustainable and resilient agricultural production and food systems in Tanzania. However, such policies and initiatives must be complemented by other measures like credit access, extension, and social protection to enhance their adoption and impacts.

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124 Political Economy of Environmental Policy under Trade

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

20. International Trade

Paper/Poster Abstract:

Concerns about global environment and more effective environmental stewardship have dominated policy arenas in the past three decades. In an increasingly interconnected and entangled world, the design of national and international environmental policies requires compromises among the conflicting interests of countries, politicians, producers, and consumers. The primary dilemma for any country is whether or not to cooperate with other countries in environmental policy arenas, such as limiting carbon dioxide (CO2) emissions, which to a large extent is determined by direct and indirect ecological-economic effects of a given environmental policy. Politicians, on the other hand, face a trade-off between enhancing social welfare and serving the interests of lobby groups in exchange for (prospective) campaign contributions. The link between environment and trade has also long been the subject of intense policy debate.

In this study, we first examine the state of the literature and then fill important gaps in this area. We develop a unified framework that embodies environmental externalities (local versus global), abatement, political competition, and trade. Our model illuminates how the incentives of producer and consumer/environmentalist lobby groups to influence the stringency of pollution control collide in environmental policy-making; how these incentives change with the nature and size of environmental externalities, environmental agreements (unilateral versus multilateral), and trade regimes; and the role of abatement and terms-of-trade effect in the equilibrium outcomes. In a large open economy, when countries cooperatively formulate their policies, the environmental regulation internalizes the costs of emission leakages resulting from lobbying activities, thus making cooperative policy more appealing than noncooperative one from the welfare standpoint. Producer and consumer lobbying generally have a counteracting effect, with the

government's weight assigned to each group determining the influence of the groups on the policy. However, in a unilateral policy setting with emission leakages, producer and consumer interests may coincide in supporting lower pollution tax.

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144 Evaluating Farmers' Perspective and Economic Viability in Environmentally Sustainable Vegetable Cultivation: An Investigation in Bangladesh

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Presentation Type:

4. Poster

Keywords:

3. Agricultural Production

14. Environmental Economics

Paper/Poster Abstract:

To assess the perspectives of farmers and the economic viability of sustainable vegetable farming in Bangladesh, this study investigates the attitudes and economic sustainability of eco-friendly vegetable farming practices among 600 randomly selected farmers. The study utilized a pre-tested structured questionnaire, employing a five-point Likert Scale to assess farmers' attitudes toward eco-friendly vegetable farming, particularly focusing on profitability, and conducted profitability analysis to evaluate the economic viability of cultivating major vegetable crops. To determine the factors influencing farmers' attitudes toward eco-friendly vegetable farming, a Logit model was employed. Furthermore, a Problem Confrontation Index was used to identify and rank the key challenges associated with eco-friendly vegetable production. The study found that an overwhelming majority of farmers (81.43 percent) held favorable attitudes toward eco-friendly vegetable farming, while a minority (18.57 percent) expressed unfavorable sentiments. Significantly, the cultivation of major vegetables such as tomato, gourd, cauliflower, and cabbage was economically sustainable and profitable. Further analysis using a Logit model revealed that the respondent's age, years of formal schooling, livestock ownership, and prior training in eco-friendly vegetable farming significantly influenced farmers' receptivity to eco-friendly practices. Challenges faced by eco-friendly farmers, identified and ranked using the Problem Confrontation Index, including natural disasters, an increased incidence of insect pests and diseases in eco-friendly crops, and rising labor costs, were considered the most severe and thus required targeted interventions. Based on the study's findings, several policy recommendations are proposed, encompassing the implementation of regular motivation and training programs tailored to eco-friendly vegetable production, frequent on-site support visits by extension officers during production, and the provision of government-backed credit facilities with reduced interest rates to promote the widespread adoption of eco-friendly practices among farmers. This research provides valuable insights into the attitudes and economic viability of sustainable vegetable farming practices in Bangladesh, while also highlighting the challenges faced by eco-friendly farmers and proposing actionable policy measures to advance environmentally sustainable agriculture in the region.

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166 Timber and trails: the economic and well-being impacts of recreational mountain biking in New Zealand

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Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

19. Impact Assessment

21. Land and Natural Resource Management

29. Valuation

Paper/Poster Abstract:

Poster Abstract

New Zealand's planted forests have emerged as critical contributors to the global wood supply chain, offering substantial economic and environmental benefits, including carbon sequestration and water flow regulation. They also serve as hubs for recreational activities, with mountain biking experiencing a remarkable surge in popularity over the past two decades. Despite their significant contributions, the full extent of planted forests' value to New Zealand's economy and society remains underappreciated in decision-making processes.

This study builds upon previous research that focused on specific regions, aiming to comprehensively evaluate the economic and non-market values of mountain biking at both regional and national scales. To our knowledge, this study represents the first attempt in New Zealand to assess both market and non-market impacts of mountain biking.

Leveraging survey data from 2,073 New Zealand mountain bikers, we employed two established economic modelling approaches. We used an input-output model to assess economic impacts in key regions, subsequently extending our analysis to cover the entire country. Furthermore, a travel cost analysis was conducted to evaluate the welfare impacts of local and distant mountain biking visits, categorizing 'local' as travel within 120 minutes each way, and 'distant' as travel exceeding 120 minutes each way.

Our findings underscore the robust economic and social contributions of mountain biking in New Zealand. Planted forests emerge as pivotal locations for this activity, with over half of the economic benefits distributed across sectors including transport, accommodation, rental and hiring, food and beverage, and retail trade. Surprisingly, the forestry sector receives less than 1% of these benefits.

Moreover, our study reveals that mountain bikers derive substantial well-being benefits from planted forests, surpassing those from other ecosystems such as native forests, grasslands, and pastoral farms. Sites in distant planted forests provide notably higher well-being value compared to locations in native forests and tussock grasslands.

Considering the results highlighted above, there is a compelling case for exploring mechanisms to reallocate economic benefits towards enhancing planted forests with mountain biking sites. Collaboration between government agencies, businesses, mountain bikers, clubs, investors, and other stakeholders could yield mutually beneficial outcomes. Alternatively, managers of planted forests offering mountain biking amenities may explore joint ventures with key businesses that benefit from mountain biking visits.

By shedding light on the economic and well-being values associated with mountain biking, this study provides valuable insights for forest owners, government agencies, businesses, and users. These findings can inform policies

and investment decision-making processes, advocating for an inclusive approach to resource allocation and conservation efforts.

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181 Coastal Hazard Adaptation Strategies: a multi-disciplinary approach to addressing coastal climate risks

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Presentation Type:

4. Poster

Keywords:

8. Climate Change

28. Uncertainty and Risk

Paper/Poster Abstract:

Coastal hazards like erosion, storm tide inundation and sea level rise, pose significant threats to adjacent communities, including loss of infrastructure, agriculture, natural environments, and local industries such as tourism and recreation. Local and regional councils have increasingly invested in developing a Coastal Hazard Adaptation Strategy (CHAS) to manage and proactively respond to the risks from these hazards. However, developing a CHAS is complex as it requires a multi-disciplinary approach that traverses a diverse range of information and data. Over the past five years, Alluvium Consulting Australia and NCEconomics developed and refined an approach to CHAS for councils affected by these hazards. The approach leverages expertise in climate modelling, biophysical sciences, hydrology, engineering, and economics to produce a science-based CHAS that is tailored to individual coastal hazard risks. Using a cost-benefit analysis framework, this CHAS approach involves developing a base case—illustrating long-term outcomes without adaptation—and assesses various options against this baseline, allowing councils to accurately assess risks, consider the potential return on investment of different options, and outline a plan for improving the region's resilience to coastal hazards.

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211 Barriers to the circular economy are diverse and business model-specific: evidence from the Australian cheese manufacturing sector

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Presentation Type:

4. Poster

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

The pursuit of Sustainable Development Goal 12.3, aimed at halving food waste by 2030, relies on a concerted effort from various stakeholders to engage in different practices that improve the utilisation of resources throughout the life cycle of a product. Circular business models (CBMs) have emerged as a promising avenue for achieving this goal by acknowledging there are multiple pathways that can contribute to the same outcome. CBMs can reduce the inputs into and/or waste and emissions from supply chains via a range of management practices, organisational configurations and part of broader value networks.

This study seeks to contribute to the growing body of literature on CBMs by examining the diverse barriers across different types of business models. To explore these barriers in-depth, we thematically analysed semi-structured interview data from the Australian cheese manufacturing sector. Our research reveals that adopting various types of circular business models have, and can mitigate to an extent, different types of barriers. We find that when firms consider in-house management practices, they predominantly faced internal barriers. These internal hurdles include technological constraints; financial viability concerns; and organisational challenges, such as competing priorities and timing issues with the business cycle. The exploration of alternative business models, such as selling to or forming partnerships with other firms, offers a contrasting picture. In these scenarios, firms tend to report predominantly external barriers that are closely tied to supply chain dynamics. These external barriers include geographical remoteness, a lack of industry coordination, and ambiguity surrounding the distribution of costs, benefits, and responsibilities.

These findings have the potential to assist with decision-making within the cheese manufacturing sector and other industries facing similar issues. By highlighting the differences in barriers faced across various circular business models, our study underscores the importance of exploring multiple pathways to achieve the same goal, while also identifying residual issues that will need to be addressed – e.g., industry coordination, clear business plans, etc.

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212 The Effect of Farmer Discussion Groups on the Adoption of Technology by Dairy Farmers in West Java, Indonesia

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Presentation Type:

4. Poster

Keywords:

10. Development Economics

26. Practice Change and Adoption

Paper/Poster Abstract:

Agricultural extension plays an important role in enhancing the adoption of improved technologies and practices by acting as a bridge between scientists or researchers and farmers. In recent years, participatory approaches to extension have emerged as an alternative to the conventional top-down transfer of technology, where farmers actively engage in the acquisition of knowledge and the implementation of new practices. However, there is a dearth of studies investigating the impact of such participatory extension initiatives on dairy farming in Indonesia. This paper aims to assess whether participation in a farmer discussion group influenced change in the adoption of better dairy farming practices. These discussion groups were established as a component of a dairy project with the aim of promoting the uptake of improved dairy farming techniques in West Java, Indonesia. To analyse the influence, a two-period panel dataset encompassing 160 farmer-participants was used, and a combination of multinomial logit and ordered logit models was applied. The findings of the multinomial logit regression indicate that attendance at these discussion groups did not have a significant effect on the change in the number of practices adopted by the farmers. Instead, factors such as education, dairy-related assets, and milk prices emerged as significant influencers. On the other hand, the results of the ordered logit regression reveal that participation in a farmer discussion group during the COVID-19 restrictions, coupled with dairy assets, played a role in determining the intensity with which dairy practices were utilized. While it may be observed that the discussion groups established within the project did not directly lead to changes in adoption practices, it is worth noting that the long-term benefits to farmers may still materialize if such participatory extension activities continue beyond the project's duration.

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228 Farmland Transaction under the Policy Change in Direct Payment Scheme for Collective Stewardship of Common Property Resources

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Presentation Type:

4. Poster

Keywords:

21. Land and Natural Resource Management

25. Policy Analysis

Paper/Poster Abstract:

This study examines the association of farmland transactions and a Japanese policy change from “Farmland, Water, and Environmental Conservation Improvement Scheme to “Payments for the Enhancement of Agricultural Multi-functionality” in 2014.

To examine this research objective, we used the micro-level data on farmland transactions from 2012 to 2016. Using this micro-level data, we constructed aggregated panel data at the municipality level, as well as panel data at the transaction level.

On the other hand, we construct the policy implementation status based on the statistics of policy implementations at the prefecture level after the recent policy change in 2014. According to this policy change, the levels of efforts in some prefectures have changed significantly. We categorized the prefectures as being in the “responder group” if the increase in the area of farmland covered by the policy payment from 2014 to 2016 surpasses the median for all of the prefectures or otherwise, the “non-responder group.”

Using this dataset, we estimate the association of farmland transactions and a Japanese policy change in 2014 on both the total area and the overall value of farmland transactions.

The result from municipality level analysis shows a significant negative association between the policy change and total transaction area at the municipality level. This suggests that transactions slowed down after the policy change in the municipalities of the responder group, which changed the level of effort on this policy. At the transaction level, however, there was a significant positive relationship between the policy change and the hectares of farmland per transaction. This indicates that farmers in the responder group were more likely to trade larger plots. These results imply that the municipalities in the prefectures that have increased their efforts by the policy change in 2014 are more likely to trade larger plots. On the other hand, the total hectare of the transacted, when aggregated at the municipality level, rather decreased. It can be pointed out that farmers may have increased the transactions before the policy change. The other interpretation is that after the policy change, the accumulation of better farmland has been promoted in the form of transactions with relatively larger plot units.

For further research, it is an issue that needs to be examined whether this phenomenon was a short-term shock or the result of a time-series structural change. Additionally, an analysis including leased land would be expected since the farmland consolidation is largely due to the leased farmland. Another perspective is the decomposition of the policy implementation status at the municipality level.

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229 Farmland Transaction under COVID-19-Related Non-Pharmaceutical Policy Intervention

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Presentation Type:

4. Poster

Keywords:

21. Land and Natural Resource Management

28. Uncertainty and Risk

Paper/Poster Abstract:

The COVID-19 pandemic ushered in an era of unprecedented public health challenges, prompting the implementation of non-pharmaceutical policy interventions globally. In Japan, we experienced 27 years of declining farmland prices, and enforcing these policies brought additional complexities, affecting various economic facets, particularly agriculture. The focal point of this study is how Japan's policies, the State Of Emergency (SOE), interplayed with the ongoing trend of declining farmland prices and transactions.

A previous study suggested that SOE enacted under COVID-19 to prevent infection spread might have lowered Japan's residential and commercial land prices. However, existing studies do not cover agricultural farmland. This study analyzes whether the potential decline in demand for farmland in areas where the additional SOE interventions related to COVID-19 were implemented manifested in the data as a decline in real estate transactions and farmland prices.

Japan’s reliance on voluntary public cooperation rather than enforced mandates provided a nuanced landscape for evaluating additional SOE’s efficacy. The inherent flexibility and reliance on public cooperation in Japan’s approach added complexity to assessing its economic repercussions, particularly in the sensitive agricultural sector marked by a prolonged decline in farmland prices.

Using real estate transaction data in farmland with policy intervention data, we constituted a comprehensive dataset that facilitated an analysis at both aggregate and individual transaction levels. Our dataset, drawing from the resources of the Ministry of Land, Infrastructure, Transport, and Tourism, Japan, encapsulates the years 2018-2020, allowing us to evaluate the pre- and post-COVID-19 policy intervention and their effects on farmland transactions.

Our analysis employed a two-way error component model to discern associations between additional SOE and farmland transactions. We categorized prefectures into treatment and control groups based on the cumulative number of days the SOE - policies aimed at inducing behavioral change to mitigate COVID-19 spread - were implemented.

The data showed no significant association between the total area of farmland transactions and the additional SOE interventions. However, a stark contrast emerges when evaluating the transaction values. A statistically significant negative association between total transaction values and additional policy interventions was uncovered. This result indicates a deceleration in transaction values in areas where COVID-19 policies were additionally implemented.

This result suggests that the demand for farmland may have declined in the areas that received this treatment, which may have been directly related to the decline in farmland prices due to constraints in transaction opportunities for contact avoidance. Other possible explanations could be due to the decline in the demand for food triggered by policy interventions or labor shortages due to immigration restrictions. Whether this phenomenon was a short-term shock or a time-series structural change is an issue that needs to be examined to investigate the impact of policies that tackle the pandemic, taking food security into account.

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230 Uncovering Complex Technology Adoption Pathways for Smallholder Dairy Farmers in Indonesia

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University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Many empirical studies commonly define adoption as a binary process, focusing solely on adoption and non-adoption. However, this simplistic approach fails to capture the intricate nature of adoption decisions, leading to potentially misleading conclusions and recommendations for increasing adoption rates. Intervention program is designed to boost adoption rates among farmers involves technology dissemination, providing information on technology usage and its benefits. Extensive resources have been invested in extension programs, particularly in developing countries, aimed at increasing adoption rates among smallholder farmers. However, little is known about farmers' decisions following the conclusion of these interventions—whether they continue to adopt or dis-adopt the introduced technologies.

This study investigates the adoption pathways of dairy farming technologies among smallholder dairy farmers in Indonesia. We adapt the adoption pathways framework developed by de Oca Munguia et al. (2021) to conceptualise adoption as a complex process. Leveraging a panel dataset comprising 480 dairy farm households in West Java, Indonesia, spanning from 2017 to 2021, our research tracks adoption decisions from the baseline (2017-2019) to the endline (2021). This approach encompasses farmers' awareness, initial adoption (trial), and continued adoption statuses, resulting in diverse adoption status in the endline, including never aware, aware but never tried, dis-adoption after tryout, never re-adopt, dis-adopt, new adopters (continued adoption after tryout), re-adopt, and always adopt.

Between the baseline and endline, 38.3% of the sample participated in an intervention (beneficiaries) consisting of farmers' discussion groups aimed at increasing technology awareness and disseminating knowledge about technology benefits. This study examines how the adoption pathways of the beneficiaries differ from those who did not participate (non-beneficiaries) and compares the reasons for adoption and non-adoption. Additionally, we investigate the socio-economic characteristics of farmers in both sub-groups since these factors may also be associated with farmers' decisions. This study focuses on three dairy farming technologies that aims to increase milk production and hygiene including teat dipping after milking, high protein concentrates (16% protein content or higher), and forage conservation.

Preliminary results reveal that among beneficiaries, a higher proportion (46.2%) adopted the teat dipping technology after the intervention, compared to high-protein concentrates (17.4%) and forage conservation (13.6%). Interestingly, by the end of the study, 50-60% of beneficiaries who tried teat dipping and high-protein concentrates discontinued these practices, while the rest became new adopters. Conversely, for forage conservation, only 15% of those who tried the technology became new adopters. We explore the primary reasons for dis-adoption post-trial, identifying cost as a barrier for high-protein concentrates and forage conservation, while the complexity of teat dipping after milking deterred adoption.

This study provides valuable insights for promoting technology adoption by tailoring interventions based on the unique characteristics of each technology, whether in terms of information dissemination, capital provision, or input accessibility. The findings will offer practical implications for enhancing sustainable dairy farming practices among smallholder farmers in Indonesia and other developing economies seeking to increase the adoption of dairy farming technologies and practices among their smallholder dairy farmers.

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268 Climate econometrics

German Puga, Kym Anderson

Wine Economics Research Centre, School of Economics and Public Policy, The University of Adelaide, Adelaide, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

19. Impact Assessment

Paper/Poster Abstract:

Climate change adaptation strategies rely on assessments of expected climate impacts and risks. Therefore, it is important to use suitable methodological approaches when analysing the potential impact of climate change projections. This paper aims to provide recommendations on how best to use econometric methods to quantify climate impacts.

We first compare what can be done with three types of data: cross-sectional, time series, and panel data. Panel data methods are usually preferred due to their strong identification properties. They allow one to estimate the impact of weather on an economic output, and in a subsequent step, to use these estimates to quantify the potential impact of climate change projections. We explain the advantages and potential use of this framework, as well as its challenges. These challenges include possible model specification issues and the way of dealing with the limitation of using short-run estimates of weather shocks (the model's estimates) to quantify long-run impacts of changes in climates.

Then, we compare the strengths and weaknesses of econometric methods to those of other methods, such as modern machine learning models, methods based on expert opinion, and biophysical models. We argue that it is usually possible to get a better understanding of climate risks when combining studies that use a variety of these methods.

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280 Well-being and life satisfaction in New Zealand's primary industry

Pike Stahlmann-Brown

Manaaki Whenua - Landcare Research, Wellington, New Zealand

Presentation Type:

4. Poster

Keywords:

11. Ecological Economics

14. Environmental Economics

Paper/Poster Abstract:

During winter 2023, the representative Survey of Rural Decision Makers collected information on well-being (via the widely used WHO-5 wellbeing index) and life satisfaction (via Cantril's Ladder) for approximately 5,000 New Zealanders engaged in primary industry. In this paper/poster, I describe well-being and life satisfaction by industry, highlighting the deleterious effects of dairy farming these outcomes. I then use the 2021 wave of the same survey to show that rural well-being has deteriorated somewhat over these two years. Next, I used a representative survey of 2,000 urban residents (also collected during winter 2023) to show that well-being and life satisfaction are higher in rural areas than in urban areas.

The 2023 Survey of Rural Decision Makers also recorded measures of self-efficacy and connectedness to nature using standard psychological inventories. I show that farmers, foresters, and growers with higher self-efficacy and connectedness to nature report both higher well-being and higher life satisfaction. Moreover, whereas most survey participants project higher life satisfaction five years into the future, survey respondents with higher self-efficacy and

connectedness to nature anticipate disproportionately higher life satisfaction in the future. All of these results are robust to controls for age, gender, ethnicity, education, location, and profitability as well as industry.

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291 Economic Impact of Climate Change Adaptation Strategies in Australian Agriculture

Abdulrasheed Zakari

University of Wollongong, Wollongong, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

12. Econometric Modelling

14. Environmental Economics

Paper/Poster Abstract:

Climate change is reshaping the agricultural landscape, posing substantial challenges to farmers worldwide. In the context of Australian agriculture, a sector particularly vulnerable to climate variability, this empirical study aims to comprehensively investigate the economic impact of various climate change adaptation strategies. Grounded in real-world data and employing rigorous econometric methods, the research provides valuable insights into the effectiveness of adaptation measures, their economic viability, and the factors influencing their adoption.

The study leverages a robust dataset encompassing diverse agricultural regions across Australia, spanning multiple years. Using advanced statistical models, including regression analysis and econometric simulations, the research evaluates the economic performance of farmers implementing different adaptation strategies. These strategies range from precision agriculture technologies, drought-resistant crop varieties, and improved water management practices to altered planting schedules and diversified cropping systems.

Key indicators such as crop yield, production costs, farm revenue, and overall profitability serve as metrics to assess the economic impact. By comparing these parameters between farms employing climate change adaptation strategies and those following conventional practices, the research quantifies the financial benefits and risks associated with adaptation. Additionally, the study delves into the socio-economic factors influencing the adoption of these strategies, exploring the role of government policies, access to financial resources, and farmers' perceptions of climate change.

Furthermore, the research scrutinizes the long-term economic sustainability of these adaptation strategies. By incorporating climate projections and economic forecasts, the study models future scenarios to predict the financial resilience of farms under changing climate conditions. This forward-looking approach provides valuable insights for policymakers, enabling them to formulate adaptive agricultural policies that are not only effective in the present but also resilient to future climate challenges.

The findings of this empirical study hold significant implications for both farmers and policymakers. For farmers, the research offers evidence-based guidance on choosing adaptation strategies that align with their specific contexts,

optimizing their economic outcomes while mitigating climate risks. Policymakers can utilize the results to design targeted support programs, subsidies, and incentives, fostering the widespread adoption of climate-smart agricultural practices. Ultimately, this study contributes to the empirical understanding of climate change adaptation in agriculture, serving as a foundation for evidence-based decision-making and sustainable agricultural development in the face of a changing climate.

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329 Climate Change, Agricultural Prices and Civil Conflict: Evidence from Cloud Cover

Hemant Pullabhotla, Prasad Sankar Bhattacharya

Department of Economics, Deakin University, Melbourne, Australia

Presentation Type:

4. Poster

Keywords:

8. Climate Change

10. Development Economics

Paper/Poster Abstract:

In this paper, we investigate how climate change events could incite civil strife through abrupt changes in agricultural prices across a number of countries in the world. To measure the climate change, we exploit a novel geo-referenced dataset on the magnitude of cloud cover which provides very detailed (every hour each day) information of cloud cover and other relevant temperature gauge data at the observation station level spanning over 15000 weather stations across the world. The cloud cover data is sourced from the Integrated Surface Dataset of the National Oceanic and Atmospheric Administration, USA. The conflict event data is also geo-referenced from the well-respected Armed Conflict Location & Event Data (ACLED) Project. The agricultural prices data are downloaded from the FAO Food and Agriculture Statistics.

Our paper complements extant studies like Hsiang, Burke and Miguel (2013) which establishes that a standard deviation increase in temperature towards warmer weather or more extreme rainfall leads to the rise of frequency of civil conflict by 14% (median value). The magnitude of cloud cover has been employed by Cortes, Duchin and Sosyura (2016) and Chhaochharia, Kim, Corniotis and Kumar (2019), amongst others, to discern behavioural pattern in financial decision making. However, we are the first in analysing how changes in cloud cover could be linked to changes of temperature or rainfall, thus providing a more nuanced measure of climate change events.

In another strand of literature, papers such as Bazzi and Blattman (2014) finds that export price shocks have no statistically significant bearing on conflict onset in developing countries but argues that rising prices could explain the continuation of conflict. In individual country setting, Dube and Vargas (2013) and Angrist and Kugler (2009) finds that fluctuations in prices of coffee and cocoa, have causal impact on civil violence in Colombia. In these studies, the price fluctuations were exogenous. We provide evidence that the agricultural price fluctuations are linked to changes in cloud cover. Thus, focusing on the cloud cover helps us to pinpoint one casual mechanism.

In Africa and Iraq, the extant research also shows that extreme weather events increased the likelihood of joining rebel forces due to decline in economic productivity (Hsiang, Burke and Miguel, 2013). Our study explicitly links how changes in cloud cover is exacerbating such extreme weather events.

338 The assessment of climate change policies through a general equilibrium model: An application to Uruguay

Francisco Rosas

Universidad ORT Uruguay, Montevideo, Uruguay

Presentation Type:

4. Poster

Keywords:

7. Carbon and Nature Markets

8. Climate Change

25. Policy Analysis

Paper/Poster Abstract:

Countries present their Climate Change Long Term Strategies (LTS) before the United Nations Framework Convention on Climate Change (UNFCCC), which consist of projecting a set of long-term scenarios of CO2 emissions mitigation aligned with global and domestic targets, in particular, those stated in their Nationally Determined Contributions (NDC). Uruguay submitted its 2050 LTS including a CO2-neutral scenario, which involves the objective of achieving a CO2 net-zero emissions by 2050, requiring a significant mitigation and sink effort in different areas of the economy. It requires a sharp reduction in fossil fuels demand, an increase of electricity demand, a moderate increase in forestry area driving CO2 sinks, and a moderate increase in livestock productivity reducing the CO2 emissions per unit of output.

The objective of this study is to analyze the impacts of this scenario on some key macroeconomic variables. We use a general equilibrium model including agriculture and energy which are the most relevant sectors for the LTS. We follow the model by Fullerton and Ta (2019) who show that this model generates comparable results to those yielded by a large computable general equilibrium model. Importantly, we propose some extensions relevant for climate policy analysis, i.e., the specification of an additional sector (timber production) and input (agricultural land). We solve the model analytically and compute the impact on GDP, prices and quantities of inputs and outputs by sector, quantities and prices in the labor market, welfare, and CO2 emissions by sector.

Our model has five sectors (households, electricity, fossil fuels, timber, and a composite good representing the remaining goods and services of the economy). Inputs are the factors capital, labor and agricultural land, as well as outputs from the electricity, fossil fuels and timber sectors that are used as inputs in the remaining sectors. Households maximize a Cobb-Douglas utility function subject to a budget restriction. Electricity, fossil fuels, timber and the composite good sector maximize profits given a Cobb-Douglas production function and taking output and inputs prices as exogenous. Government net revenues come from taxes or subsidies on labor, fossil fuels, electricity purchases and forestry land purchases in the timber sector. Except from labor, all these taxes or subsidies are linked to the CO2 emissions from the corresponding activity.

We calibrate the model to the Uruguayan economy in 2019. We implement the LTS CO2 neutral scenario by specifying a carbon tax on fossil fuel purchases, a subsidy on electricity purchases, a subsidy on land purchases for the timber sector, and a positive shock in the total factor productivity of the composite good sector to replicate the livestock productivity increase. Results show that the LTS CO2 neutral scenario implies a cumulative impact on GDP level though 2050 of -0.01%. If we assume it is equally distributed over time, it implies that the GDP growth rate

remains almost the same than in the business-as-usual the scenario. Therefore, this LTS, which implies drastic changes in the energy supply composition, implies mild changes in GDP but strong reductions on CO2 emissions.

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350 Comparing Climate Pledges and Eco-Taxation in a Networked Agricultural Supply Chain Organization

Arnaud Dragicevic[1,2], Jean-Christophe Pereau[3]

[1]Chulalongkorn University, Bangkok, Thailand. [2]CIRANO, Montreal, Canada. [3]Bordeaux School of Economics, Bordeaux, France

Presentation Type:

4. Poster

Keywords:

14. Environmental Economics

24. Mathematical Programming

Paper/Poster Abstract:

This paper examines the effectiveness of climate pledges and eco-taxation as strategies for mitigating climate change within a networked agricultural supply chain organization. We utilize variational inequality techniques within a multicriteria decision-making framework and validate our theoretical findings through numerical simulations using a machine learning augmented algorithm. By employing this approach, we are able to situate a climate pledge initiative, such as the Agricultural Sector Roadmap to limit global warming to 1.5 degrees Celsius, within the broader context of the entire agricultural sector. Our results demonstrate that environmental taxation emerges as the most effective approach for addressing climate change. Eco-taxation leads to a 57.87% reduction in global emissions, whereas climate pledges only account for a 20.59% reduction at the same level of production. Furthermore, eco-taxation results in a 45.68% greater reduction in emission intensity compared to climate pledges. In contrast to climate commitments, an eco-fiscal policy is capable of achieving the objectives established by the European Union.

Parallel 6A. Special Session - "Carbon farming on pastoral and forest land, science, policy and economics" (Part B)

10:40 - 12:20 Friday, 9th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Jeff Connor

Growing recognition of climate change continues to spawn diverse national, sub-national and industry GHG emissions reductions initiatives. The broad array of schemes includes cap and trade, payment for emissions reductions and hybrid systems. offset credits that allow above cap emission from one source by paying another source for and equal amount of emissions reduction or sequestration feature in several schemes (e.g. Australian, Russian, and Californian emissions reductions policies and national GHG accounts). Methods for land use change projects that increase forest cover and carbon storage are the largest single source of offsets in all these countries and in voluntary credit registers. This includes avoided deforestations, plantation timber forest management, active forest planting and assisted natural regeneration methods. Whilst forest offsets play a big role in emissions reductions policies both peer reviewed journal and grey literature paint a bifurcated picture of their effectiveness and benefit. Some studies extoll benefits such as environmental co-benefits and farm income diversification. In contrast, a number of critics question whether forest offset achieve abatement equivalent to the above cap emissions that they allow.

This extended special session includes presentations on latest science, policy and economics evaluating carbon offsets for Australian pastoral and farmland.

Presentations include:

- 10:40-12:20 - 25 minute (Waters, Moore), 30 minute Gao) presentations inclusive one minute intro – 2 minutes for questions

- 10:40-11:05 Climate mitigation through the retention of native vegetation is constrained by agricultural production trade-offs, Dr Cathleen Waters, Head of Science, GreenCollar

- 11:05-11:30- Ensuring integrity in assisted natural regeneration projects with the new ERF Integrated Farm Land Management method, Dr Tim Moore,Chief of Science and Strategy, Regenco

- 11:30-12:00 – Land degradation resilience and biodiversity co-benefits of HIR in western NSW. Yuan Gao, PhD Candidate, University of South Australia

- 12:00-12:20 Panel Discussion with presenters

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242 Carbon farming on pastoral and forest land, science, policy and economics

jeffery connor[1], Courtney Regan[2], Tim Moore[3], Oscar Cacho[4], Yuan Gao[1], Cathleen Water[5], Don Butler[6], megan Megan Surawski[7]

[1]University of South Australia, Adelaide, Australia. [2]CSIRO, Adelaide, Australia. [3]Regenco, Adelaide, Australia. [4]University of New England, Armidale, Australia. [5]DPI, dubbo, Australia. [6]ANU, Canberra, Australia. [7]Emissions Reduction Fund, Canberra, Australia

Presentation Type:

2. Special Session

Keywords:

7. Carbon and Nature Markets

21. Land and Natural Resource Management

Parallel 6B. Special Session - "Understanding the Drivers of Successful and Inclusive Rural Transformation in the Asia-Pacific Region"

10:40 - 12:20 Friday, 9th February, 2024
Location Cinema, Kambri Cultural Centre
Dong Wang, Yu Sheng

Theme: Rural transformation is a process of comprehensive societal change which is essential to global economic growth and social development. Nowadays, half or more of the population still remains in rural areas of developing countries, which account for a large proportion of people living in poverty globally. To cope with this stern challenge and achieve the United Nation Sustainable Development Goals (UNSDG), a deeper and faster transformation of the rural economy is of great necessity. However, the process of rural transformation in Asian developing countries is far less studied than it deserves and the origins of the differences in experiences by country and region are unclear.

Over the past decade, there have been many studies carried out by researchers from the developing countries in the Asian and Pacific region, with the aim to better understand the nature, drivers, and consequences of rural transformation in the region. Sponsored by The Australian Centre for International Agricultural Research (ACIAR), a joint project had been carried out for the past two years to explore the path for rural transformation and its underlying determinants in four Asian developing countries including China, Pakistan, Bangladesh, and Indonesia. A set of essential research outcomes in the aspects of the patterns, drivers and impacts of rural transformation have been found.

Based on previous achievements, this thematic session is for delivering the latest research outcomes from the above ACIAR funded project of inclusive rural transformation. In this thematic session, we will present the recent findings from the related researches. The purpose is not only to share the research outcome on the topic about exploring the impacts of policy tools such as institutions, policies and investment (IPIs) on the successful rural transformation in the Asia and

Pacific region, but also to exchange ideas with other academic researchers who are interested in the related research.

Format: The symposium will be organized in a hybrid way, which include invited speakers to present their research papers, the comments from invited discussants, and open-floor discussion. The session is designed to take up to 90 minutes in total, and host 4 presentations with each presentation taking about 15 minutes plus 5 minutes for comments/discussion from the invited discussants. At the very end of the session, a 10-minute period will be used for open discussion and questions for all presenters.

Presentations include:

- Nexus between gender inclusiveness and rural transformation: What the literature tells us (Maria Fay Rola-Rubzen)

- Does Irrigation Promote Rural Transformation? New Evidence from the Rural Household Data in China (Pengfei Shi)

- Linkages between gender and rural transformation in Indonesia (Rika Reviza Rachmawati)

- Rural Transformation, Income Growth and Poverty Reduction: A Comparison of China, Bangladesh, Indonesia and Pakistan (Dong Wang)

Presenters Details:

- Yu Sheng, Professor and Deputy Director, China Centre for Agricultural Policy, Peking University, yu.sheng@pku.edu.cn

- Maria Fay Rola-Rubzen, Associate Professor and Deputy Director, Center for Agricultural and Environment, The University of Western Australia, fay.rola-rubzen@uwa.edu.au

- Dong Wang, Post-doctoral Fellow, Crawford School of Public Policy, Australian National University, D.Wang@anu.edu.au

- Rika Reviza Rachmawati, Research Center for Behavioral and Circular Economics, National Research and Innovation Agency (BRIN)

- Pengfei Shi, Assistant Research Fellow, Research Center for Rural Economy, Ministry of Agriculture and Rural Affairs, shipf.16b@igsnrr.ac.cn

- Mohammad Alam, Dept. of Agribusiness and Marketing, Faculty of Agricultural Economics and Rural Sociology, Bangladesh Agricultural University (BAU)

Invited Discussants

- Chunlai Chen, Professor, Crawford School of Public Policy, Australian National University, Chunlai.chen@anu.edu.cn

- Christopher Findlay, Professor, Crawford School of Public Policy, Australian National University
Christopher.Findlay@anu.edu.au

- Jikun Huang, Professor at School of Advanced Agricultural Sciences and Director of China Center for Agricultural Policy (CCAP), Peking University.
Jkhuang.ccap@pku.edu.cn

Short abstracts for the presentations

Linkages between gender and rural transformation in Indonesia

Helena Juliani Purba[1*], Rika Reviza Rachmawati[1], Aldho Rizki Irawan[2], Maria Fay Rola-Rubzen[3], Erwidodo[4], Tahlim Sudaryanto[1], Saktyanu Kristyantoadi Dermoredjo[4]

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Abstract

Indonesia has been experiencing rural transformation in the past three decades. While women play a vital role in rural transformation in Indonesia, the gap in gender equality persists. This research examines the empirical relationship between gender and rural transformation in Indonesia. Here, we explore several factors, including the share of non-farm labor in rural areas, the share of non-agricultural GDP, women's income per capita, men's income, women's access to health care, women's access to education, irrigation, homeownership, access to technology, access to electricity, rice productivity, and access to clean water, using longitudinal data from the National Labor Force Survey (SAKERNAS). We used panel data regression analysis of 34 Indonesian provinces for three waves (2010, 2015, and 2020). The findings showed that improving women's access to education and healthcare affects their per capita income. However, women's total income remained lower than men's, showing that income disparities between men and women continue to perpetuate. Access to electricity and clean water was also found to be a key driver of women's GDP growth in the non-agricultural sector. Concentrating on women's access to health and education is also important in boosting women's roles in increasing non-agricultural GDP in Indonesia. Moreover, strengthening rural infrastructure will indirectly boost rural transformation.

Keywords: rural transformation, gender, inequality index, rural labor

Does Irrigation Promote Rural Transformation? New Evidence from the Rural Household Data in China

Pengfei Shi

Abstract China has witnessed rapid rural transformation in the past few decades. Within the framework of institutions, policies and investments (or IPIs), this paper is to estimate the effect of irrigation on path of rural transformation (both non-bulk commodities in farm crops and non-farm employment in rural labors). Particularly, the sequential impact of irrigation is evaluated for the first time. The results are as follows: Irrigation has promoted the production of bulk commodities (e.g., grain, cotton, oil and sugar crops) in the early stage of rural transformation, and then played an increasingly important role in producing non-bulk commodities (or high-value agricultural crops, e.g., vegetables, fruits and horticulture) in the middle and later stage of rural transformation. The similar results are also obtained from rural labor employment in non-farm. That is more rural labors releasing for non-farm employment with rising agricultural productivity. The paper concludes with a set of policy implications that the Chinese Government can take to foster rural transformation in the future.

Keywords: irrigation, rural transformation, high-value agricultural crops, non-farm employment, sequential effect, China

Rural Transformation, Income Growth and Poverty Reduction: A Comparison of China, Bangladesh, Indonesia and Pakistan

Dong Wang, Chunlai Chen and Christopher Findlay

Abstract: Rural transformation is an important phenomenon occurring in many developing countries. It can result in an increase in rural income as well as reduce the poverty in rural areas. This paper examines the relationship between rural transformation, per capita rural income and poverty reduction happened in four Asian developing countries: China, Bangladesh, Indonesia and Pakistan. We measure rural transformation as the share of high-value agriculture and the share of non-farm employment. By using the Fixed-effect model, we found that the rural transformation had indeed increased the per capita rural income and reduced the poverty in those countries, though the degree varies in different stages and different regions. Therefore, facilitating rural transformation can be used as a policy tool to promote income growth and reduce the poverty.

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275 Understanding the Drivers of Successful and Inclusive Rural Transformation in the Asia-Pacific Region

Yu Sheng[1,2], Dong Wang[2], Maria Fay Rola-Rubzen[3], Rica Reviza Rachmawati[4]

[1]Peking University, Beijing, China. [2]Australian National University, Canberra, Australia. [3]The University of Western Australia, Perth, Australia. [4]Research Center for Behavioral and Circular Economics, Jakarta, Indonesia

Presentation Type:

2. Special Session

Keywords:

10. Development Economics

25. Policy Analysis

Parallel 6C. Contributed Paper Session - Mathematical Programming

10:40 - 12:20 Friday, 9th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre Jack Dorries

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30 Analysis of risk factors in agritourism enterprises using GAMLSS

Tho Quang Anh Nguyen[1], Huu Nhuan Nguyen[2], Dinh Thao Tran[2], Chi Truong[3]

[1]Vietnam National University of Agriculture, Hanoi, Vietnam. [2]vietnam national university of agriculture, hanoi, Vietnam. [3]Macquarie University, Sydney, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

28. Uncertainty and Risk

Paper/Poster Abstract:

Agritourism plays an important role in diversifying and raising the income of households in developing countries, especially rural households. However, there is currently a lack of understanding about the factors that affect the risks in agritourism enterprises. In this research, we examine the factors that determine the performance as well as the risk related to agritourism enterprises. We do so by using a comprehensive survey data set collected from the 2021 Economic Census of the General Statistics Office of Vietnam that covers 13282 agritourism accommodation businesses in 63 provinces, and the generalized additive model for location, scale, and shape (GAMLSS) model. We find that the GAMLSS model fits data much better than the general linear regression models frequently used in the literature. The results show that labour, firm size, and the percentage of female employees in enterprises positively influence revenue. This suggests that enterprises with a diverse workforce and large firm size are more likely to experience higher revenue. We also find that the factors that affect revenue risk include company size, the percentage of female employees in enterprises, and tourism demand. These results have implications for the mechanisms to manage the risks of agritourism enterprises.

349 Assessing the Impact of Payments for Environmental Services on a Bioeconomic Supply Chain Equilibrium

Arnaud Dragicevic[1,2], Jean-Christophe Pereau[3], Serge Garcia[4]

[1]Chulalongkorn University, Bangkok, Thailand. [2]CIRANO, Montreal, Canada. [3]Bordeaux School of Economics, Bordeaux, France. [4]INRAE, Nancy, France

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

24. Mathematical Programming

Paper/Poster Abstract:

This study explores the effectiveness of Payments for Environmental Services (PES) in addressing both climate change and biodiversity loss within the framework of bioeconomic supply chain management. Leveraging variational inequality methods within a multi-criteria decision-making framework, we substantiate our theoretical claims through numerical simulations executed via an optimized machine learning algorithm. Our findings indicate that reductions exceeding 50% in both greenhouse gas emissions and biodiversity loss are achievable. While PES are integral to this success, they are insufficient on their own. A synergistic approach that combines a moderate decrease in production levels due to the economic decoupling effect, heightened environmental awareness among stakeholders, and targeted monetary incentives is essential to realize such substantial reductions. Thus, PES are necessary but not sufficient to achieve a meaningful reduction in ecological footprint. The adoption of sustainable practices and the improvement of resource efficiency are equally crucial.

41 Farm profit and soil organic carbon stocks associated with grazing management in New South Wales

My Pham-Kieu[1], Matthew Harrison[1], Stephen Ives[1], Warwick Badgery[2]

[1]University of Tasmania, Launceston, Australia. [2]Department of Primary Industries, New South Wales, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

24. Mathematical Programming

Paper/Poster Abstract:

Grazing management has been promoted widely to improve soil carbon sequestration on sheep farms. There is a need to find grazing management approaches that obtain benefits in both economic and environmental dimensions. The study, thus, was aimed to investigate trade-offs between farm-gate profit and soil organic carbon (SOC) stocks associated with implementation of grazing management. Data was sourced from a long-term field experiment in New South Wales, which examined impacts of different grazing treatments (combinations of stocking rates and rest durations) on SOC stocks and livestock production. Seven grazing treatments included continuous grazing-high stocking rate, continuous grazing-low stocking rate, flexible, fast rotation-high stocking rate, fast rotation-low stocking rate, slow rotation-high stocking rate and slow rotation-low stocking rate. A mixed-binary nonlinear programming model was developed, and findings have been found that the most appropriate grazing management varied depending on the objective; profit, SOC stocks or a combination of both. If profit was the key objective, a fast rotation (short resting duration) - high stocking rate was optimal. In contrast, if the aim was to maximise SOC accrual then a slow rotation (longer resting period) - high stocking rate was found to be optimal. If the objective was to maximise both SOC stocks and profit, there was a difference between adoption of only one and multiple grazing treatments. For implementation of only one grazing treatment, a slow rotation-high stocking rate was preferable, although this treatment would not be an optimal choice in the long run due to a decrease in the extent of SOC changes. Adoption of multiple grazing treatments on farm brought greater SOC economic income and total profit than implementation of only one treatment since its optimal choice was flexible grazing, slow rotation-high stocking rate, and fast rotation-high stocking rate. The results indicated that while rainfall and temperature significantly impacted SOC stocks, these variables did not alter farmer decisions with respect to profit or SOC stocks; rather, carbon prices, grazing area and sequestration period were driving factors of production and profit outcomes. In the future, there should be increases in carbon price to encourage more farms to increase SOC stocks. Implementation of multiple grazing treatments on farm would facilitate this goal. Besides, intervention combinations, such as carbon removals and methane reduction could also be considered to maximize reduction of greenhouse gas emissions on farm.

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182 A Quadratic Compromise Risk Programming Model (QUADCOMPRO) for income-risk trade-off decision making under climate variability.

David Ahiamadia, Thiagarajah Ramilan, Peter R. Tozer

Massey University, Palmerston North, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

24. Mathematical Programming

Paper/Poster Abstract:

Due to climate variability in northern Ghana, making decisions about which crops to grow without considering the associated risks can result in unrealistic income targets. Smallholder farmers in the region rely on rainfed agriculture, which makes them vulnerable to climate variabilities such as fluctuating temperatures and precipitation patterns. In the face of climate uncertainty, many risk-averse smallholder households are willing to compromise by accepting lower returns in exchange for more stable income. Given the diverse nature of smallholder-based production systems, capturing the risk variability and understanding the income-risk trade-off for the different farm types in the study area is crucial. In addition, the non-separability of consumption and production further amplifies the effect of risk on income and household expenditure. To quantify the impact of income-risk trade-off decision-making under climate variability, a Quadratic Compromise Risk Programming Model was developed from three theories: Compromise programming, Quadratic programming, and Linear expenditure system. The model development process involved the

Aqua-crop model to simulate climate-sensitive yield variability; Africa RISING Survey for household resource endowments; and FAO, and World Food Programme data for prices. The model generates an income-risk frontier to identify the most suitable crop combinations for farm types in the study area. Also, farm-type wealth effect on risk and crop choices are determined by the weight farm types attached to their risk and income objective. The findings indicate that to remain resilient to climate variability, relatively poor households should focus on cultivating more sorghum (1.75 Ha) with groundnut (0.4 Ha) and maize (0.1 Ha), while wealthier households grow more groundnut (2.43 Ha), plus sorghum (1.71 Ha), and maize (0.66 Ha). Moderately wealthy farmers should cultivate more rice (1.74 Ha), with groundnut (0.20 Ha), sorghum (0.16 Ha), and maize (0.10 Ha). Our approach is very useful for household-level decision-making under climate variability, considering heterogeneity in a developing country context.

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131 A mathematical model to support coconut wood harvesting and veneer manufacturing decisions in Fiji

Jack Dorries[1], Tyron Venn[1], Robbie McGavin[2]

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Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

12. Econometric Modelling

Paper/Poster Abstract:

Coconut palms are integral to the lives of millions of farmers throughout the Pacific region, however, in many of these countries, coconut plantations are characterised by the prevalence of low-productive senile palms over the age of 60. The high levels of senile palms have had negative impacts on income and employment, food security and national trade throughout the region. Landholders have often been reluctant about replacing senile palms due to the high costs of removing the palms and replanting the areas with new crops, the insecure property rights in many coconut-growing areas, and generally high status-quo bias among smallholder coconut farmers in the region. To encourage senile palm replacement, many government and international aid programs have been trialled, however, these programs have often been ineffective at reducing the high population of senile coconut palms due to lack of funding and long-term incentives and poor infrastructure and logistics.

An alternative approach is to create generate private sector demand for senile coconut palms that would minimise costs to taxpayers and international aid agencies. Since market-based approaches are driven by long-term corporate goals, rather than short term public-sector projects, a market for senile palms could facilitate long-term largescale senile palm removal, encourage the establishment of new, productive crops, and support rural development goals throughout the region. The forest products market could be such a market, whereby senile coconut palms are purchased by log processing facilities to provide feedstock for the manufacture of veneer and veneer-based engineered wood products (EWPs). Of all the countries within the Pacific, Fiji is perhaps the most likely to benefit from harvesting senile coconut palms for wood manufacture since 60% of all coconut palms are senile, and mills have reported difficulties procuring logs and has had to increasingly import wood products to support the domestic industry.

Previous research has demonstrated that veneer can successfully be produced from senile coconut palms and can offer a feasible alternative to conventional wood in many structural and aesthetic applications. However, the financial performance of coconut veneer and EWP manufacture is untested and has hindered commercialisation. To inform coconut veneer manufacturing decisions in Fiji, a spatial mathematical model has been developed. The model is designed to help support strategic decisions of the wood product industry about processing scale and facility location, as well as tactical decisions about log procurement. Although the model is demonstrated in Fiji, the results of this case study are intended to highlight how a coconut wood value-chain can reduce widespread coconut senility and offer an alternative to largescale government-led intervention programs.

Parallel 6D. Contributed Paper Session - Agribusiness

10:40 - 12:20 Friday, 9th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre Richard Volpe

92 Impacts of marketing contract choices on technical efficiency: Insights from citrus production

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Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

3. Agricultural Production

Paper/Poster Abstract:

The stable connection between smallholder farmers and markets is essential to reducing risks and uncertainties of product sales and increasing rural incomes. However, in many developing countries, smallholder farmers face various barriers (e.g., inadequate information on output markets, high transaction costs, and market failure) when entering domestic and international markets. Marketing contracts are one of the effective ways to link farmers to markets. Specifically, marketing contracts allow buyers and sellers to pre-agree on terms such as the price, quantity, timing, quality standards, and technical requirements for the products, which is conducive to lowering transaction costs, stabilizing marketing channels, reducing uncertainty with sales, and alleviating market failure. Meanwhile, farmers may adjust their production behaviour in advance to meet the product attributes market buyers require. Therefore, in addition to influencing farm income, marketing contracts can also affect farmers' production behaviour

and farming efficiency. Nevertheless, little is known about whether marketing contract users are more efficient in farm production than non-users. This study contributes to the literature by examining the impacts of marketing contracts (written contracts, verbal contracts, and no contracts) on technical efficiency, taking citrus production in Jiangxi Province, China, as an example. We first use a stochastic production frontier (SPF) model to calculate the technical efficiency scores of citrus production at the individual level. Then, we use a multinomial endogenous switching regression (MESR) model, which mitigates selection bias issues arising from observed and unobserved factors, to estimate the treatment effects of marketing contract choices on technical efficiency. The SPF model estimates show that the mean technical efficient score of citrus production is 0.626, ranging between 0.021 and 0.892. The MESR model estimates reveal that the average technical efficiency scores for written and verbal contract users are 14% and 2% higher than those for no-contract users. The average technical efficiency score for written contract users is 8% higher than for verbal contract users. Our findings highlight the importance of helping citrus farmers use marketing contracts when selling their products, especially formal written contracts, which can help increase technical efficiency and farm productivity.

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111 Global Agri-FinTech Development: A Systematic Literature Review

Joko Sustiyo, Risti Permani

The University of Queensland, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

2. Agricultural Finance

Paper/Poster Abstract:

The global financial technology (FinTech) market continues to grow at an estimated value of US$169.32 billion by 2023 and it is predicted to reach US$1.5 trillion by 2030. However, there are concerns regarding the level of FinTech utilisation in the agriculture sector (Agri-FinTech). The Tracxn report shows there were only 219 Agri-FinTech companies in the world in2023, significantly fewer than 126,488 FinTech firms. Despite the increased interest in FinTech applications in agriculture, there are limited studies that systematically review the nexus between agriculture, finance, and technology in the sector. Most existing studies focus on either agricultural technology, access to agricultural finance, FinTech in specific regions (such as Sub-Saharan Africa) or countries, or specific FinTech types such as mobile payments. Therefore, this study aims to synthesise and analyse global research on Agri-Fintech development. Using the PRISMA framework, the study reviews the historical development, drivers, outputs, and agricultural and development impacts of Agri-FinTech. Central to this review is identifying gaps in the literature and potential areas for future studies. Results from this study inform factors influencing the adoption of FinTech including farmer, farm and sectoral and regional characteristics, the various types of FinTech and their different attributes, the impacts of Agri-FinTech on sustainable agri-food system development, and policy recommendations to support the Agri-FinTech development at the sectoral, regional, and national levels.

Keywords: financial technology, Indonesian agriculture

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301 Economics of food loss mitigation: Making loss prevention worthwhile

Nauman Ejaz[1], Thilak Mallawaarachchi[2,3]

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Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

28. Uncertainty and Risk

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

Much of the fruits and vegetables grown by farmers never make to the market and a fair proportion of fresh produce brought to markets never gets eaten. In this paper we examine factors influencing the rates of utilisation of fresh produce along the chain from farm to retail in Pakistan and Sri Lanka, focusing on market production of mangoes and tomatoes. The paper focuses on understanding food loss from an economic perspective; analysing efforts to measure food loss; and developing a state-contingent modelling framework to assess economic risks and opportunities in promoting food loss mitigation in developing economy contexts. Potential for cost effective recovery through improved product differentiation and market segmentation is examined using export-oriented production of mangoes in Sri Lanka and improved field practices and packaging in Pakistan as case studies.

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296 The Crowdy Three - Clarifying outcomes and reviewing trade-offs for inclusive value chain interventions for smallholder producers.

Daniel Hill[1], Daniel Gregg[2,3]

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Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

Participating smallholder farming households within agricultural value chain interventions are often able to derive value through higher incomes or new market opportunities. However, these value chains have often been shown to be exclusionary for certain households, offer diminishing or unfavourable terms, or impact broader agrarian systems due to in higher prices, reduced food security and displaced employment. Incomplete conceptualisations of what outcomes are to be achieved by inclusive value chains for rural development means that adverse outcomes are rarely investigated or articulated.

This paper seeks to achieve two objectives. The first objective is to establish an outcomes-based framework for smallholder value chains as rural development tools, which we define as the simultaneous achievement of inclusion, value, and scale/financial sustainability. Using this outcomes framework, the second objective is a scoping literature review of buyer driven and producer driven agricultural value chain assessments to identify instances where trade-offs between inclusion, value, and scale are identified and whether value chains are achieving meaningful rural development outcomes. Our review encompasses 344 case studies in 283 peer reviewed empirical and qualitative papers since 2003.

In our paper we make important contributions in how to define inclusion, value and scale for smallholder value chains, and also outline limitations to our current approaches towards inclusion measurement. But importantly, in our review we find very few value chains simultaneously achieve inclusion, value, and scale, raising serious doubts that that current approaches for value chain interventions are an effective vehicle for rural development. Only 13% of cases studies are considered inclusive of target populations, with the remainder being exclusive along at least one domain such as land holdings, gender, and social indicators. Our results also suggest that value chains that are high value are 80% less likely to be inclusive, relative to value chains with low value outcomes. Of the very few case studies that are both inclusive and high value, we find that these value chains more closely resemble monopsonist commodity buyers who enter locations where poor and marginalised households have very limited alternative options. High value outcomes are likely derived from very low value outside options, and where other low value outcomes such as power imbalances and value destruction along other value domains is likely. Overall, the inclusion, value and scale outcomes, of which are necessary for value chains to achieve rural development objectives, appear to crowd each other out under current value chain approaches.

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15 Specialty Crop Prices and Refrigerated Truck Availability in the United States

Richard Volpe[1], Xiaowei Cai[1], Timothy Delbridge[2], Alexander Stevens[3]

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Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

3. Agricultural Production

Paper/Poster Abstract:

We combine USDA Economic Research Service data on specialty crop prices throughout the supply chain, at both the farm and retails, with refrigerated truck availability data from the USDA Agricultural Marketing Service. Truck availability data are reported by by route and by commodity, and we match these data with commodity-level prices as closely as possible, aggregating at the monthly level. We find that truck shortages were increasing, on average, nationally leading up to the COVID-19 pandemic, but accelerated during the lockdowns and have remained high.

Truck availability remains tight and constrained in many cases, but there is substantial variation by geography and commodity. We find a positive and significant association between truck shortages and prices, with the strongest effects observed for retail prices. This association holds even when controlling for other factors that explain prices, including production, energy rates, and overall food price inflation as measured by the CPI. Truck shortages are a systemic problem in the specialty crop supply chain and likely account for a small but significant share of the historic food price inflation in the U.S., 2020-2022.

Parallel 6E. Contributed Paper Session - Practice Change and Adoption 2

10:40 - 12:20 Friday, 9th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre Rick Llewellyn

221 Harvesting the Breeding Technology Effectively: Evidence from County-level Study on Newly-bred Rice Variety Adoption in Southern China

Moyu Chen, Yu Sheng

Peking University, Beijing, China

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

26. Practice Change and Adoption

Paper/Poster Abstract:

New breeding technologies promise to revolutionize agricultural productivity, but their effectiveness depends not only on the traits of newly-bred crop varieties but also on farmers' technology adoption capacity. While many studies have examined the innovation in new breeding technologies and their potential impacts on agricultural productivity growth, little is known about how newly bred varieties are adopted particularly in developing countries. This paper examines farmers' technology adoption capacity and its impact on the contribution of newly breeding technologies to crop yield, by using the county-level rice production in Southern China as an example.

We use a panel data of 1185 counties for the period 1982-2015, combined with the traits of 4,452 rice varieties that have been widely planted in the related regions, to assess the effectiveness of farmers' adopting new rice varieties. Methodologically, we employ a general method of moments (GMM) model, conditional on four moments (i.e., mean, variance, kurtosis, and skewness), to fit the distribution of actual rice yields to that of nominal rice yields estimated by using the traits of both old and new varieties. The effectiveness of farmers' adopting the newly bred varieties is thus

measured as the difference between the nominal adoption intensity (dividing the acreage of new varieties by the total acreage of all varieties) and effective adoption rates. Additionally, we also conduct a series of non-parametric regression analyses to explore the enabling factors and barriers that affect the effectiveness of farmers' adopting newly bred rice varieties.

We show that: the number of new rice varieties more than tripled from 1982 through 2015, but the average effective adoption rate is only 34.8% far lower than the nominal one (say, 56.2%). In addition to the mean differences, effective adoption rates were much lower in counties that adopted fewer new varieties, suggesting that low adoption capacity hinders the adoption of new varieties. Further analysis of the underlying determinants shows that distortion in the seed market and the lack of effective tie-in between new rice varieties and capital equipment could be two important reasons. In particular, increased capital intensity may weaken the effect of newly bred varieties on yield gains.

Our study contributes to the literature in two ways. First, this paper uses county-level data for the exercise, which for the first time systematically explores farmers' adoption capacity. This provides empirical evidence on how new breeding technologies have been adopted in agriculture in a large developing country, like China. Second, we identify the enablers and barriers to the adoption of breeding technologies, coping with the challenges linked to multiple mechanisms and encompasses both temporal and spatial dimensions.

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247 The relationship between herbicide resistance and use of integrated weed management: is it simply reactive?

Md. Monirul Islam, Marta Monjardino, Rick Llewellyn

CSIRO, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

26. Practice Change and Adoption

Paper/Poster Abstract:

Herbicide resistance has been a major management challenge and ongoing threat in cropping regions over several decades, particularly in the time since the widespread adoption of no-tillage cropping systems. Despite extensive and increasing forms of resistance in Australian cropping regions, growers have been able to maintain control of new weed populations by introducing new herbicide and non-herbicide practices. This has enabled important farming systems adaptation to climate change and increasing productivity. Earlier studies found that the adoption of these alternative practices was associated with a reaction to the initial development of forms of herbicide resistance on a farm. Practices include those classified as harvest weed seed control (HWSC) that kill potentially herbicide resistant weed seeds and reduce overall weed seedbank populations without increasing herbicide resistance selection pressure. A largely unexplored aspect of the socio-economics of herbicide resistance management is whether the initial 'reactive' adoption of integrated weed management practices (IWM) has a 'preventative' effect on further resistance development to other herbicides and in other weed species.

In order to gain a deeper understanding of the farm-scale factors determining the adoption of IWM practices and the relationship between IWM use and herbicide resistance, we used data collected from 602 broadacre grain growers across the 13 agroecological zones (AEZ) of the entire cropping land of Australia. Data were analysed using different

econometric models, including ordered logit models capturing the diversity of practice use (including HWSC) and ordinary least squares (OLS) representing treatment intensity across cropped areas. Almost all case studies show that the presence of herbicide resistance is associated with different IWM use combinations along with factors including cropping scale, years of no/zero-tillage use, and advisory support. The cross-sectional study also shows adoption of IWM (including HWSC) practices to be higher in Western and Southern regions, most likely where HWSC practices can offer greater control on the most common resistant weed types such as annual ryegrass. There was no evidence to support the argument that IWM use on farms is associated with reduced herbicide use, but there is considerable evidence to show that early forms of herbicide resistance development on farms have led to the use of practices (such as HWSC) that have the potential to reduce the seed set of weeds with potential new forms of resistance.

These results are used to inform the analysis of recent trends in herbicide resistance development measured at the regional scale. Beyond the farm scale weed management analysis, a bio-economic modelling framework is developed using additional regional scale data to predict the risk of herbicide resistance to important herbicides at a scale of relevance to industry and broader weed management strategy. This has the capacity to pre-emptively identify sustainable weed management scenarios in various regional farming systems and future contexts, including where earlier 'reactive' adoption of resistance management practices may now be offering 'pro-active' benefits.

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198 Assessing the Benefits of Organic Fertilizers in Cropping Systems

Richard Culas[1,2,3], Muhuddin Anwar[4,3], Nick McGrath[5], Alison Southwell[5], James Diack[6], Jaime Hogan[6], Tek Maraseni[7], Christine Storer[8], Sosheel Godfrey[8], Catherine Allan[9,2]

[1]School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Orange, NSW 2800, Australia. [2]CRC for High Performance Soils, University of Newcastle, Callaghan, NSW 2308, Australia. [3]Gulbali Institute, Charles Sturt University, Wagga Wagga, NSW 2650, Australia. [4]NSW Department of Primary Industries, Wagga Wagga, NSW 2650, Australia. [5]Holbrook Landcare Network, Holbrook, NSW 2644, Australia. [6]Soils for Life, Deakin, ACT 2600, Australia. [7]Australian Centre for Sustainable Catchments, University of Southern Queensland, Toowoomba, QLD 4350, Australia. [8]School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Wagga Wagga, NSW 2650, Australia. [9]School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Albury, NSW 2640, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

26. Practice Change and Adoption

Paper/Poster Abstract:

Soil is a vital carbon sink that sustains life on Earth. However, human activities, such as agricultural practices involving inorganic fertilizer use, can negatively affect soil health. In Australia, most cropping soils have lost 2-3% of their nitrogen reserves annually and are low in phosphorus. Potassium levels are also low or deficient on many sandy soils, and can be depleted due to intensive grazing and horticulture. Organic fertilizers, which are derived from organic waste materials, can offer a sustainable solution by improving soil structure, increasing soil carbon storage and other co-benefits. This can lead to sustain or higher crop yields, improved farm profitability and help to mitigate climate change.

This paper identifies potential organic fertilizers that farmers can use, and assesses their impacts on crop yields, soil health, and greenhouse gas emissions. Based on this assessment, we can develop guidelines for farmers on how to incorporate organic fertilizers into their cropping systems and improve farm income. This initiative has the potential to make a significant contribution to the sustainability and profitability of Australian agriculture. By improving soil health and reducing greenhouse gas emissions, organic fertilizers can help farmers to produce more food with less environmental impact.

Organic amendments, such as biochar, farmyard manure, animal manure, and chicken manure, are increasingly being used in cropping systems to improve soil health and crop yields. However, their impact is complex and depends on a variety of factors, in particular their economic feasibility to use and the level of any risk involved. To better understand this impact, we used the Agriculture Production System Simulator (APSIM) model to selected organic amendments. APSIM simulates crop growth, soil water movement, and nutrient cycling. To simulate organic amendments in APSIM, we need parameters such as the fraction of carbon in fresh organic matter, the potential decomposition rate, and the fraction of C, N, and P in the amendment. We obtained these parameters from published literature or laboratory experiments.

Our results show that organic, as combined with inorganic fertilizers, could be used as substitutes for nitrogen mineral fertilizers in growing crops, as these treatments sustained productivity while improving soil health. Our analysis also showed that biochar has a larger impact on environmental outcomes than farmyard manure in the case study area used in our analysis. To provide some perspective on the trends of economic and environmental trade-offs, we present some economic model concepts. This work will provide a better understanding of the impact of organic amendments on crop yields, nutrient uptake, soil health and farm income.

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217 Understanding current grain grower decision-making under risk

Brendan Brown, Rick Llewellyn

CSIRO, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

4. Agricultural Technology and Innovation

15. Farm Management and Farmer Behaviour

26. Practice Change and Adoption

28. Uncertainty and Risk

Paper/Poster Abstract:

The grand challenges that face the Australian agriculture will require not only technological advancement but well-informed decision-making for increasingly complex and uncertain future scenarios.

Reviews have highlighted not only the exceptionally high volatility faced by Australian grain growers but the potential for more sophisticated approaches and systems context in on-farm decision-making under risk. Accordingly, the Grains Research and Development Corporation (GRDC) have invested over $30m in a national risk management initiative (RiskWi$e) aimed at increasing the capacity for grain growers to evaluate probabilities and risk-reward when making key management decisions with uncertain outcomes. The focus is not just on the technical aspects of

production risk or economics, but also integrates the need for deeper engagement with the social and behavioural aspects of risk management in farming systems.

Through an initial baseline survey of more than 300 grain growers across WA, SA, Vic, NSW and QLD, we explore the decision process behind gain-grower risk decision making to identify opportunities and create new insights for improved decision-making process and inputs. To study this, growers and advisors were asked to explore their current approach to risk and risky decision making processes while also identifying the most challenging on-farm decision types involving risk

Analysis highlights that while a majority of growers may consider their approach to significant risky decisions as grounded in consideration of probabilities of uncertain outcomes, only a minority use a quantitative approach involving calculation or conduct reviews of prior decision-making.

Further to this, a diversity of decision processes and profiles were also identified, which can be disaggregated by various demographics such as location, rainfall, age and farm size to better understand how to approach the discussion of risk decision processed with growers and advisors. Growers most often assume their advisors apply a more quantitative approach compared to their own more instinct-based decision-making.

A quantification and ranking of key decisions under uncertainty was also undertaken. While only a minority found seasonal nitrogen fertiliser decision-making ‘not difficult’ the results highlight that the major perceived risky decisions in Australian grain systems relate not to seasonal agronomic decisions but large, less frequent decisions such as land purchase/leasing and major new machinery investment, along with grain marketing decisions.

The results identify a self-assessed lack of comfort with current processes used for farm decision-making under uncertainty. Opportunities are identified for not only greater application of basic decision analysis approaches that incorporate probability-based calculation. A common reliance on production-based rather than economic-based evaluation is also revealed.

As part of the 5-year RiskWi$e initiative, a participatory farming systems research approach including a national network of grower groups, field trials supported by modelling, farm-level analysis and behavioural economics will be applied. These initial measures of grain grower and advisor decision process will form part of the monitoring of change in grain grower and advisor decision making aimed at improving risk-reward outcomes for Australian grain growers.

Parallel 6F. Contributed Paper Session - Agricultural Production

10:40 - 12:20 Friday, 9th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre
Chris O'Donnell

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314 The Impact of Development Initiatives on Dairy Farmer Sustainable Performance in a Developing County

Leeza De Silva[1,2], Nihal Jayamaha[1], Elena Garnevska[1]

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Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

30. Value Chain Analysis and Marketing

Paper/Poster Abstract:

We tested the supply chain management (SCM) hypothesis “sustainable supplier development leads to improvement in supplier’s capability and relationships with the buyer to improve sustainable performance of suppliers and buyers” in an agri-food context (formal fresh milk value chain) in a developing economy (Sri Lanka). In this value chain, the farmers are the suppliers and the milk processor (Sri Lanka’s largest privately owned processor) is the buyer, and the farmer-processor dyadic relationship is demonstrably strong. The motive of the study is to examine whether the two different epistemologies of SCM (strategic selection and development the suppliers to maximize net present value of future returns to the investing firm) and agribusiness (macroeconomic stability of the rural economy and farmer inclusiveness) can both be accommodated under the right conditions (e.g., when there is incentive for a milk processor the develop their farmers to improve farmer capability for mutual benefit). In our study context, the farmer development was an activity that was left in the hands of the private sector (milk processor) with minimal or no government support. While this situation may be far from satisfactory from an agribusiness perspective, it was a good, controlled condition from the study design perspective to demonstrate study’s internal validity. In our theoretical model, farmer development is represented by three dimensions: Farmer Training, Financial Support, Farmer Evaluation and Feedback on quality. We hypothesized that three dimensions of farmer development has a positive effect on farmer capability and farmer-processor relationship and that farmer capability and farmer-processor relationship in turn has a positive effect on farmer’s economic, social, and environmental outcomes (we used the triple bottom line framework to represent sustainable farmer performance). Our theoretical model was tested using data collected from 324 farmers (via a survey questionnaire) in the two most active dairy production regions in Sri Lanka using Partial Least Squares Structural Equation Modelling. Of the farmers, exactly 50% were farmers who received special training (more formal training) from the processor.

Empirical test results supported our hypotheses, except the Farmer Training on Farmer Processor Relationship, which returned a non significant p value. Results suggested that as far as Farmer Capability improvement is concerned, Financial Support is the most effective farmer development initiative (effect = 0.544), followed by Farmer Training (effect = 0.147) and Farmer Evaluation and Feedback (effect = 0.139). Financial Support was also found to be the most effective initiative (effect = 0.400) for improving the Farmer-Processor Relationship, followed by Farmer Evaluation and Feedback (effect = 0.319). Financial Support had the highest effect on Farmer’s Economic Sustainability (effect = 0.304) and Farmer’s Social Sustainability (effect = 0.422), but unfortunately none of the three farmer development initiatives had a practically significant effect on Farmer’s Environmental Sustainability, although they all returned $p < 0.05$. This suggested that much needs to be done to increase Farmer’s Environmental Sustainability. The study also showed that farming region and special training have a small positive effect on Farmer’s Social and Environmental performances, which may be useful finding to streamline training.

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266 What explains changes in grape varietal mixes in Australia’s wine regions?

German Puga, Kym Anderson

Wine Economics Research Centre, School of Economics and Public Policy, The University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

32. Wine and Horticultural Systems

Paper/Poster Abstract:

In an ever-more-competitive global beverage market, vignerons compete for the attention of consumers by trying to differentiate their wine from others while also responding to technological advances, climate change, and evolving demand patterns. In doing so, they highlight their regional and varietal distinctiveness while keeping an eye on changes in consumer preferences for different varieties.

This paper examines and seeks to explain the extent to which winegrape varietal mixes vary across regions and over time within Australia and relative to the rest of the world. We are able to do this thanks to a recent dataset that we have compiled for Australia. This dataset includes information on area, price, and production by region and variety, as well as many derivative indexes. Further, this dataset allows us to compare the Australian winegrape data with data from another dataset on other countries and the world as a whole.

We first report changes in indexes of similarity across regions and of concentration in the winegrape varietal mix within regions, as well as multivariate statistical analyses using these indexes. Nationally the varietal mix has become less differentiated and closer to that of France and the world as a whole. However, individual regions within Australia are becoming more concentrated in their mix of varieties and thus more differentiated from other Australian regions.

In order to further explain these changes in the winegrape varietal mix, we use a Nerlovian partial adjustment framework. Our main econometric models assume adaptive profit expectations and partial area adjustments to estimate the extent to which differences in winegrape prices (or revenues, or relative revenues) explain differences in the varietal mixes across regions.

We also estimate a set of regional Nerlovian partial adjustment models in which the dependent variable is the share of total winegrape area planted to a given variety and the variable of interest is an index of regional comparative advantage of that variety with respect to the other varieties in the region. As with the other econometric models, these models allow us to estimate both short- and long-run supply response elasticities.

While our econometric models go some way toward explaining varietal mixes, we discuss their limitations and explain why other variables such as costs should be added for a fuller explanation. We also discuss the theory that may explain changes in winegrape areas. This theory goes beyond the Nerlovian partial adjustment framework, and relates to other theories such as those related to investments under uncertainty.

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310 Analysing the Trends in Organic Coffee Cultivation and Farm-Level Production Constraints in Nepal

SADICHCHHA ADHIKARI[1], Richard Culas[1], Christine Storer[2], Krishna Timsina[3]

[1]School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Orange, NSW 2800, Australia. [2]School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Wagga Wagga, NSW 2650, Australia. [3]National Agricultural Policy Research Center, Lalitpur, Nepal

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

27. Productivity and Efficiency

Paper/Poster Abstract:

Background

Coffee cultivation thrives in over 40 mid-hill districts of Nepal due to favorable conditions, with Lalitpur and Sindhupalchok standing out as top regions for successful organic coffee production, with Lalitpur ranking second in 2023 and Sindhupalchok fourth, according to The Everest List. These districts were chosen for their production capacity and market dynamics, making coffee farming a rapidly growing occupation for local farmers. Lalitpur excels in coffee productivity, while Sindhupalchok shows significant potential for coffee bean production.

Nevertheless, farmers face various production constraints at the farm level. These challenges encompass land shortages, labor and capital limitations, inadequate irrigation facilities, disease and pest infestations, limited understanding of the entire agriculture system, and a lack of modern techniques and technologies. Agricultural productivity is adversely affected by both biotic and abiotic constraints. Biotic constraints include factors such as diseases, insects, the absence of high-yielding crop varieties, and weed infestations. Abiotic constraints encompass issues like nutrient imbalances, insufficient moisture, drought, heat, and shortages of agricultural inputs such as fertilizers, all of which hinder crop growth and diminish yields.

Objective

The aim of this study was to identify and analyse the trends and progress in the cultivation area, production, smallholder coffee farmer population, and overall productivity in the regions of Lalitpur and Sindhupalchok, as well as at the national level in Nepal (2013/2014- 2021/2022).

Additionally, it seeks to carry out a comprehensive examination of the challenges in coffee production encountered by smallholder farmers at the farm level, with a particular emphasis on the districts of Lalitpur and Sindhupalchok in Nepal (2022).

Materials and Methods

Data concerning to the trend of coffee cultivation and production at national and district levels were sourced from the National Tea and Coffee Development Board Nepal (NTCDB). The trend analysis was conducted employing the Linear Trendline tool with Microsoft Excel.

The cross-sectional data for the production constraints at farm level was sourced from the Coffee Cooperative Unions in Lalitpur and Sindhupalchok and was analysed using the Cobb-Douglas production function in IBM SPSS version 29.

Results

The trend of coffee cultivation indicates that in both of the districts, there has been a decline in coffee cultivation area, production, and productivity. Nonetheless, the number of smallholder farmers is increasing. On a national level, the coffee cultivation area has expanded, but production, the number of farmers, and productivity have all decreased between the years 2013/2014 and 2021/2022.

The analysis of production constraints has shown that in Lalitpur district, labor has a notably positive and significant effect on coffee production, while disease has a significant adverse impact. Conversely, in the Sindhupalchok district, both labor and the coffee production area significantly contribute positively to coffee production.

Conclusion

Coffee cooperatives should prioritize training for smallholder farmers to sustain and enhance coffee cultivation. District-level studies are needed to address declining coffee production. Expanding cultivation area, improving worker skills, and investing in research for new varieties and disease resistance are crucial for a thriving coffee industry.

Keywords: Trend analysis, Smallholder farmers, Productivity, Production Constraints

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104 Components and drivers of productivity in New Zealand Dairy Farms

Mario Fernandez

DairyNZ, Hamilton, New Zealand

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

27. Productivity and Efficiency

Paper/Poster Abstract:

New Zealand is a prominent milk exporter as only 5% of its dairy production is used to meet its domestic demand. Production increased from 1.5 million kg of MS in 2010 to 1.9 million in 2015. At that point, it plateaued while the national herd fluctuated around 4.9 million cows. Productivity growth is essential to maintaining the long-term competitiveness of the dairy industry in New Zealand. This paper measures productivity growth and efficiency and identifies potential drivers.

Productivity is measured using all factors of production in a dairy business. We track the growth of milk output over time while controlling for inputs such as herd size, labour hours, feed, capital, and the production environment. For this we use detailed farm financial and operational data from Dairy Base, a farm-level survey owned and managed by DariyNZ.

We use the proper TFP index approach developed by O'Donnell (2018)[1], which ensures that the indices represent farm performance and allow decomposing productivity into its components: technological change, technical efficiency, scale efficiency, mix of inputs, and environmental factors. We apply Data Envelopment Analysis to estimate the TFP, and Stochastic frontier analysis to determine the productivity estimates and their relationships.

Results show a nuanced relationship between the input variables and compelling patterns of the indices over time.

Understanding productivity is a precondition to enhance the competitiveness position of dairy farms, and, ultimately, enable farmers to make informed decisions about their operations while remaining profitable and sustainable.

[1] O'Donnell C. (2018), Productivity and Efficiency Analysis, An Economic Approach to Measuring and Explaining Managerial Performance

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293 The Drivers of Productivity Change on Australian Farms

Chris Boult[1], Louise Capel[1], Will Chancellor[1], Chris O'Donnell[2]

[1]ABARES, Canberra, Australia. [2]University of Queensland, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

27. Productivity and Efficiency

Paper/Poster Abstract:

Measures of productivity change are measures of output volume change divided by measures of input volume change. We use farm-level data to compute several measures of partial factor productivity (PFP) and total factor productivity (TFP) change. The indexes we use allow us to make valid productivity comparisons across both space and time. We use a stochastic production frontier model to estimate the main drivers of productivity change: technological progress (i.e., the discovery of new techniques for transforming inputs into outputs); environmental change (i.e., changes in factors that are outside the control of farmers, such as temperature and rainfall); technical efficiency change (i.e., changes in how well farmers make use of existing technologies); and scale-and-mix efficiency change (i.e., changes in economies of scale and substitution). We use our results to identify policies that we feel offer the greatest potential for increasing both farm productivity and farm profits.

Parallel 6G. Contributed Paper Session - Valuation 4

10:40 - 12:20 Friday, 9th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre
John Rolfe

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313 A Decision Support Framework to achieve Value for Money in projects requiring $100M+ of Biodiversity Offsetting

Bill Williamson[1], Amanda Griffith[2], Simon Tweed[2]

[1]magicdirt.xyz, Dubbo, Australia. [2]Niche Environment and Heritage, Parramatta, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

7. Carbon and Nature Markets

11. Ecological Economics

23. Market Design and Policy

28. Uncertainty and Risk

29. Valuation

Paper/Poster Abstract:

Abstract

Biodiversity offsets are a mechanism to allow developers of land and infrastructure to compensate for adverse impacts. The legislative requirements that developers must offset their development impacts, encourages rigorous environmental management decisions.

Policy around offsetting has tried to foster market based mechanisms to encourage efficient outcomes for developers and for the environment. However there is extensive evidence of market failure at the current time in an adolescent industry.

In spite of market performance, procurement of biodiversity offsets needs to be considered on the same terms as all other expenditure on infrastructure development activities, on a Value for Money basis (VfM). In the case of publicly funded infrastructure, there is a strong public interest on both sides of the procurement activity.

The context of biodiversity offsetting is very much rural and regional Australia, as this is where large infrastructure projects are developed and where offsetting can be achieved by the development of biodiversity credits. Since the market is still developing, the behavior of participants in the market is an important factor to understand when attempting to achieve VfM.

We propose that value for money in procurement of biodiversity offsets can be clarified by;

- Modelling of species distribution
- Land economy studies on rural property
- Quantifying risk associated with the various options for offsetting

After further development of biodiversity offsetting options, the intersection of government policy settings and commercial imperatives becomes apparent.

We discuss how offsetting options differ by Offset Trading Groups (OTGs), considering the physical limitations of distribution and abundance. This differentiates the application of market based mechanisms in biodiversity, compared to carbon emissions offsetting and other environmental programs.

We differentiate between cost and pricing and discuss price discovery in the emerging industry.

Finally we comment on the experience of offsetting programs which have adopted VfM strategies and how the activity in those reflects on government policy settings.

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40 Valuing biodiversity in freshwater fisheries: Evidence from Lao PDR

Benjamin Chipperfield[1], Paulo Santos[1], Carly Cook[2]

[1]Monash University, Caulfield, Australia. [2]Monash University, Clayton, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

16. Fisheries, Marine Systems and Aquaculture

Paper/Poster Abstract:

Freshwater ecosystems make a critical contribution to food security and livelihood for people in developing countries, however, are rarely recognised in international development discussions and policy circles. External factors including habitat modification and destruction, environmental pollution, climate change and overfishing have led to global freshwater fish populations declining at an alarming rate, which has consequences for the services provided by freshwater ecosystems. Importantly, the rate of decline across different species has not been equal. Biodiversity losses are particularly concerning as freshwater fish species play important ecological roles in the complex functioning of freshwater ecosystems. Given that many local communities depend on nutrition and income from freshwater fisheries, and there is evidence of a heterogenous decline in fish species, it is important to consider the role of biodiversity in facilitating the provision of fish in freshwater fisheries. It has been well established in marine fisheries that biodiversity facilitates the provision of fish, however, it is less clear whether this effect translates to freshwater fisheries, as a causal impact has yet to be established.

In this paper, we exploit a detailed dataset of fish catch monitoring and diversity from the Xe Banghieng River, a tributary of the Mekong River Basin in Lao PDR, to show that higher levels of biodiversity lead to economically significant increases in freshwater fish yield. This result is causally determined using an instrumental variable approach by exploiting the exogenous variation in geographical locations along the natural path of the river to address potential concerns of endogeneity. Furthermore, this result is robust to different measures of biodiversity, including species and functional richness, and unobserved confounders of fishing yield and biodiversity. Simulations of species extinctions show that the functional richness of fisheries is dependent on the continued presence of a small number of species, potentially rendering local fisheries vulnerable to even small extinction episodes. Our analysis suggests win-win solutions exist for protecting biodiversity and food security in freshwater fisheries.

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255 Testing for Scope effects in nested management actions with choice experiments: Valuing native fish populations in the Murray Darling basin

John Rolfe[1], Jeremy De Valck[2], Megan Star[1], Nicole Flint[1]

[1]CQUniversity, Rockhampton, Australia. [2]CQUniversity, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

29. Valuation

Paper/Poster Abstract:

Since the NOAA inquiry into the application of contingent valuation in the 1990s, it is standard practice that stated preference experiments should demonstrate some sensitivity to changes in the scope of the item being valued. The concept is sometimes vague but the general premise is that more widely scoped goods should have higher values than more narrowly scoped ones, although the devil is in the detail about how the tradeoffs are framed. In this paper we report the results of three parallel split-samples of a choice experiment designed to assess values for native fish populations in the New South Wales part of the Murray Darling Basin. Version one presented potential improvements in fish populations in unlabelled format with two improvement options that were underpinned by descriptions of engineering solutions to provide fish ladders, fish screens, and address cold water pollution from impoundments. Version two was the same survey except that the choice sets were presented in labelled format for the three improvement alternatives, while version three used the unlabelled format again but only described solutions for addressing cold water pollution. The results demonstrate some limited sensitivity to the scope and format of the choice tradeoffs being presented. We recommend careful attention to the way that choice experiments are framed, and note that scope effects will influence values in more narrowly framed experiments.

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173 A combined revealed preference and contingent behaviour model to estimate the value of mountain bike recreation in Tasmania.

Isobella Grover

University of Tasmania, Hobart, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

29. Valuation

Paper/Poster Abstract:

Over the last decade Tasmania has evolved into a leading mountain biking destination following the development of world-class mountain bike networks and trails. Set amidst the backdrop of the State's unique natural forested landscapes, many Tasmanian mountain bike networks are located on or adjacent to production forests where harvesting activities periodically occur. Despite the popularity of mountain biking in Tasmania, there is limited information of the total demand and economic benefits associated with visitation to Tasmanian mountain bike networks as well as a gap in understanding how changes to site characteristics impact these benefits. Using data collected from an on-site and online survey, travel cost methods are used to estimate the value of mountain bike recreation across three of the main mountain bike networks in Tasmania. The study combines mountain biker's stated visitation in the last 12 months, in combination with responses to contingent behaviour questions related to visitation in the next 12 months, to investigate the marginal effect on economic value given hypothetical changes to site characteristics in the context of harvesting. This study contributes to the understanding of the economic value of mountain bike recreation in Tasmania and will provide inputs into land use management decisions in the future.

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156 Valuing environmental tradeoffs with uncertain outcomes: Discrete choice experiments for spider crabs in Port Philip Bay

John Rolfe[1], Kym Whiteoak[2], Sabiha Marine[3]

[1]CQUniversity, Rockhampton, Australia. [2]Canopy Economics and Policy, Melbourne, Australia. [3]Deakin University, Melbourne, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

29. Valuation

Paper/Poster Abstract:

Stated preference experiments to value environmental benefits normally involve the presentation of scenarios that show discrete losses or gains. However this is much more challenging for environmental issues where limited science knowledge makes it difficult to present baseline or change scenarios with any degree of precision. The case study of interest is spider crab populations in Port Philip Bay in Victoria, where there are concerns about fishing pressures despite little being known about population dynamics and pressures. Two approaches to represent these gaps in knowledge were tested. First, an uncertainty attribute was included in the choice sets to communicate the gaps in knowledge about potential outcomes. Second, a split sample experiment was run to test if values were sensitive to assumptions about whether spider crab populations were in long term decline or remaining stable. Consistent with prior expectations, respondents placed higher importance on solutions when the spider crab population was reducing. The Certainty attribute was interacted with attributes with crab populations and fishing access to generate values for expected outcomes. The results provide some guidance as to how valuation experiments can be applied to relatively unknown environmental assets.

Parallel 6H. Contributed Paper Session - Water 2

10:40 - 12:20 Friday, 9th February, 2024
Location Room 6, (Level 5) Marie Reay Teaching Centre Claire Stephenson

205 Hydro-economic modelling to assess potential adaptation strategies under future climate-induced water stress in the Macquarie River catchment

Shokhrukh Jalilov[1], David Robertson[2], Wahid Shahriar[3], Muhammad Watto[3]

[1]CSIRO, Brisbane, Australia. [2]CSIRO, Melbourne, Australia. [3]CSIRO, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

31. Water

Paper/Poster Abstract:

Australia's Murray-Darling Basin is facing the significant challenge of protecting its water resources while maintaining a healthy and functioning ecosystem to uphold the Basin's water-dependent assets and values. The Basin's water-dependent communities, industries, businesses, and the natural environment are highly vulnerable to climate change. Environmental flows strategies to mitigate the effects of diverted flows on the environment have led to discussions about inter-sectoral water allocations and use. However, climate change projections indicate further challenges of rising temperatures and declining winter rainfall, signalling a significant shift in the Basin's hydrological cycle. Given this context, management of the Basin's water resources requires that decision-makers and stakeholders have access to organised information to devise plans for innovative and sustainable water allocation decisions and policies.

Given the complexity of hydrology and economics, incorporation of hydro-economic models (HEMs) into water management frameworks is crucial in the Murray-Darling Basin. This study places particular emphasis on the spatial and temporal disparities in water availability and demand within the Macquarie River catchment of the Murray-Darling River Basin. The research aims to develop a hydro-economic model (HEM) that optimises base conditions to reflect observed data on water use for various purposes within the Macquarie River catchment, which supports over 200 thousand people across 92,000 square kilometres. The model employs a novel hydro-economic modelling framework to assess the impacts of climate change and adaptation in the Macquarie catchment, considering agricultural, socio-economic, and hydrological systems at varying scales. The applied framework encompasses a mathematical programming model and the hydrology model IQQM (Integrated Quantity-Quality Model) with a focus on spatially explicit socio-economic and agronomic processes. Scenarios evaluated include severe climate change, policy-based adaptation, and autonomous adaptation. Ultimately, this integrative approach is expected to serve as a robust tool to assist in water and climate change policy-making, advancing understanding of climate change impacts, multi-scale vulnerability, and adaptation pathways.

123 Rural-Urban Water Transfer and Urban Economic Growth: Chinatown Revisited

Sherzod Akhundjanov[1], Reza Oladi[1], Arpita Nehra[2], Arthur Caplan[1]

[1]Utah State University, Logan, USA. [2]North Carolina State University, Raleigh, USA

Presentation Type:

3. Contributed Paper

Keywords:

10. Development Economics

31. Water

Paper/Poster Abstract:

The 2022 United Nations IPCC report estimates that water insecurity in several parts of the world will be exacerbated as a result of climate-induced water scarcity and inadequate water governance. The report mentions that impacts of droughts and floods have intensified due to extreme weather events, which in turn have exploited socioeconomic vulnerabilities. The Colorado River system, which serves as a prime water source for much of the Western United States, is a prime example of a high-risk, water-stressed region in the face of climate change. Rapid urban development in the Western United States since the dawn of last century, along with the region's arid environment, has put tremendous pressure on the region's water resources, particularly in the presence of climate change. Since these urban economies generally face recurring conditions of water scarcity, their future development requires water importation, mostly from rural regions. It is thus paramount to have a clear, firm grasp of the role water plays in the growth and development of the region's urban economies.

This paper explores the economic impacts of a rural-urban water transfer on an urban economy using the 1920's Owens Valley water transfer to Los Angeles (LA) County, one of the largest and most controversial rural-urban water transfers ever undertaken in the United States, as a natural experiment. We first develop a growth-theoretic model incorporating a water transfer, and explore the transfer's impact on urban economic growth. With testable hypothesis from the theoretical model, we then apply synthetic control and difference-in-differences methods to a newly constructed historical dataset to examine the overall transfer effects on LA County's gross domestic product (GDP) per capita, as well as its effects on GDP's two main components---the value of agricultural and manufacturing output per capita. We also assess the water transfer's associated impact on urban sprawl. We find a positive effect overall, i.e., the 1920's Owens Valley water transfer impelled decades-long GDP growth in LA County. The county's overall growth has in turn been driven by growth in its per-capita value of manufacturing output, at the expense of agricultural output. We also find a positive transfer effect on urban sprawl within the county.

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162 At the intersection of markets and personhood: The problem of instream flow revisited

Julia Talbot-Jones[1], Daniel H. Cole[2], Dustin Garrick[3,4]

[1]Te Herenga Waka - Victoria University of Wellington, Wellington, New Zealand. [2]Indiana University, Bloomington, USA. [3]University of Waterloo, Waterloo, Canada. [4]University of Oxford, Oxford, United Kingdom

Presentation Type:

3. Contributed Paper

Keywords:

23. Market Design and Policy

31. Water

Paper/Poster Abstract:

The public good nature of water flows left in natural channels for recreational, wildlife, cultural, and aesthetic purposes – instream flows - continues to present challenges for water managers. Even within water market settings, approximately optimal solutions are difficult to achieve despite the formulation of the necessary conditions for optimisation being a relatively simple task. This is because the real challenge with instream flow provision lies in the design and establishment of institutions that will sufficiently approximate the optimum. Motivated by this hypothesis, we seek to understand how the design and establishment of instream flow regimes have evolved over the past fifty years. Our analysis reveals an institutional shift towards polycentricity and institutional layering that has created opportunities for the design and establishment of new institutional arrangements over time. One such arrangement that has the potential to affect instream flow provision is the integration of legal personhood and water markets. Drawing on insights from environmental and institutional economics we ask the question: how would a water market work when a river owns itself? We then examine the positive, normative, and practical realities of institutional layering in the context of legal personhood and water markets to understand whether this kind of integration could address the underprovision of instream flow in some contexts. The results highlight the ongoing challenge of designing and establishing institutions that sufficiently approximate the optimum.

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244 Utilizing Ostrom's institutional design principles to uncover adaptive co-management strategies for the Phewa lake in Nepal

Deepa Basnet, Ram Pandit, Abbie Rogers, Chunbo Ma

University of Western Australia, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

31. Water

Paper/Poster Abstract:

Phewa Lake is one of the largest lakes in Nepal and is considered a prime tourism destination in the Pokhara Valley. The lake area has been reduced due to siltation from upstream and encroachment of the shoreline by developers. Similarly, water pollution from city drains has become an urgent environmental challenge in managing the lake. However, the water quality and other environmental aspects of the lake have not improved under current management practices. This paper attempts to examine current management practices based on Ostrom’s institutional design principles for collaborative management using qualitative data collected from key stakeholders through focus group discussions and key informant interviews. The data was analyzed to examine cooperation between and among key stakeholders—boatmen, fishermen, tourism entrepreneurs, government agencies, and local

residents—to manage water quality in the lake and to understand management issues to identify potential policies and strategies for adaptive co-management of the lake.

The results provide a comprehensive examination of the alignment and divergence from Ostrom's eight design principles in the management of Phewa Lake. The findings indicate that adherence to Ostrom's principles varies among stakeholders but shows partial congruence for certain aspects, such as clear physical boundaries and minimum rights to organize. Several gaps are evident in the current management practices of Phewa Lake, particularly concerning principles related to the congruence between appropriation and provision rules and local conditions, collective choice arrangements, monitoring of resources and the users, conflict-resolution mechanisms, graduated sanctions, and nested enterprise structures.

This study highlights the need for a holistic approach to address these gaps and ensure equitable outcomes. Essential components include strategies for fair returns, robust monitoring strategies, and a multifaceted approach incorporating graduated sanctions, incentives, and penalties. Tailored conflict-resolution mechanisms and nested governance structures emerge as crucial elements for the sustainability of co-management. The study underscores the significance of collaborative engagement among diverse stakeholders, including traditional fishers, boatmen, hoteliers, local residents, and the Pokhara Metropolitan City Office, as a promising avenue for achieving sustainable lake management.

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137 Economic and Policy Factors Influencing Sustainable Groundwater Management in a Semi-Arid Region in Australia.

Claire Stephenson, Sayed Iftekhar, James Smart, Christopher Fleming

Griffith University, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

21. Land and Natural Resource Management

31. Water

Paper/Poster Abstract:

Groundwater is a key natural resource, estimated to contribute $3.0 to $11.1 billion to Australia’s Gross Domestic Product. Dependence on groundwater is greatest in arid to semi-arid environments with unreliable or poor-quality surface water resources and rainfall patterns. This dependence is predicted to continue to rise with population growth and impacts due to climate change. Within Australia, groundwater management strategies largely focus on water access licensing within designated management areas, cap and trading rules. However, despite these strategies there are no systems in place to quantify actual groundwater usage, and over 25 % of groundwater management areas in Australia are classified as over-allocated. There is limited research into economic instruments that may be most effective in achieving sustainable groundwater extraction in arid and semi-arid regions in Australia. To contribute to this knowledge gap, this research utilized existing land use and groundwater use mapping and farm economics to quantify actual groundwater use and farm profitability within a semi-arid region of Australia. Based on this, we developed a farm optimization model that allowed us to measure the impact of tailored management strategies on farm profitability and groundwater use.

The Study Area covered 8,000 km2 within the Darling Downs region of Queensland. Spatial data analysis showed the main groundwater use activities within the Study Area are town water supply, stock (cattle grazing), irrigated cropping and stock intensive (feedlots). For the main productive land use and groundwater use activities within the Study Area, standardised farm economic inputs were compiled based on current literature. Linear optimisation modelling was applied to predict total groundwater use and farm profitability, under different groundwater limits and groundwater prices in accordance with current management practices. The results identify that under current management practices total groundwater use exceeds the defined groundwater extraction limit, and is thus not sustainable. Management options tailored to dominant groundwater use activities were explored, including adjustments to the extraction limit incorporating stock groundwater use, with the volume inferred from annual stock density reporting. As well as application of a nature positive incentive scheme aimed at reducing stocking levels (cattle grazing), and water use efficiency requirements for intensive land use developments (feedlots). The scenario analysis showed that sustainability targets could be achieved when stock groundwater use is captured in the sustainable extraction limit and when an incentive scheme is used. However, it also highlighted that a tailored approach using a range of management measures that align to local conditions and land use practices could achieve sustainable groundwater management while maintaining farm profitability and social cohesion.

Lunch

12:20 - 13:20 Friday, 9th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Lunchtime session - "AJARE Meet-the-Editors"

12:30 - 13:10 Friday, 9th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
David Stern

Keith Campbell Distinguished Lecture: "Why trade matters – how policy shapes who eats what where and how it is produced"

13:20 - 14:20 Friday, 9th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Jenny Gordon

Abstract: Food security is a core element in human security – but so to is economic security, the ability to earn an income, and environmental security as the natural environment supports both the standard of living and quality of life. Australian agriculture delivers more than sufficient food for Australians and makes a major contribution to food security around the world. But the contribution Australian agriculture makes to food security and the economic security of people in the agricultural industry face increasing risk from global insecurity. From China's use of trade sanctions on barley, wine, lobsters and beef, to the COVID 19 pandemic supply chain disruptions, to further disruptions from the war in Ukraine and more recently in Gaza, risks to agricultural industries are rising. Increasing concerns about security and rising populist sentiment are fuelling protectionism, that ironically further undermine stability. Add in production challenges from climate change, and agriculture's capacity to deliver for human security looks increasingly vulnerable. This talk will look at what governments and international institutions are doing that either magnify or mitigate the risks for human security arising from their policies impact on agricultural production and distribution.

Dr Jenny Gordon is an Honorary Professor at the Centre for Social Research and Methods, at the Australian National University. She is also a non-resident fellow at the Lowy Institute, one of Australia's leading think tanks on foreign policy. Jenny is a member of the Australian International Agricultural Research Centre's Monitoring, Evaluation and Learning Advisory Panel, on the Asian Development Bank Institute's (ADBI) Advisory Committee, and a non-executive director with NCEconomics. She is recently was a co-chair for the taskforce on Peace, Stability and Governance for the T7, organised by the ADBI. Jenny was the Chief Economist at DFAT from 2019 to 2021, tasked with setting up the Office of the Chief Economist to integrate development and trade and investment policy analysis. Jenny joined DFAT from Nous Group, where she was the inaugural Chief Economist. Her work at Nous included a report for APEC on the economic impact of investment in earth observation, understanding the motivations for and impediments to business investment in innovation for Science and Innovation Australia, and an assessment of Queensland's innovation program. From 2007 Jenny spent 10 years with the Australian Productivity Commission as Principal Adviser (Research), where she worked on a wide range of policy reviews including regulation reform, aged care, childcare, the not-for-profit sector and migration. Joining in 1995, Jenny became a partner at the Centre for International Economics (TheCIE), where her work included financial market stabilization and development in Indonesia. Jenny has a PhD in Economics from Harvard University and started her professional career at the Reserve Bank of Australia.

Chair: Prof. Kym Anderson

10 minute break to move rooms

14:20 - 14:30 Friday, 9th February, 2024

Parallel 7A. Special Session - "How agricultural and natural resource economics can better inform policy"

14:30 - 16:10 Friday, 9th February, 2024

Location Manning Clark Hall, Kambri Cultural Centre

Jenny Gordon

Overview: We look to governments to improve the sustainability of environmental services, promote long term profitability in agriculture, and promote the resilience of the natural environment to climate change and the depravations of economic activity. But designing effective economic and environmental policies is not easy. There are many competing interests with different timelines of concerns. Short term considerations tend to dominate over long term, and simple solutions that ignore the likely consequences of a policy choices are often the most politically appealing. To convince politicians and the communities of interest to make hard decisions requires compelling evidence. This panel will discuss the types of evidence that policy makers need to design more effective policies.

The panellists have wide experience in policy advice across agriculture, natural resource management and climate change in Australia and our region. They will discuss the big policy challenges for governments as the consequences of climate change loom large and agriculture faces additional headwinds from a more fraught global trading environment and how the current body of research helps to inform their work. The panel will also raise gaps in the evidence base that need to be filled, and the role that researchers can play in informing public debates about the need for policy action and the choices available.

This panel discussion will follow Jenny Gordon's keynote presentation. Each panellist will be asked to discuss the following questions:

- What are the big policy challenges that you have to address in your work where agricultural, natural resource management, and climate change mitigation and adaptation research is being used?

- How useful is the current body of research in informing your policy analysis? This could be information about the scale of problems, range of intervention options and their effectiveness and cost effectiveness, and identifying and measuring spillovers and unintended consequences.

- What areas of research would be of greatest value to the areas of policy that you work in?

- What role do you think researchers could play in better informing public debates about the need for policy action and the choices available?

Panellists include **Fiona Lynn** (DFAT), **Neil Byron** (Alluvium), **Tim Fisher** (NCEconomics) and **Jared Greenville** (ABARES):

- Fiona Lynn is Director of the Agricultural Development and Food Security Section in the Australian Department of Foreign Affairs and Trade. As Director, Fiona oversees a number of the Department's development investment programs which aim to increase income and employment opportunities for

small holder farmers, including through public-private partnerships. Improving the benefits for women farmers from these opportunities is also an important component of the various programs, as is improving food and nutrition security. Climate resilience is a focus of many the agricultural development programs. Fiona is also Australia's representative on a number of multi-donor agricultural programs. Prior to joining the Department of Foreign Affairs and Trade, Fiona worked in rural water management in Australia for State Government of Western Australia and for the Murray-Darling Basin Commission (now Authority). Before working in government, she worked as a development socio-economist in a number of countries in Asia and the Pacific. She is an agricultural economist with a Master of Economics from the University of New England.

- Dr Neil Bryon has provided independent, highly-credible and practical policy advice on natural resources – water resources, agriculture, fisheries, biodiversity and forestry – including 12 years as Productivity Commissioner, where he conducted 26 public Inquiries, and led the Environmental Economics program. Subsequently, he has been engaged in a succession of part-time assignments involving policy formulation and/or evaluation of natural resource management policies, in Australia and overseas. He has accumulated extensive experience in leading multi-disciplinary (e.g. economics, science, engineering, law), multi-stakeholder consultation processes that ask probing questions and make informed judgements about important and complex issues. This not only delivers the evidentiary basis for excellent technical advice, but also engages with (often very polarised) stakeholders in a way that facilitates acceptance and implementation of the solutions identified. Neil has extensive experience in governance, and strategic and corporate planning that anticipates and identifies emerging trends, in both government and the private sector. Neil has a PhD in Resource Economics from the University of British Columbia; is a Non-Executive Director, Alluvium Holdings Pty Ltd and Natural Capital Economics Pty Ltd (since 2015), Chairs the Audit and Risk Committee, Productivity Commission, Melbourne (since 2021), Chairs the Farm Forestry Expert Panel, NSW Local Land Services, Sydney (since 2021), is a Member of the Stakeholder Advisory Committee, Asia Pacific Resources International Ltd, Riau Indonesia (since 2016) advising on meeting APRIL commitments to SDGs and TFND.

- Dr Jared Greenville was appointed Executive Director of ABARES in 2020. In this role he leads a comprehensive program of scientific research and economic analysis across Australian agriculture, fisheries, and forestry. The Bureau's work underpins the development of Australian Government policy as well as decision-making from the farm gate to national industries and international markets. Jared currently represents Australia at Organisation for Economic Co-operation and Development (OECD) forums on sustainable agricultural production, global food security and climate policy. Prior to joining ABARES, Jared held a senior role at the OECD, focusing on agri-food trade policy, global value chains in agriculture, and food security and risk (Southeast Asia) along with monitoring and evaluating. He has also worked for the Productivity Commission, providing high level advice to the Australian Government on bilateral and regional trade agreements, domestic drought support policy, infrastructure policy and the challenges posed by an ageing population. Jared holds a PhD in agricultural and natural resource economics from the University of Sydney.Fiona Lynn

- Tim Fisher is NCEconomics' General Manager, bringing a diverse and extensive background in public policy, water, conservation and natural resource management spanning three decades. Tim joined NCE sister company, Alluvium in September 2020, leading climate change services across the company. Previously, Tim was Assistant Secretary, Farm Performance Branch in the Commonwealth Department of Agriculture, Water and the Environment. This role included development of the Future Drought Fund and delivery of sustainable agriculture components of the National Landcare Program. Prior to this, Tim led the Murray Darling Basin Policy branch through a challenging period that spanned development of the Basin Plan and significant progress in its implementation. This role also covered Basin inter-

governmental arrangements, water legislation and regulation and the 2015 Review of the Water Act 2007. Tim served as Senior Adviser Water to the Minister for Climate Change and Water, Senator Penny Wong, in the Rudd-Gillard government. Tim's previous roles included extensive involvement on a range of water and environmental issues, with a particular focus on the Murray-Darling Basin. He also served six years as non-executive Director with the (former) Land and Water Australia research and development Corporation. In 2001, Tim received a Centennial Medal for service in water conservation and salinity management.

Chair: Dr Jenny Gordon

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346 How agricultural and natural resource economics can better inform policy

Jenny Gordon

ANU, Canberra, Australia

Presentation Type:

2. Special Session

Keywords:

14. Environmental Economics

27. Productivity and Efficiency

Parallel 7B. Contributed Paper Session - Development Economics 5

14:30 - 16:10 Friday, 9th February, 2024
Location Room 1, (Level 4) Marie Reay Teaching Centre Rene Villano

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213 Timor-Leste's National Seed System: An Overview of its Structure, Challenges, and Opportunities

Rio Maligalig, Alexandra Peralta

University of Adelaide, Adelaide, Australia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

10. Development Economics

18. Grains and Cropping Systems

Paper/Poster Abstract:

Adoption of improved crop varieties is important in enhancing agricultural productivity and safeguarding food security. The seed system, which facilitates the availability of these improved varieties, serves as a vital bridge between the research that creates them and the farming communities that use them. A well-functioning seed system is instrumental in ensuring that farmers consistently have access to superior crop varieties, thereby guaranteeing their seed security. In Timor-Leste, where majority of the population relies on agriculture for their livelihoods, two distinct seed systems exist: the formal or state-run seed system and the informal or farmers' seed systems. However, majority of farmers predominantly rely on the latter. Within the informal seed system, farmers produce and save seeds for their personal use, or they engage in the exchange and sale of these seeds within their local communities. The Seeds of Life (SoL) Program and the Timor-Leste Ministry of Agriculture and Fisheries (MAF) embarked on an initiative to integrate these two seed systems into a unified National Seed System (NSS). The final phase of the SoL program, spanning from 2011 to 2016, laid the groundwork for the NSS, with the goal of making it fully operational by the program's conclusion in 2016. The National Seed Policy (NSP) serves as the guiding framework for implementing the NSS and forms the basis for the development of a national seed law. Although the NSP was approved and adopted in 2013 by the MAF, it has yet to receive approval from the Council of Ministers. This implies that the policy is not legally binding and lacks widespread government recognition and endorsement. More than seven years after the conclusion of the SoL program, we assess the current state of the seed system and compare it to the envisioned system. Through initial interviews and mapping of the seed system with stakeholders, it becomes evident that while research, development, and dissemination of improved crop varieties continue, there is a pressing need for funding and broader government support to ensure that a fully functional seed system is in place. This is important because farming communities require consistent access to an adequate supply of high-quality seeds and planting materials for their preferred crop varieties, regardless of the prevailing crop conditions.

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259 Economic Viability Of Gliricidia-Maize Systems In Dryland Areas Of Dodoma Region, Tanzania

Martha Swamila[1], Damas Philip[2], Adam Akyoo[2], Stefan Sieber[3], Philip Smethurst[4], Anthony Kimaro[5]

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Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

10. Development Economics

Paper/Poster Abstract:

The optimal agricultural productivity in dryland areas of Sub-Saharan Africa (SSA) is hindered by the ongoing high extent of land degradation and climate change. In addition, smallholder cereal food producers in these areas apply no or sub-optimal quantities of mineral fertilizers due to socio-economic and technical factors like high prices and risk of crop failure. Agroforestry using intercropping of Gliricidia (Gliricidia sepium (Jacq.)) and Maize (Zea mays L.) was developed to complement conventional soil fertility management technologies. This study assesses the economic viability of the Gliricidia-maize systems in dryland areas of Dodoma, Tanzania. Data from Focus Group Discussions and Gliricidia and maize models of the Agriculture Production Systems sIMulator (APSIM) were used to assess adoption potential, profitability, and risks in the Gliricidia-maize relative to the sole-maize systems. Inspired by new tools that incorporate risk associated with crop yields and returns due to climatic variability, integrated ex-ante analytical approaches were used to advance understanding of the economic viability of the Gliricidia-maize relative to the sole-maize systems to inform farmer adoption and scaling up decisions. Results revealed variations in peak adoption levels with Gliricidia intercropping exhibiting peak adoption of 67.6% in 12 years, and that the most influential variable to peak adoption is the upfront cost of investing in Gliricidia intercropping technology. The Cost-Benefit Analysis results showed significant variation in profitability indicators in absolute and relative economic terms. The Gliricidia-maize systems exhibited the higher Net Present Values ranging between USD 5 517.88 (unfertilized Gliricidia-maize) and USD 7 486.26 (fertilized-Gliricidia-maize) in contrast to USD 2 286.97 (fertilized sole-maize) and USD 1 389.31 (unfertilized sole-maize). Risk analysis revealed that risk to net returns is higher in the sole maize than the Gliricidia-maize systems (Coefficient of Variation of 64.04-66.88% versus 51.38-52.63%). The Gliricidia-maize systems presented 40-90% probability of exceeding the income poverty line of around USD 255.32 per adult equivalent per year in contrast to 0% probability presented by the sole-maize systems. Stochastic efficiency analysis results show that the Gliricidia-maize systems are more preferred than the sole maize systems at lower (0) and upper (4) Risk Aversion Coefficients (RAC). The certainty equivalent values of yields of the Gliricidia-maize are 139% and 78% higher than the sole-maize system at lower and upper RAC, respectively, under the negative exponential utility function. This result implies that risk-neutral and extremely risk-averse decision makers would prefer the Gliricidia-maize systems. Therefore, the Gliricidia-maize systems are economically viable and can contribute to increased household income and food security. Supporting farmers to afford initial investment costs is critical for successfully upscaling Gliricidia-maize intercropping technology in dryland areas of Dodoma, Tanzania.

KEY WORDS: Gliricidia-Maize, ADOPT, Monte Carlo simulation, APSIM, Dryland areas.

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233 Understanding heterogeneity of spousal perception on upland forest area utilization among Indonesian smallholder farmers

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Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

14. Environmental Economics

15. Farm Management and Farmer Behaviour

21. Land and Natural Resource Management

25. Policy Analysis

Paper/Poster Abstract:

The utilization of upland forest areas for agricultural purposes has increased significantly in the last few decades due to various factors such as population growth, economic development, limited agricultural land availability, and increasing demand for agricultural products. A large number of farmers in many developing countries including Indonesia are continuously cultivating food crops in upland forest areas near catchment areas for watersheds. These practices could potentially result in deforestation, soil erosion, landslides, flooding, loss of biodiversity, and reducing the availability of water stock in downstream areas which in turn have detrimental effects on the environment and economy for the local community, regional, and national development. This situation leads to a growing concern regarding the sustainable management of upland forest areas. This study investigates the multifaceted landscape of spousal perceptions regarding upland forest area utilization among Indonesian smallholder farmers.

Drawing on data from 500 farm households, this study incorporates responses from both the heads of households (n=500) and their spouses (n=439) to unravel the intricate web of perspectives concerning the pivotal role of forested areas in environmental support, clean water provision, conservation efforts, and land banking strategies within the agricultural context. We employ the innovative Latent Class Analysis to discern latent categories or clusters within the spousal perceptions, revealing nuanced variations in viewpoints among the respondents. The research also delves into the dynamic interplay between these differentiated spousal perceptions and farmers' land use behaviour, particularly focusing on the cultivation of coffee and vegetables. Through a comprehensive analysis, the study illuminates the complex relationships between spousal forest perceptions and land use decisions, shedding light on how varying perspectives impact agricultural practices and sustainability outcomes in upland regions.

The preliminary results show that there are three distinct clusters among responses from household heads and their spouses. Both samples have a cluster that places a strong emphasis on forests as a major source of household income and supports government protection (47% in both samples), a cluster that strongly emphasizes the environmental functions of forests (43% in household head sample and 33% in the spouse sample), and a cluster with balanced views. Overall, the key differences in the formation of clusters between the household heads and spouse samples include variations in the emphasis on environmental versus economic aspects and the level of support for specific forest-related activities such as farming. The spouse sample generally places a stronger emphasis on the economic role of forests, while the household head sample emphasizes both environmental and economic aspects but varies in their priorities across clusters. These findings provide valuable insights for policymakers, practitioners, and researchers seeking to enhance the effectiveness of sustainable land management strategies and foster a deeper understanding of the intricate dynamics within smallholder farming households in Indonesia.

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215 Uncovering the sequential nature of long term adoption of sustainable agricultural practices by smallholders: Experiences from India

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Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

12. Econometric Modelling

15. Farm Management and Farmer Behaviour

17. Food, Health and Nutrition

Paper/Poster Abstract:

We study the policy environment in India under which farmers are supposed to pool their lands together and commit to organic farming for three years. Each year farmers are certified as C1 [year 1], C2 [year 2] and C3 [year 3], for their adoption of agrochemical free cultivation practices and improvement in soil quality parameters. However, every year farmers drop out and only a small percentage ends up as fully certified C3 farmers after three years, only thereafter they can label and sell their products as organic. This provides us a perfect opportunity to analyze what are the critical factors in the long term adoption of sustainable practices in a smallholder farming system. We conducted a detailed primary survey of 400 farmers that enrolled into the sustainability adoption program and applied a sequential logit model to assess their year-wise decision making of whether to continue or to drop out. Results point out that poor access to bio-inputs and output markets for selling organic produce were the major reasons that discouraged farmers in moving during the first time-step, that is, from Year 1 to Year 2. In the second time step, year 2 to 3, farmers who depended more on rainfed groundwater, had poor irrigation access and could not reduce their costs of cultivation were the ones to drop out with a higher likelihood. Additionally, when comparing broadly the cohort that entered into C1 and those who ultimately graduated as C3 certified farmers, we find that those farmers who have better access to irrigation, have livestock, and do not cultivate mainstream cereals like paddy, wheat, and maize are more suited to adopting sustainable agricultural practices. Our study is a first attempt to capture the sequential nature of farmers' decision making in adopting sustainable practices in a context where the policy frameworks are based upon static incentives.

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157 Unravelling the Impact of Social Capital on the Diffusion of Conservation Agriculture and Sustainable Intensification Innovation in Northwest Bangladesh

Renato Villano[1], M. Jahangir Kabir[1], Maria Fay Rola-Rubzen[2], Roy Murray-Prior[2,3], Jon Marx Sarmiento[2,1], Farid Khan[4]

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Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

10. Development Economics

Paper/Poster Abstract:

Recent evidence has shed light on the important role that social capital plays in the decision-making process surrounding the adoption of agricultural innovations. However, our understanding of how various components of social capital intertwine to shape the behaviour of smallholder farmers remains limited. Gaining insights into these complex interactions is vital for understanding the influence of different social capital elements on decision-making processes regarding specific behaviours. This study aims to investigate the impact of social capital on the adoption of Conservation Agriculture and Sustainable Intensification (CASI) technologies. Using farm-level data collected from a sample of 1,523 farmers in the Rajshahi and Greater Rangpur districts of northwest Bangladesh, we evaluate the interplay among various social capital variables, including trust, networks, and norms, and examine how they collectively affect the likelihood of adopting CASI technologies. By employing structural equation modelling, we have empirically confirmed several significant correlations. Firstly, our analysis has confirmed that trust and networks exhibit a strong and positive correlation, signifying the importance of trust within social networks. Additionally, we have found positive correlations between human capital and trust, as well as between human capital and networks, emphasizing the role of knowledge and skills in building trust and expanding social networks. Consequently, we have substantiated that components of social capital, such as trust and networks, exert a substantial and positive influence on the probability of adopting CASI technologies. Finally, our results have revealed that human and physical capital act as significant catalysts in the diffusion of CASI practices. This underscores the importance of investing in human capital development and providing access to essential resources to facilitate and enhance the widespread adoption of innovative agricultural practices such as CASI, thereby improving the livelihoods of many smallholder farmers.

Parallel 7C. Contributed Paper Session - Circular Economy

14:30 - 16:10 Friday, 9th February, 2024
Location Room 2, (Level 4) Marie Reay Teaching Centre Jack Hetherington

165 China’s pathway towards a net zero and circular economy: A model-based scenario analysis

Yingying Lu[1,2], Heinz Schandl[1], Heming Wang[3], Junming Zhu[4]

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Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

25. Policy Analysis

Paper/Poster Abstract:

The remarkable economic growth of China over recent decades has been accompanied by significant achievements in poverty reduction. However, this growth has also led to increased resource consumption and greenhouse gas (GHG) emissions. It's now evident that addressing the triple challenges of climate change, biodiversity loss, and pollution hinges in part on China's capacity to curtail its resource use and emissions. Our study utilizes an integrated economic modelling framework to assess China's role in the global context. We evaluate ambitious policies in resource efficiency, GHG reduction, and land-use transformation within China. Our findings indicate that, under such ambitious policies, China could likely achieve peak material use and emissions by 2030 and attain net-zero emissions by 2050. Moreover, our analysis underscores that China can play a pivotal role in helping achieve global climate goals in collaboration with the rest of the world. Implementing well-designed policies, including the adoption of a circular economy approach, might enable China to meet these environmental targets with minimized economic repercussions.

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119 What people value when they value recycling

Ben McNair, Maurice Gauder, Satchi Kalra

The Centre For International Economics, Canberra, Australia

Presentation Type:

3. Contributed Paper

Keywords:

14. Environmental Economics

29. Valuation

Paper/Poster Abstract:

In Australia, most small electric and electronic equipment (SEEE) and solar photovoltaic (PV) systems that reach end of life are currently sent to landfill or low-efficiency recycling at scrap metal processors. This waste management can lead to damaging environmental outcomes such as groundwater pollution from toxic landfill leachate; amenity and safety impacts from waste dumped on public land; air pollution from fires caused by batteries in waste trucks and facilities; and pollution and loss of habitat from mining virgin minerals for manufacturing new PV systems and SEEE. Recycling the waste from these products would avoid some of these environmental damages, but very little recycling takes place because the costs tend to exceed the value of recovered materials.

This study uses national online choice modelling surveys of more than 8600 Australians to estimate monetary values for the environmental benefits from recycling PV systems and SEEE. These values are being used in economic cost-benefit analysis of national regulated stewardship schemes that would require higher levels of recycling.

Previous studies into community willingness to pay (WTP) for recycling asked respondents to value changes in collection and/or recovery rates with very little information about the magnitude of the likely environmental impacts. Subsequent reviews have rightly expressed concern that the values from these studies could be based on exaggerated perceptions of environmental impacts. The present study addresses this concern by including quantified environmental impacts as attributes in the choice experiment and asking debriefing questions to understand the degree to which respondents perceived any additional benefits.

We found less than half of estimated WTP for a hypothetical stewardship scheme can be directly attributed to the environmental improvements described to respondents. The remainder is associated with an increased collection rate and a bias against the business-as-usual alternative. Debriefing questions revealed that some respondents treated the collection rate as a proxy for the environmental benefits discussed in the survey as a means of making the choice tasks more manageable, while others treated it as a proxy for perceived additional benefits. Some of these perceived

additional benefits may not be delivered by the scheme. Estimates of average WTP are reduced by around one quarter when respondents evidencing exaggerated perceptions of benefits are excluded from the sample.

The results confirm respondent misperceptions of environmental impacts are an important consideration, even in studies that specify environmental impacts, and that practitioners should conduct sensitivity analysis to inform decision makers of potential implications for the net benefits from recycling initiatives.

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333 Beyond Net-Zero Emission Cities: Insights from an Urban Economics Metabolism Model—A Case Study in Darwin, Australia

Raymundo Marcos Martinez[1], Natthanij Soonsawad[1], Sorada Tapsuwan[1], Stephen Cook[2], Tim Muster[3]

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Presentation Type:

3. Contributed Paper

Keywords:

8. Climate Change

19. Impact Assessment

Paper/Poster Abstract:

Climate change constitutes a substantial threat to urban areas. We conduct a thorough analysis of emissions-reduction policies through a two-stage methodology. Initially, the Driving forces, Pressures, State, Impacts, and Responses (DPSIR) framework is used to map key elements of urban emissions. Subsequently, an urban metabolism model is developed to investigate the dynamic relationships among city processes governing resource use and waste management. We used this approach to investigate the causes and effects of greenhouse gas emissions in Darwin's human and environmental systems, generate a baseline assessment of the city's emissions profile and project impacts of policies towards net zero emissions. Our findings indicate that economic variables are pivotal in shaping greenhouse gas (GHG) emissions in Darwin. Despite economic deceleration during the COVID-19 pandemic, Darwin's Gross Regional Product (GRP) has grown. The employment sector's composition has evolved, affecting emissions across different industries. Demographic factors, indicated by a 6% population increase from 2012 to 2022, influenced housing, transport, and resource utilization. Similarly, rapid urban development, catalysed by substantial public infrastructure investments, contributed to the city's emissions profile. Climate change intensified emissions by raising energy requirements for cooling and resource allocation for adaptation strategies. The Northern Territory's dependence on fossil fuels complicates emissions-reduction action. Additionally, waste generation and land-use alterations were significant emission contributors. The Northern Territory's low waste-recovery rate highlights opportunities for emissions reduction via enhanced waste management. Transport, the urban built environment and energy consumption emerged as critical domains within Darwin's emissions portfolio. On-road activities and electricity consumption were primary contributors, emphasizing the need for targeted interventions to diminish their emissions intensity. Darwin’s emissions had considerable impacts on provisioning, regulating, cultural, and indirect ecosystem services, including challenges in water supply, temperature regulation, air quality, flood risk, and effects on recreational activities and biodiversity. Our results highlight the benefits of employing both the DPSIR framework and an urban metabolism model for assessing the implications of urban policies on GHG emissions. Darwin's case offers insights into the intricate interactions of economic, demographic, and environmental variables in shaping emissions and stresses the necessity for a comprehensive policy approach towards net-zero emissions cities and beyond.

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36 Motivations behind daily preventative household food waste behaviours: The role of gain, hedonic, normative, and competing goals

Trang Thi Thu Nguyen[1], Lenka Malek[1], Wendy J. Umberger[2], Patrick J. O'Connor[1]

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Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

14. Environmental Economics

Paper/Poster Abstract:

The relationships between consumers' motivations, food management behaviours, and food waste are complex and depend on multiple motivational and health-related competing goals. This study uses Goal-Framing Theory and Structural Equation Modelling using data from a household survey (n=1030) to demonstrate that multiple motivations, including gain, hedonic, normative, and competing goals, can influence food waste through the mediations of daily food management behaviours (i.e. planning, purchasing, storing, preparing, and consuming leftovers). The normative goal emerges as the most significant driver of food waste reduction through four food management phases, except purchasing behaviour, which primarily occurs in settings outside the household. The gain goal exerts the second-largest effect on food waste reduction and is associated with all five food management behaviours. The hedonic goal shows weaker associations with food waste reduction, primarily manifesting in phases involving the physical disposal of food (e.g. managing leftovers). Importantly, competing goals related to health and food safety concerns emerge as the two strongest motives leading to increased food waste. Amongst the food management behaviours, over-purchasing and consuming leftovers have the largest effects on food waste, presenting two critical points for interventions, especially in the context of consumer-retailer engagement, where the normative motivation is absent while the gain and hedonic motivations for food waste reduction are weak. Understanding the underlying motivations associated with specific behaviours provides valuable guidance for identifying ways to motivate households to change behaviours in relevant domains, ultimately contributing to reductions in food waste and fostering more sustainable practices.

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60 Exploring incentives to move up the Food Waste Hierarchy: case study of the Australian cheese manufacturing sector

Jack Hetherington[1,2,3], Adam Loch[1], Pablo Juliano[2], Wendy Umberger[4,5]

[1]Centre for Global Food and Resources, School of Economics and Public Policy, University of Adelaide, Adelaide, Australia. [2]CSIRO Agriculture and Food, Werribee, Australia. [3]End Food Waste Cooperative Research Centre, Adelaide, Australia. [4]The Australian Centre of International Agriculture Research (ACIAR),, Canberra, Australia. [5]School of Agriculture, Food and Ecosystem Sciences, The University of Melbourne, Parkville, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

26. Practice Change and Adoption

Paper/Poster Abstract:

Food loss and waste (FLW) is a global challenge, with one-third of all food produced being lost or wasted. The United Nations' Sustainable Development Goal 12.3 aims to halve FLW by 2030 due to significant environmental, social, and economic implications. To address FLW, various definitions and frameworks have been developed including the circular economy (CE) and the Food Waste Hierarchy (FWH), which provide structured approaches to prioritise management practices by focusing on reducing, reusing, recycling, and recovering materials throughout the food production and consumption stages. Governments and firms often use the FWH to set targets and develop strategies to reduce FLW.

There are multiple types of motivators that can incentivise behaviour change. The importance of motivators for firms to change their FLW behaviour has not been systematically examined nor has how these motivators differed as firms move up the hierarchy. This study uses the cheese manufacturing sector as a case study to explore multiple motivators for firms to change management practices according to the alignment with the FWH. Interviews were conducted with 42 cheese manufacturers in Australia, which represent 31% of Australian firms across states and production scale. Using a 100-point allocation question, participants were asked to identify the relative importance of six motivators, plus an optional 'other' category. Participants' responses were grouped and compared based on predominant whey management behaviour.

Relevant motivators include coercive (profit maximisation, government regulation and buyers' expectations), normative (society's expectations and protecting the natural environment) and mimetic factors (keeping up with practices used by others). The most important driver for change relates to finding an alternative practice that maximises profit, followed by firms' desires to protect the natural environment and adhere to government regulation.

Currently, whey management issues motivate little behavioural change in buyers' waste management practices. Generally, there is a lack of differences between factors that are affecting to change their behaviour between hierarchy-levels. These results indicate there are not strong enough (dis)incentives for firms to move up the hierarchy towards human food products or animal feed, which the federal government is seeking to address going forward. Overall, the study contributes to understanding the motivators that drive firms to engage in circular business models and provides insight into their relative importance and variations across hierarchy levels, and how government agencies may do better. The findings offer areas where change can be made to reduce FLW, which can be explored in future studies. For example, increasing the awareness of whey management issues and alternative uses of whey to consumers, which could drive expectations of cheese manufacturing processes back through the supply chain. It could also drive the demand for whey-based products (e.g., alcohol products) and other full-utilisation practices.

Parallel 7D. Contributed Paper Session - Food

14:30 - 16:10 Friday, 9th February, 2024
Location Room 3, (Level 4) Marie Reay Teaching Centre
Will Martin

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251 Consumer Heterogeneity in Price Elasticity of Food: Examining the Impacts of Food Environment and Search Patterns

Nobuhiro Ito, Tomoaki Murakami

Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries, Tokyo, Japan

Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

17. Food, Health and Nutrition

Paper/Poster Abstract:

Introduction

Food environment is crucial for consumers' health and nutrition. Each consumer shops for food locally and their health and nutrition depend on local food environment, such as the level of price, quality, accessibility etc. Retailers compete spatially on price and service levels to attract neighbouring consumers. For example, while one of their strategies involves offering sales, some consumers who don't search for sale information may remain unaware. Consequently, it is important to consider spatial price competition within the local food environment, considering consumers' search behaviour. This study examines the impacts of price competition within each food environment and consumers' search behaviours on the price elasticities of food demand.

Data/Methodology

We use household purchase data collected by the Japanese survey company, Macromill, Inc. This dataset includes purchase information from 2019 to 2022 in the Tokyo area with demographic variables. Additionally, we employ store location data obtained from retailer surveys and telephone directory records to identify the locations of supermarkets, discount stores, pharmacies, and convenience stores.

We generate several key variables to represent spatial competition within each food environment and chain loyalty as proxies. The proxy for spatial competition is the number of stores within a 1km radius in each residential area (NStore), and the proxy for chain loyalty is a binary indicator denoting that only one retail chain is used within a specific month (ChainLoyal). This allows us to assess the impact of spatial competition and search behaviour on price elasticities.

We estimate a simple demand equation using a latent class regression model with interaction terms with key variables on weekly egg purchase data.

Results/Discussions

We obtained results from a 3-class model using BIC. The class proportions are 13.3%, 20.0%, and 66.7%, respectively. In each class (class 1, class 2, and class 3), the price parameters are -0.059, -0.027, and -0.065; the interaction terms with NStore are -0.086, -0.028, and -0.009; and with ChainLoyal are 0.024, 0.063, and 0.030. The total price parameters in each class are -0.121, 0.008, and -0.044. Consequently, we categorised them as follows: class 1 as environment-sensitive, class 2 as price-insensitive, and class 3 as average consumers. Spatial competition has the most significant impact on class 1; even with loyalty to a specific retail chain, they remain price-sensitive. Conversely, class 2 consumers, with chain loyalty, are less responsive to price changes. In the case of class 3, their

price sensitivities resemble those of the 1-class model with the highest BIC, indicating they represent the average consumers.

These findings suggest that price sensitivity for each consumer depends on each food environment and their behaviours. The 1-class model showed food environments lead consumers to be price-sensitive on average. However, we found that some consumers are largely influenced by the number of stores while others have little effect in our 3-class model. Retail chains should adapt their pricing strategies based on regional or consumer characteristics. Loyal consumers tend to be price-insensitive, possibly because they may not actively search for stores offering the best prices.

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185 Minimum Wage Impacts on Labor Market Outcomes in the U.S. Food Manufacturing Industry.

Dahye Kim, Zachariah Rutledge

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Presentation Type:

3. Contributed Paper

Keywords:

23. Market Design and Policy

25. Policy Analysis

Paper/Poster Abstract:

The literature on minimum wage policies has predominantly concentrated on the service sector, leaving the food manufacturing industry relatively unexplored. However, it is essential to highlight the substantial economic significance of the food manufacturing industry, which stands as the largest contributor to the US manufacturing sector, boasting a 2021 shipment value of $904.1 billion. Furthermore, this industry ranks as the second-largest employer within the US manufacturing sector, supporting over 1.5 million jobs and contributing to an annual payroll exceeding $80 billion.

Operating within a dynamic market environment, the food manufacturing industry is susceptible to changes in minimum wage regulations. These changes can have profound effects on labor costs and workforce composition, ultimately influencing operational decisions that reverberate throughout the food supply chain. Given its pivotal role in ensuring food security and pricing, understanding the impact of minimum wage policies on this sector is of paramount importance.

There are studies that investigate the minimum wage effects on aggregated manufacturing sector. However, disaggregated study is important in understanding sector-specific implications. This study focuses on the food manufacturing industry and investigates how minimum wage effects may differ across various subsectors within food manufacturing. By examining how minimum wage policies affect various subpopulations within the food manufacturing workforce, this research aims to provide a comprehensive understanding of the complex dynamics at play in this crucial sector of the economy.

Utilizing data from the American Community Survey, this paper employs econometric methods to estimate the impacts of minimum wage changes on a spectrum of labor market outcomes for food manufacturing production workers. These outcomes encompass hourly wages, likelihood of employment, hours worked, and weeks worked. Importantly, this analysis also considers the substantial presence of vulnerable groups within this workforce, such as immigrants and individuals with lower levels of education.

Key findings from this study underscore the importance of considering both sector-specific and worker-specific heterogeneities when examining the effects of minimum wages. For instance, while the fruit and vegetable (FV) and bakery manufacturing sectors experience substantial wage increases in response to minimum wage hikes, the meat manufacturing sector does not exhibit significant positive wage effects. This suggests that the impact of minimum wage policies within the food manufacturing industry is not uniform and varies across subsectors.

Beyond sectoral variations, this research unearths disparities among demographic groups within the food manufacturing workforce. It reveals that immigrants experience modest negative impacts on employment and working hours in response to minimum wage increases. Moreover, there appears to be a preference within the industry for hiring males over females and native-born individuals over foreign-born individuals.

By examining various labor market outcomes and accounting for the vulnerability of specific worker groups, this study contributes valuable insights that can inform policymakers, industry stakeholders, and researchers as they navigate the intricacies of minimum wage policies in a sector that plays a pivotal role in both the US economy and food supply chain.

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312 An enhanced treatment of resilience in food and fibre supply chains

Derek Baker[1], Elizabeth Jackson[2], Simon Cooke[3]

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Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

4. Agricultural Technology and Innovation

Paper/Poster Abstract:

There are widespread and well supported calls for enhanced sustainability in agriculture, and numerous initiatives to embed these in policy which reconciles environmental considerations with social responsibility and food security (Galli et al., 2020). Along the food and fibre supply chains firms, governments and public-private partnerships are also seeking out frameworks, or roadmaps (Dwyer et al., 2020) to meet national and international commitments while maintaining market access. Implementation mechanisms for what might be top-down policy approaches to achieve food sector sustainability have been proposed at the country (Clune, 2021) and international level (Herrero et al., 2020). These have emphasised transition in food systems which feature stakeholder interactions (Wojtynia, van Dijk, Derks, Groot Koerkamp, & Hekkert, 2021) and the networks for transactions between them (Drottberger, Melin, & Lundgren, 2021). Australian initiatives at the commodity sector level such as dairy[1] and horticulture[2] have outlined sustainability frameworks, and recent work by the Australian Farm Institute has seen an early case of a national Sustainability Framework.[3]

The drive for sustainability in food systems addresses continuity of productive themes and the preservation of the productivity of various capitals (Cook, Jackson, Fisher, Baker, & Diepeveen, 2022). Capacity for continuity is also addressed as resilience: its entry to management, stakeholder considerations, supply chain networks and policy tends to be defined over specific threats (e.g. “resilience to climate change”), or in relation to a spectrum of specified threats (Taghikhah et al., 2023).[4] Recent shifts and shocks in the geopolity, climate change, animal and human

disease, and derived behaviour of key economic actors such as providers of financial services (Mandel et al., 2021), have highlighted both the resilience of food systems (Davis, Downs, & Gephart, 2021) and shorter term adaptations in a more general sense which addresses a variety of shocks over time.

A limited number of studies have placed the economic decision maker in a food system context where a variety of resilience capacities may be present. A rare exception is Sanderson, Capon, and Hertzler (2017), which defines resilience by the time interval of a switch between regimes. Such time-specified management change is well established in supply chain strategies which employ or experience alternative regimes (Manning, Birchmore, & Morris, 2020), but does not generally extend beyond the individual firm nor approach potential sustainability frameworks. On another research front, unification of agrifood system resilience with the supply chain, the various stakeholder bases, and adaptation dynamics has been the subject of a literature review and identification of policy agendas with various goals, including sustainability (Stone & Rahimifard, 2018).

This paper addresses gaps in the literature characterised by the lack of

1. application of well-defined and generally applicable resilience metrics,
2. explicit application of supply chain management tools to different parts of the agrifood system, and
3. integration of food and fibre supply chains' resilience into frameworks for sustainability

An analytic framework is developed which integrates ongoing approaches and commentary. Conclusions extend to the framework's contribution to the design of sustainability frameworks, and its implications for stakeholder networks.

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176 Vouchers to increase the affordability of fruits and vegetables in Nigeria and Vietnam

Alan de Brauw[1], Kate Ambler[1], Oleyemisi Shittu[2]

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Presentation Type:

3. Contributed Paper

Keywords:

9. Consumer Choice

17. Food, Health and Nutrition

Paper/Poster Abstract:

Though fruits are an important part of diets, they are relatively expensive and therefore most individuals consume fewer fruits than is recommended. We use a randomized control trial to study a voucher program designed to improve the affordability of fruits and analyze whether vouchers can increase fruit consumption in peri-urban and urban settings in Vietnam and Nigeria. The vouchers were designed to be redeemed in local markets with recruited vendors, were eligible for selected fruits that were in season during part of the five month trial, and had a value representing a meaningful increase in fruit consumption. In both contexts, a large majority of consumers who received vouchers used them. The goal was to observe increases in fruit consumption as the project ended, and then a few months after, with the latter representing habit formation. In both countries, endline data collection was delayed due to complications with the COVID-19 pandemic, though monitoring surveys took place during the implementation.In Nigeria, vouchers increased consumption of certain fruit categories during program

implementation, but we find no evidence of sustained impacts post-project. In Vietnam, we find suggestive evidence of sustained increased fruit consumption in Vietnam following the project conclusion. Fruit consumption in higher across the board in Vietnam, and the sample is wealthier overall, suggesting that affordability of fruit may not be a binding constraint. In Nigeria however consumers react to voucher receipt, but may not have the resources to continue consumption once the project concluded.

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352 Food Trade Policy and Food Price Volatility

Will Martin, Abdullah Mamun, Nicolas Minot

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Presentation Type:

3. Contributed Paper

Keywords:

20. International Trade

23. Market Design and Policy

Paper/Poster Abstract:

Trade frictions in many countries are systematically adjusted to insulate domestic markets from price shocks in world markets for staple foods and reduce the associated risks of adverse impacts on food security. The model developed in this paper represents policy makers as seeking to minimize a weighted sum of costs from changing domestic prices in the presence of loss aversion and from deviating from political-economy equilibria. It is estimated by applying error correction techniques to nonstationary domestic and world price data for rice and wheat adjusted to remove all differences other than trade policies. The results suggest that systematic short-run price insulation reduces shocks to domestic prices of rice and wheat relative to those in world markets, but that this insulation roughly doubles the amplitude of price shocks in world rice and wheat markets. Unfortunately, current policies also involve large idiosyncratic policy shocks that increase domestic price volatility relative to the magnified volatility of world prices. National policy reforms to move away from current discretionary, destabilizing policies could lower costs, reduce volatility in both domestic and world prices and facilitate reform of international trade rules.

Parallel 7E. Contributed Paper Session - Farm Management and Farmer Behaviour

14:30 - 16:10 Friday, 9th February, 2024
Location Room 4, (Level 5) Marie Reay Teaching Centre
Nikki Dumbrell

106 Simulating farm decisions for policy analysis in Aotearoa New Zealand

Alex Sharples[1], Kenny Bell[1], Adam Barker[1], Kayla Jordan[2], Giotto Frean[3]

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Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

25. Policy Analysis

Paper/Poster Abstract:

The Aotearoa primary sector, which represents more than 70% of New Zealand's export economy, faces increasingly strict obligations to manage and reduce its environmental footprint, both in terms of freshwater quality and greenhouse gas emissions. While targets exist in legislation for both domains, the scale and composition of policies required to effect such transformational change remains largely unknown. To provide guidance for public policy decision makers, we have developed a multi-agent simulation model to explore the relative impacts of different types of policies on land management and land-use change decision making across primary producers. Prior work in this area have focused primarily or exclusively on financial outcomes, using optimisation models to simulate profit-maximising entities. Our model integrates behavioural mechanisms including slow adjustment, heterogeneous capability, direct environmental concern, and imperfect optimisation to capture the full causal chain from changing financial incentives and extension investments to production, profit, and pollution. To our knowledge, this comprehensive approach is unique in the literature.

The model is implemented under a modular open-source, open-data framework, with the expectation that contributions from subject-matter experts will be used to continuously improve the fidelity and accuracy of its predictions. We use recently developed spatially explicit economic indicators for 16 land uses as the basis for the financial component of the decision-making process. Contaminant loss characteristics, which demonstrate a high degree of real-world spatial heterogeneity, are similarly implemented using recent maps which provide 593,445 spatially resolved estimates of required reductions in nitrogen, phosphorous, and sediment. The model makes use of an efficient continuous optimization framework to implement land management decision making down to the sub-farm level across some 10 million hectares of productive land nationwide.

The key findings of this project will be modelling to inform the scale and composition of policies required to effect substantial environmental change, as defined by the targets legislated in the Climate Change Response Act and the National Policy Statement for Freshwater Management. We will model three high-level scenarios to evaluate their economic (sector and individual profitability) and environmental (water quality and greenhouse gas emissions) impacts relative to a no-policy baseline. First, a regulation-and-incentivisation approach, consisting of policies such as pricing agricultural emissions, restrictions on new land intensification, and taxes on excess nitrate, phosphorus, and sediment loss to waterways. Second, an educate-for-change approach, which will consist of a range of extension

programmes aimed at improving capability in alternate land uses, educating primary producers on nutrient loss mitigation techniques, and increasing the efficiency of existing farm systems. Finally, we will model a combined approach, which will use targeted regulations and incentives along with extension programmes to maximise net public benefits. We expect that these findings will serve two purposes; to increase awareness among policymakers of the available policy options and their efficacy, and to highlight critical gaps in the literature which may then be addressed by future research programmes.

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90 Integrating farmers' knowledge and scientific expertise on soil attributes – using an interdisciplinary approach in central Myanmar

Robert Farquharson[1], Ramilan Thiagarajah[2], So Pyay Thar[1]

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Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Recognition of farmers' perspectives of their soil attributes informed by their knowledge, values, and experiences is vital in understanding their fertiliser and crop management decisions. Mutual understanding between farmers and scientists has been reported to be challenging. Hence, the purpose of this study is to compare farmers' knowledge about soil attributes with what emerges from soil science knowledge. This study provides valuable context of how an interdisciplinary approach - agricultural economic and soil science disciplines - can contribute to understanding how rice farmers in Central Myanmar identify their soil attributes and how these assessments compare with soil science profile descriptions derived from a soil mapping via a reconnaissance survey. Seventy-seven percent of cases showed farmers perceptions of their soils were very closely aligned with soil science rankings. A statistical analysis showed that the farmer perceptions of their soil suitability (soil rankings) were positively significant as explanators of crop yield. We conclude that future research for development initiatives should deploy the socio-economic component at the early stages of project development to gauge farmers knowledge for effective intervention.

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31 Inter- and Intra-state Assessment of COVID-19 as a Trigger for Changes in Farm-level Decisions on Cattle Movement and Trade in Australia

Joshua Aboah, Peggy Schrobback, Stephen McFallan, Dianne Mayberry

CSIRO, St Lucia, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

1. Agribusiness

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Context: Despite the COVID restrictions, agricultural activities were permitted to continue as essential services in Australia. However, there were reported shortages of meat on the shelves of supermarkets and a general increase in the price of meat in Australia during the COVID period. Besides, the COVID-19 impact on farm-level production decisions has received little attention in the literature.

Aim: This paper examines the inter- and intra-state-level changes in farm-level decisions on beef cattle movement and trade in Australia in relation to the COVID-19 pandemic as a trigger event.

Methods: Diagnostic checks were performed to determine the optimal model-fitting approach for beef cattle movement and trade data. Based on the results of the diagnostic checking, the t-test statistic was estimated to establish the significant changes in cattle movement and trade for the pre-COVID (2014–2019) and COVID (2020–2022) periods.

Key results: The results indicate no significant change in the proportion of beef cattle herds sold nationwide. Tasmania and Western Australia (WA) recorded significant changes (1.4% increase and 3.8% decrease, respectively) in the proportion of herd size purchased. For WA, these changes were localised to changes that occurred in the WA Central and Southern Wheat Belt and the WA Southwest Coastal regions. Also, the results show a significant 2.6% decrease in the proportion of beef cattle herd size transferred onto farms in South Australia (specifically, the SA Northern Pastoral regions) during the COVID period.

Conclusions: Overall, the findings suggest that most regions in Australia did not experience significant changes in farm-level decisions regarding beef cattle movement and trade during the COVID period. Instead, minor adjustments were made to address the demand changes.

Implications: The findings highlight the potential effectiveness of normalising farm-level operations by implementing biosecurity measures and facilitating the movements of animal transport workers for breeding facilities and abattoirs by veterinarians during the COVID period. Consequently, such biosecurity measures can be reviewed by policymakers and advanced in the event of emergent animal disease outbreaks to help mitigate potential shocks in the food chain.

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21 Using the Whole Farm Economic Approach to Farm Analyses, Decisions and Management Does Things Better.

Bill Malcolm[1], Mike Stephens[2], Alex Sinnett[1], Paul Deane[1], Richard Shephard[3]

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Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

Paper/Poster Abstract:

Using the Whole Farm Economic Approach to Farm Analyses, Decisions and Management Does Things Better.

By

Bill Malcolm, Mike Stephens, Alex Sinnett, Paul Deane, Richard Shephard

Running a good farm business is about combining all the key 'bits and pieces' that make up and affect the farm business and its environment. The bits and pieces comprising and affecting a farm business are (i) the human resources; (ii) natural, physical, technical resources; (iii) economic and financial capital; (iv) the risk dimension; and (v) factors beyond the farm like weather and markets and policies. Farm systems of all shapes and forms and sizes comprise these same bits and pieces, albeit coming in combinations made up of vastly different qualities and quantities.

Each farmer and farm business are unique, placing different emphases on the various bits and pieces. Farms are run the way prefer farming, while hoping to achieve goals to a satisfactory degree, knowing goals have trade-offs. One key goal of most farmers is to continue to own and run their business. The imperative stay in business and keeping resources in good shape, for the time consistent with owners goals - being sustainable – means bills have to be paid, a return on capital earned, wealth grown, and the risk and uncertainty has to be managed effectively. This is done under the one surety of farm analyses, decisions, and management: uncertainty is trumps.

Managing the human and natural, physical, technical bits and pieces properly is necessary for success but there is more to staying in business and being efficient, liquid and growing. Achieving these types of goals as fully as possible needs the whole farm economic approach to informing farm decisions and management. Economics is the discipline about making choices and an integrating discipline. Farm economics is the core discipline of farm analysis, decisions, and management. The whole farm economic approach brings a balance of emphases on the farm bits and pieces that is apt to the questions at hand and the goals in sight.

In practice partial approaches to farm analyses, decisions and management are ubiquitous. Single-minded focus by farmers and their advisors on the technical parts of the farm business like the soil or maximum yield or overlooking risk angles are all things commonly done, yet they are done at the expense of the chances of achieving key goals. The whole farm economic approach does things better.

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82 Incentives for *maintaining* environmental benefits from land management changes for the Great Barrier Reef, Australia

Nikki Dumbrell[1], Anthea Coggan[2], Bruce Taylor[2], Scott Wilkinson[1]

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Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

21. Land and Natural Resource Management

Paper/Poster Abstract:

Multiple challenges confront environmentally, economically, socially, and culturally valued assets across the globe. The Great Barrier Reef World Heritage Area is no exception. In response, resources are being allocated to the protection of the Great Barrier Reef. However, there is a notable focus on singular environmental outcomes in these resource investments. A case study of an Australian Government program of investment in stream bank and gully erosion control projects to improve water quality in the Great Barrier Reef lagoon shows the importance of multiple public and private benefits accruing to diverse stakeholders to support and maintain the achievement of water quality improvements. Using the Great Barrier Reef case study, a conceptual framework is offered to support land management change at scale using the negotiation of state or national policy priorities and landholder (local/paddock-scale) priorities through the design, implementation, and maintenance phases of land management change projects. The role of regional planning and brokers to negotiate and coordinate national and local priorities will also be discussed. Semi-structured interviews with 26 landholders across six catchments to the Great Barrier Reef in April and May 2023 revealed that diffuse water quality benefits in the Great Barrier Reef were not a key benefit motivating engagement or maintenance of erosion control projects. Rather, landholders engaged to access resources (expertise, finance) for projects they wanted to do anyway but lacked resources for, e.g., changed grazing management, changed fencing layout. The interviews also revealed that public resources were available mostly for the project design and implementation phases and the availability of resources for maintenance of project sites was mixed. Consequently, the agricultural production or other site benefits accruing to landholders were critical motivators for landholders to maintain project sites without further public investment for maintenance or repair following substantial weather events. We pair these findings with predictions of the impact of maintenance of erosion control project sites on sediment. The analysis shows that maintenance of erosion sites is critical to achieving sediment savings created through the implementation of projects. The results also show that while outcomes for one environmental metric may drive initial investment and be used to assess the cost-effectiveness of public investment in environmental (public good) outcomes, the maintenance of land management changes is critical for environmental outcomes and relies on the simultaneous accrual of economic and social benefits to landholders.

Parallel 7F. Contributed Paper Session - Valuation 5

14:30 - 16:10 Friday, 9th February, 2024
Location Room 5, (Level 5) Marie Reay Teaching Centre Ben White

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187 Harvest for ecosystem: Evaluating the production impact of pollination service in agriculture

Shuay-Tsyr Ho

National Taiwan University, Taipei, Taiwan

Presentation Type:

3. Contributed Paper

Keywords:

3. Agricultural Production

28. Uncertainty and Risk

Paper/Poster Abstract:

Pollination service delivers the value of ecosystem services and secures agricultural production. Animal pollinators facilitate the harvest of specialty crops. Agricultural production reciprocates by sustaining the livelihood and habitats of these pollinators. Crops that require bee pollination are therefore susceptible to the stability of bee colonies. A wide variety of crops rely on pollination services including the melon family, perennial fruit crops, and shallow-rooted vegetables. Increasing use of agricultural facility such as greenhouses or net houses however might dampen the benefits of pollination services since their indoor mobility are restricted which may pose challenges to growers. Popularity of shallow-rooted vegetables and conventional farming in slopeland could result in soil erosion at higher severity level compared to production in plains. This research focuses on pollinated crops in Taiwan encompassing different terrains and uses panel data to examine how pollination risks could have aggravated the production risk facing farmers. The purpose of this study is to empirically investigate how weather factors, chemical and pesticide usage, and habitat losses affecting the supply of pollinating bees could predominantly influence the market of those pollinated crops in production, market price, and sales. Furthermore, the impacts are differentiated by land use pattern and crop industries, where the ecosystem services provided by honey bees could entail different values depending on the economic value of crops and growing region. This study contributes to existing research on honey bees, crop industry, and pollination market in two ways. First, a variety of crops are considered for broad impact evaluation. Second, land use, agricultural facility, insurance program, and the economic value are incorporated into the linkage between crop market and pollination services. This study compiles data on agricultural production, farm-gate prices, weather conditions, agricultural facility, and honey bee market to consolidate both economic and non-economic information on the market for pollinated crops in Taiwan across both plain and slopeland region from 2003 to 2022. We first estimate the impact of natural and human factors on the supply of honey bees by using aggregate-level data on honey bees and bee products including number of honey bee hives, beekeepers, honey collection periods, and honey from Litchi and Longan, combined with input usage and temperature data. We identify the critical threshold year(s) that determine the reduction of honey bee hives, shortened periods of honey collection, and surging prices to characterize the pollination risk. We then examine how production, harvested acreage, price, and crop sales are affected by the pollination risk event, shrinkage of honey bee colonies, as well as the insurance for agricultural facilities. Furthermore, we examine how the pollination impact on agricultural production interacts with protected house adoption and land choice. Our findings would shed light on the direct linkage between pollination service and crop market, where the heterogeneous values of ecosystem service brought about by different land uses and crop industries should be taken into consideration in designing effective policy tools for not only mitigating economic losses but internalizing the value of ecosystem service and risk premium in insurance scheme.

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225 Achieving Socially Optimal Pesticide Use in Modern Agriculture: A Choice Experiment in Japan

Hiroki Kiriyama, Hirotaka Matsuda, Yoshiaki Kamiji

Tokyo University of Agriculture, Kanagawa, Japan

Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

29. Valuation

Paper/Poster Abstract:

Introduction

Agriculture in recent is marked by its heavy reliance on intensive pesticide use to boost crop yields and ensure a consistent food supply. While pesticides have unquestionably played a pivotal role in enhancing agricultural productivity, their extensive use comes with a set of significant challenges. These include concerns over pesticide residues in agricultural products and environmental pollution, particularly the contamination of groundwater. In light of these issues, there exists a compelling need to strike a balance between the costs and benefits of pesticide use and to align agricultural practice with social preferences.

The crux of the matter lies in the presence of information asymmetry and a competitive market. In an ideal scenario with perfect information, farmers driven by profit-maximizing motives would naturally gravitate towards an optimal level of pesticide use. However, the real-world agricultural is far more complex. It is reasonable to assume that consumers do not possess detailed information about variations in pesticide use throughout the different growth stages of crops. On the other hand, farmers often perceive that consumers favor agricultural products with reduced pesticide residues. This perception creates an equilibrium where farmers may strategically reduce pesticide use, especially close to the time of consumption, to address consumer concerns. Furthermore, the impact of pesticide use on production outcomes can vary depending on the crop's growth stage. Therefore, farmers' preferences for reducing pesticide use at each growth stage may fluctuate.

In this study, we conduct a choice experiment for farmers and consumers in Japan. Our primary aim was to discern whether farmers can adapt their practices in response to consumer preferences, thereby contributing to the realization of socially optimal pesticide use.

Methodology and Data

We initiated a choice experiment for farmers in Japan, distributing surveys through agricultural cooperatives. We received 250 responses, primarily from rice farmers. The choice experiment featured attributes such as the extent of reduction in insecticide and fungicide use at various crop growth stages (nursling seedlings, after planting, and harvest), alongside rice prices.

For the consumer, we conducted an online questionnaire survey to individuals residing in Tokyo in November 2022. The data are analyzed using mixed logit model.

Results

Farmers exhibited the highest utility and willingness-to-accept (WTA) for reducing insecticide and fungicide use during the harvest. Concurrently, consumers demonstrated their highest utility and willingness-to-pay (WTP) for reduced pesticide use during the harvest. These findings emphasize the crucial importance of focusing on pesticide reduction strategies during the harvest to achieve social optimality in pesticide use.

Conclusion

The convergence of farmers' willingness to accept changes in their pesticide use and consumers' desires for reduced pesticide residues underscores the potential for attaining a socially optimal equilibrium in pesticide use. Recognizing these shared interests and enabling farmers to adjust their pesticide use accordingly holds the key to sustainable and

socially optimal pesticide practices in modern agriculture. This research offers valuable insights into the complex dynamics of pesticide use, emphasizing the pivotal role of consumer preferences and information dissemination in fostering sustainable agricultural practices.

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78 Hedonic land valuation utilising soil carbon and nitrogen variation

Nicola Thomas

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Presentation Type:

3. Contributed Paper

Keywords:

15. Farm Management and Farmer Behaviour

29. Valuation

Paper/Poster Abstract:

Soil carbon is essential for sustainable agricultural land use: it increases the soil's ability to store moisture and nutrients and can vary depending on land management practices (Turmel et al., 2015). With predicted climate change it is expected that resulting climate shocks will impact crop yields but can also increase the rate of soil carbon loss, leading to a reduction in soil nutrients (Arora, 2019). Soil nitrogen can be used as a proxy for the wider suite of nutrients required by crops consistent with Schulte et al. (2014). Evaluating the impact of management practices and climate shocks on soil and agricultural land productivity is a key research area. This study utilises site soil carbon and nitrogen data to develop a soil productivity index used to value agricultural land at a site in Wagga Wagga, New South Wales, Australia.

The value of agricultural land reflects its future productive capacity. Crop yields are limited by soil nutrient content and texture, and prevailing climatic conditions. Farmers use management practices to manage soil organic material improve soil cationic exchange capacity (CEC), and, therefore, crop yields and farmer income (Agegnehu et al., 2016; Godde et al., 2016). Research has identified a link between the soil CEC, nitrogen and carbon content. Using these relationships this study develops and evaluates the effectiveness of a soil productivity index which uses periodic changes in soil carbon, nitrogen and the CEC. The soil productivity index provides a mechanism for evaluating the impact of climate shocks and management processes on future agricultural land productivity.

The results demonstrate that the soil productivity index consistently reflects the soil carbon and nitrogen variation across climate scenarios, management treatments and fertiliser input quantities modelled using crop modelling software. The soil productivity index is concordant with results in biophysical studies measuring the impact of soil nitrogen or carbon losses on soil productivity (Dai et al., 1993; Lassaletta, 2014). The soil productivity index provides insight into why higher soil nitrogen is insufficient to increase soil productivity.

An extension is undertaken extending the soil productivity index to vary land value, which creates a method of evaluating the impact of management processes on soil quality. The soil productivity index is used to vary land value in Wagga Wagga generating variation in land value consistent with the NSW Government's land valuation variation for the region between 2010 and 2014 (New South Wales Department of Finance and Services, 2014). Consistent with stock market theory of Chen et al. (1986) changes in soil productivity represent unrealised returns to land assets that must be allocated to the asset. Incorporating biophysical changes in the productive capacity of land into an

economic land value analysis represents a new land valuation approach utilising the wealth of soil data available to farmers.

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143 Benefit transfer to value environmental projects in developing countries: Potential challenges and solutions

Md Sayed Iftekhar

Griffith University, Brisbane, Australia

Presentation Type:

3. Contributed Paper

Keywords:

5. Biodiversity

14. Environmental Economics

Paper/Poster Abstract:

Ecosystem protection and rehabilitation projects are likely to generate multiple ecosystem service benefits. Many of these benefits (such as potable water supply and production of goods) could be measured using existing market prices. However, many other types of benefits (such as improvement in aesthetics, and recreation opportunities) often do not have clear market prices. Application of nonmarket valuation techniques is common to assess the nonmarket values of such ecosystem services. However, conducting primary nonmarket valuation studies requires considerable time and effort which are often unavailable during the rapid economic assessment of projects. This is particularly challenging for agencies in developing countries who are often capacity and resource constrained. The application of benefit transfer techniques could be useful in this context. In this paper, based on a systematic review of literature potential challenges of benefit transfer in developing country context will be discussed. Further, potential solutions to tackle these challenges will be discussed.

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139 Valuing the Services of a Hidden Work Force: the Case of Australian Dung Beetles

Benedict White[1], Jacob Berson[1,2]

[1]UWA, Perth, Australia. [2]CSIRO, Perth, Australia

Presentation Type:

3. Contributed Paper

Keywords:

4. Agricultural Technology and Innovation

11. Ecological Economics

Paper/Poster Abstract:

Regulating and supporting ecosystem services often provide non-market, non-rival and non-excludable “public good” inputs into agriculture. Examples include pollination services in Western Australia from feral bees that are sustained by building their hives in remnant native vegetation; the moderation of catchment water flows through retained native vegetation; and the introduction of exotic dung beetles into Australia. The introduction of dung beetles in the 1960s and 1970s is linked to numerous pasture productivity, livestock health, and community health benefits. This is due to the ability of dung beetles to incorporate dung in the soil and compete with pest flies and nematodes for dung resources. This paper develops an empirical approach based on a distance function and duality to value dung beetles in Australia. Valuing dung beetles is important as it indicates the return on investment in new dung beetle species and encourages farmers to manage the dung beetles on their farm in a way that maximises the collective benefit to the farmers.

Afternoon Tea

16:10 - 16:25 Friday, 9th February, 2024
Location Lobby Bar and Northern Courtyard, Kambri Cultural Centre

Awards and Closing Session

16:25 - 17:00 Friday, 9th February, 2024
Location Manning Clark Hall, Kambri Cultural Centre
Sorada Tapsuwan