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15 October 2024

Ike Sari Astuti
Universitas Negeri Malang

SMERU - ANU Indonesia Project Collaborative Research Grant Offer Letter

Dear Ike Sari Astuti

(cc: Research team of Paul Dargusch, Bagus Setiabudi Wiwoho, Ifan Deffinika)

I am pleased to inform you that the selection committee for the 2024/2025 ANU Indonesia Project Collaborative Research Grants has awarded a grant for your research proposal, titled “A spatial approach to characterize the perishable vegetation supply chain and risks to post-harvest loss due to climate change”

The grants, delivered by the ANU Indonesia Project in collaboration with the SMERU Research Institute (SMERU), aim to stimulate research cooperation among Indonesian and Australian research institutes in the areas of (i) trade and industry, (ii) politics and governance, (iii) agriculture, resources and the environment, (iv) climate change, (v) social policy and human capital, and (vi) gender equality, disability and social inclusion.

Grant Arrangements

You have been awarded the grant based on the details in your proposal and are expected to follow these. If any of the details change (including timeframes and deliverables) you will need to notify us in writing.

SMERU will disburse the grant to the lead applicant’s institution for the project. The lead applicant is expected to hold and manage the grant, including dispersing any funds to the other partners. The lead applicant is also responsible for the financial reporting.

9 Fellows Rd, Coombs Building, Canberra 2600, ACT Australia
The Australian National University

TEQSA Provider ID: PRV12002 (Australian University)
CRICOS Provider Code: 00120C

SMERU will provide 50% of the total grant amount (as stipulated in your proposal) at the start of the project and the remaining 50% after your team submit the deliverables listed in your proposal and a brief financial report (with receipts attached) justifying the expenses. Any funds that have not been claimed by 31 September 2025 will expire. Please contact Hesti Marsono at SMERU (hesti@smeru.or.id) and provide her the details required for the transfer of funds.

It is anticipated that recipients of a Collaborative Research Grant may be requested to participate in publicity of the grant from time to time. Recipients may be contacted for an interview and photograph. The ANU Indonesia Project may also publicise the grants by publishing the names of the recipients. Such arrangements will be made through the Indonesia Project administration. You must acknowledge the receipt of the grant in your research output.

If you agree with the terms and conditions, please accept this offer by replying to Indonesia.Project@anu.edu.au. If you have any further questions, please don't hesitate to contact us via Indonesia.Project@anu.edu.au.

I wish you all the best with your research project and am looking forward to learning about your findings.

Yours sincerely,



Sarah Xue Dong
Indonesia Project,
Crawford School of Public Policy
ANU College of Asia and the Pacific
The Australian National University



**Indonesia Project Collaborative Research Grants
Application Form– 2024-2025**

Section 1: Composition of research team	
Lead applicant	
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Co-applicant	
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Title	Dr
University / Institute	Pacific Action for Climate Transition, Monash Business School, Monash University
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Phone	+61 476 292 560
Other researchers	
Name	Bagus Setiabudi Wiwoho, Ifan Deffinika
Title	Dr (Bagus SW), M.Sc. (Ifan Deffinika)
University / Institute	Universitas Negeri Malang
Email	bagus.setiabudi.fis@um.ac.id , ifan.deffinika.fis@um.ac.id
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Phone	+62-889-7542-6490 (Bagus S Wiwoho), +62-856-9449-8014 (Ifan Deffinika)

Section 2: Proposal detail (max. 2 pages)	
Title	A spatial approach to characterize the perishable vegetable supply chain and risks to post-harvest loss due to climate change
Research objectives	This research aims to explore the potential of Geographic Information Systems (GIS) and remote sensing geospatial datasets to (1) map and analyze the characteristics of the perishable vegetable supply chain from production sites to market in East Java, (2) look at the critical loss points of vegetable transports, (3) examine the role of temperatures, rainfall, and humidity in affecting the post-harvest loss of the transported vegetables.
Background	<p>In tropical countries, especially in lowland areas such as coastal regions, post-harvest loss from perishable vegetation is a crucial problem. Elevated temperature and humidity are expected to fasten the decay processes of vegetables, leading to increasing waste, reduced product lifespan, and finally, higher economic loss for small-scale farmers. As climate change issues become intensified, the need to comprehend the perishable vegetable supply chain is more critical.</p> <p>A vegetable supply chain is a complex process that involves biophysical and socio-economic factors. It also involves both spatial and non-spatial elements such as distance and infrastructure which need to be integrated into a common platform. GIS and remote sensing geospatial datasets and technologies offer such capacity for data integration, advanced spatial analysis capabilities, and geo-visualization to better understand the complex process of the vegetable supply chain from gate to market. For example, GIS and remote sensing can be used to analyze the hotspots of delays, variability of temperature risks among locations, zones, or proximity clusters to markets, patterns, and distribution of farms, storages, facilities, and markets, and efficiency of such transportation through networking analysis.</p> <p>GIS and remote sensing approaches have also proven effective in capturing the complexity of a spatio-temporal dynamics-driven issue. Unfortunately, most supply chain studies rarely exploit the use of GIS and remote sensing technologies to obtain an alternative both spatial and non-spatial perspectives of the supply chain process. Leveraging GIS and remote sensing datasets and technologies can provide insights into vegetable supply chains that cannot be obtained through traditional non-spatial approaches.</p>
Significance and Policy Relevance	This project provides opportunities to improve the understanding of spatiotemporal aspects of perishable vegetable supply chain processes, barriers and challenges of supply chain processes, and efficiency and sustainability of the vegetable supply chain. Integration of GIS and remote sensing datasets and technologies could improve the understanding of climate factors and their impacts on post-harvest loss and potential ways to mitigate the risks. This research is beneficial for enhancing the resilience of the tropical perishable vegetable supply chain amidst the increasing risks of climate change. By addressing the impacts of climate change on post-harvest losses, the study will contribute to reducing food waste and improving the profitability of such vegetable farming for small-scale farmers.

Methodology	<p>The project will be using a case study of the perishable vegetable supply chain in East Java from two vegetable centers in coastal and upland areas (Surabaya area and Malang area). The project will be carried out through a mixed approach exploiting qualitative and quantitative techniques. A field observation, survey, and interview in two sites will be employed by enumerators to gain data about the key actors and features of the vegetable supply chain from gate to market.</p> <p>Tracking and physical measurement of climatic variables will be performed throughout the process of vegetable deliveries. Analysis of post-harvest losses in terms of product weight will be done along with the tracking and qualitative assessment of product qualities will also be utilized.</p> <p>GIS and remote sensing data will be acquired to understand the dynamic of important variables affecting product quality such as temperature, humidity, and precipitation. Data acquisition from local weather stations will also be acquired for finer information. A set of GIS analyses such as hotspots analysis, buffer analysis, network analysis, time series, and spatial clustering will be exploited to depict in detail the distribution, proximities, distance, risk of climate, and transports of vegetables. Numerical modeling will be explored to quantify the relationship between climatic factors, transportation, infrastructure, and weight loss of the vegetables.</p>																																																																																																																												
Outcomes, deliverables, and timeline	<p>Expected outcome: The research would reliably produce a set of spatially informed, data-driven insights that can significantly improve the management of post-harvest losses in tropical vegetable farming. This includes a spatial map of the vegetable supply chain; identified critical loss points, quantified relationship of factors affecting loss, and enhanced understanding of regional variability leading to tailored scalable solutions for other areas.</p> <p>Proposed deliverables: A comprehensive research report, GIS-based spatial vegetable supply chain maps, a brief executive summary for local stakeholders, and public presentation tools (videos) for public outreach.</p> <p>Timeline:</p> <table border="1"> <thead> <tr> <th rowspan="2">No</th> <th rowspan="2">Activity</th> <th colspan="12">Month</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> <th>11</th> <th>12</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ethical clearance and scoping</td> <td>x</td> <td>x</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Literature review</td> <td></td> <td>x</td> <td>x</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Preparation and coordination</td> <td></td> <td></td> <td></td> <td>x</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>Field observation, survey and interview</td> <td></td> <td></td> <td></td> <td></td> <td>x</td> <td>x</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Data analysis</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>x</td> <td>x</td> <td>x</td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>Workshop wrap-up</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>x</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>Reporting and deliverables finalization</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>x</td> <td>x</td> </tr> </tbody> </table>	No	Activity	Month												1	2	3	4	5	6	7	8	9	10	11	12	1	Ethical clearance and scoping	x	x											2	Literature review		x	x										3	Preparation and coordination				x									4	Field observation, survey and interview					x	x							5	Data analysis							x	x	x				6	Workshop wrap-up										x			7	Reporting and deliverables finalization											x	x
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Section 3: Relevant publications of the applicants and research team (max. 1 page)

- Pastrana, Felipe Jimenez, **Paul Dargusch**, and Genia Hill. "How is environmental sustainability a key to innovation?." *Advances in Environmental and Engineering Research* 3, no. 2 (2022): 016.
- Hill, Genia, Rachel Friedman, and **Paul Dargusch**. "Food Systems Development: The Necessary Paradigm Shift for a Healthy and Sustainable Agrarian Transition, a Case Study from Bougainville, Papua New Guinea." *International Journal of Environmental Research and Public Health* 19, no. 8 (2022): 4651.
- Chandra, Alvin, Karen E. McNamara, and **Paul Dargusch**. "Climate-smart agriculture: perspectives and framings." *Climate Policy* 18, no. 4 (2018): 526-541.
- Rochecoste, Jean-Francois, **Paul Dargusch**, Donald Cameron, and Carl Smith. "An analysis of the socio-economic factors influencing the adoption of conservation agriculture as a climate change mitigation activity in Australian dryland grain production." *Agricultural Systems* 135 (2015): 20-30.
- **Wiwoho, Bagus Setiabudi, Ike Sari Astuti**, Purwanto Purwanto, **Ifan Deffinika**, Imam Abdul Gani Alfarizi, Hetty Rahmawati Sucahyo, Randhiki Gusti, Mochammad Tri Herwanto, and Gilang Aulia Herlambang. "Assessing long-term rainfall trends and changes in a tropical watershed Brantas, Indonesia: an approach for quantifying the agreement among satellite-based rainfall data, ground rainfall data, and small-scale farmers questionnaires." *Natural Hazards* 117, no. 3 (2023): 2835-2862.
- **Astuti, Ike Sari, Bagus Setiabudi Wiwoho**, Purwanto Purwanto, Satti Wagistina, Ifan Deffinika, Hetty Rahmawati Sucahyo, Gilang Aulia Herlambang, and Imam Abdul Gani Alfarizi. "An application of improved MODIS-based potential evapotranspiration estimates in a humid tropic brantas watershed—implications for agricultural water management." *ISPRS International Journal of Geo-Information* 11, no. 3 (2022): 182.
- **Wiwoho, Bagus Setiabudi, Ike Sari Astuti**, Imam Abdul Gani Alfarizi, and Hetty Rahmawati Sucahyo. "Validation of three daily satellite rainfall products in a humid tropic watershed, Brantas, Indonesia: implications to land characteristics and hydrological modelling." *Hydrology* 8, no. 4 (2021): 154.
- Santi Irawati*, **Ifan Deffinika**, Desi Rahmadani, I Nengah Parta, Norkhairiah Hashim , (2024), "Analysis of The Potential of Women's Economic Empowerment in the Digital Marketing Sector" in 2nd International Conference on Gender, Culture and Society, KnE Social Sciences, pages 414–424. DOI 10.18502/kss.v9i23.16752

Section 4: Budget and budget justification

No	Item	Cost (AUD)	Justification
1	Ethical clearance and scoping		
	Travel & accommodation	698	This is to be used for components: car rents and accommodation of Indonesia's researchers and research assistants, per diems for outside activities focusing on ethical clearance and scoping in 2 sites for 3 persons, 3 days
	Survey	550	Compensation for 30 respondents, enumerators for initial field assessment, identification of key respondents, institutional and situational setting, resources and facilities (2 enumerators, 8 days in 2 sites), as well as compensation for interviewees 30 persons (farmers, middleman, wholesalers)
	Per Diem,	487	Per diems for three researchers during activities outside Malang (2 sites, 2 days)
	Ethical clearance	50	Fees for submitting ethics and clearance to the UM website
2	Field observation, survey, and measurement		
	Equipment	693	To be used for lab and field equipment rent, tracking, bike rent during data collection and tracking process
	Accommodation	1,709	Accommodation for 3 researchers in 2 sites for 5 days. This is to collect data, engage with stakeholders and farmers
	Per Diem	1,218	Per Diems for outside Malang for 3 researchers 2 sites 5 days
	Travel	891	Car rental as travel along the project during fieldwork, workshops,
	Workshop	1,163	To be used for attendees' transport compensation, meals during the workshop, materials,
	Survey	760	Enumerators will be doing the biophysical data collection, tracking, monitoring, observation
3	Technical support		
	Personnel	1,604	We will hire 2 RA's full-time, to assist research implementation major phase including assisting in a literature review, managing the database, developing instruments, organizing the survey, assisting in supervising enumerators, and preparing and performing GIS and remote sensing analysis.
	Outreach	149	Video design, editing and advertising materials
	TOTAL	9,971	

Annexes

CV for main and co-applicants are separate files

Signatures

Main Applicant



Ike Sari Astuti

Co-applicant



Prof. Paul Dargusch

**CLOSING
DATE**

15 August 2024

*Email this form with relevant supporting documents to the Indonesia Project:
indonesia.project@anu.edu.au*