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Japan Science and Technology Agency
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JST is to fund six research projects for the e-ASIA Joint Research Program in the fields of "Alternative Energy" and "Agriculture (Food)"

The Japan Science and Technology Agency (JST) decided to start new projects within the framework of the e-ASIA Joint Research Program [*1].

JST and seven funding agencies from five countries (Appendix 1) jointly opened the call for research projects in the fields of "Alternative Energy" and "Agriculture (Food)".

A total of 42 proposals, 26 in the field of "Alternative Energy" and 16 in the field of "Agriculture (Food)" were submitted in response to the joint call. Based on an expert evaluation conducted in each country (Appendix 2), JST and the other funding agencies jointly decided to support six projects, three in the field of "Alternative Energy" and three in the field of "Agriculture (Food)" (Appendix 3, 4).

The research period is scheduled to be three years.

*1) e-ASIA Joint Research Program (e-ASIA JRP)
Through the acceleration of science and technology research exchange and collaboration in the Pacific Rim countries and ASEAN countries, etc., the e-ASIA Joint Research Program (e-ASIA JRP) aims to strengthen research and development capabilities towards resolution of shared challenges across the region, including those associated with materials, alternative energy, agriculture, health research, disaster risk reduction and management, advanced interdisciplinary research towards innovation, and environment.
As part of that objective, e-ASIA JRP is intended to support collaborative research implemented among three or more of its member countries. Through the implementation of joint research among participating countries in agreed fields of research, it is the goal of the e-ASIA JRP to contribute to economic and human resource development, as well as the resolution of various challenges in the region.
URL: https://www.the-easia.org/jrp/

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Appendix 1

Participating funding agencies

Alternative Energy

Country Name	Funding Agency Name
Japan	Japan Science and Technology Agency (JST)
Indonesia	National Research and Innovation Agency (BRIN)
New Zealand	Ministry of Business, Innovation and Employment (MBIE)
The Philippines	Department of Science and Technology Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD)
Thailand	Program Management Unit for Human Resources and Institutional Development, Research and Innovation (PMU-B)

Agriculture (Food)

Country Name	Funding Agency Name
Japan	Japan Science and Technology Agency (JST)
Cambodia	Ministry of Industry, Science, Technology and Innovation (MISTI)
Indonesia	National Research and Innovation Agency (BRIN)
The Philippines	Department of Science and Technology Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD)
Thailand	National Research Council of Thailand (NRCT)

Appendix 2

Experts for evaluation (JST)

Alternative Energy

Member Name	Position and Institution	Note
KOKUBUN Makie	Professor Emeritus, Tohoku University	Program Officer
ISHIHARA Tatsumi	Professor, Faculty of Engineering, Kyushu University	Advisor
Armando Tibigin Quitain	Professor, Center for International Education, Kumamoto University	Advisor
GOKON Nobuyuki	Associate Professor, Faculty of Engineering, Niigata University	Advisor
XU Yibin	Group Leader, Center for Basic Research on Materials, National Institute for Materials Science	Advisor
TAKADA Kazunori	Fellow, National Institute for Materials Science	Advisor
TADA Chika	Associate Professor, Graduate School of Agricultural Science, Tohoku University	Advisor
NEGISHI Shintaro	Associate Professor, Faculty of Engineering, Kanagawa University	Advisor
HIRANO Yujiro	Chief Senior Researcher, Social Systems Division, National Institute for Environmental Studies	Advisor

Position & Institution are as of the time of the expert evaluation.

Agriculture (Food)

Member Name	Position and Institution	Note
KOKUBUN Makie	Professor Emeritus, Tohoku University	Program Officer
TANAKA Fumihiko	Professor, Faculty of Agriculture, Kyushu University	Advisor
NAKAGAWA Junichi	Director General, Research Center for Agricultural Robotics, National Agriculture and Food Research Organization	Advisor
NINOMIYA Seishi	Professor Emeritus, The University of Tokyo	Advisor
MOCHIDA Keiichi	Team Leader, Center for Sustainable Resource Science, RIKEN	Advisor
WASHIZU Ayu	Professor, Faculty of Social Sciences, Waseda University	Advisor

Position & Institution are as of the time of the expert evaluation.

Appendix 3

Abstracts of the new projects – Alternative Energy

Project Title	Principal Investigators	Position and Institution	Abstract of Research Project
Improving the Sustainability of Resource Recovery from Wet Biomass Waste: Experimentally-Validated GIS-Based Integrated Biorefineries for Cleaner Mobility	<u>ONODA Hiroshi</u> (Japan)	Professor, Graduate School of Environment and Energy Engineering, Waseda University	This collaborative research project aims to improve the economic and technical viability of biorefineries in Southeast Asia to convert municipal solid wastes and residues from the agricultural and tourism sectors into biofuels and liquid fertilizers. Specifically, the Japanese team will perform studies about at-source collection and mechanical separation technologies. Geospatial data collection will be done by the Thai team, the Filipino team, and the Indonesian team while Geographic Information System (GIS) mapping and energy management design of supply, demand, and recovery in integrated biorefineries will be performed by the Japanese team and the Filipino team. The Indonesian team will perform biochemical and thermochemical conversion experiments with catalysts developed by the Thai team. The Thai team will also perform bio-alcohols production experiments, and the chemical characterizations will be done by the Indonesian team. Finally, socio-techno-economic (STE) analysis will be performed by all countries led by the Japanese team. Through collaborative and complementary research among four countries, experimentally informed GIS-based decision-making tool will be developed to optimize biorefineries using wet biomass waste. We integrate spatial modeling, experiments, process simulations, and econometrics to evaluate and improve STE performances.
	Hanifrahmawan Sudibyo (Indonesia)	Assistant Professor, Chemical Engineering, Gadjah Mada University	
	Apanee Luengnaruemitchai (Thailand)	Professor, The Petroleum and Petrochemical College, Chulalongkorn University	
	Rovick Tarife (the Philippines)	Instructor, Electrical Engineering, Mindanao State University – Iligan Institute of Technology	

Underlined: Lead Principal Investigator

Project Title	Principal Investigators	Position and Institution	Abstract of Research Project
Integrated Biomass Upgrading: Advancing Hydrogen and Valuable Green Chemicals through Electroreforming	TESHIMA Katsuya (Japan)	Professor, Institute for Aqua Regeneration / Faculty of Engineering, Shinshu University	This collaboration research project aims to build a low-cost biomass electrolysis system that can produce hydrogen fuel along with high-value oxidation byproducts. The Japanese team will develop catalyst materials, analyze the mechanism of catalytic action and design electrolytic reaction process. The Thai team will be responsible for the design, construction, and electrochemical reaction analysis of the electrolysis cell, and design of electrolytic reaction process. The New Zealand team will be responsible for scaling up the electrolysis system to commercial scale. Through collaboration research by teams from three countries, a circular economy type biomass electrolysis system will be created. Our feature is that we contribute to the social implementation of locally produced systems that reflect the development needs and environment of each country through a consistent approach, from science such as material creation and scientific exploration on a laboratory scale to system design suitable for Life Cycle Assessment optimized for each country.
	Holger Fiedler (New Zealand)	Energy Materials Scientist, Earth Resources and Materials, GNS Science	
	Soorathep Kheawhom (Thailand)	Associate Professor, Chemical Engineering, Chulalongkorn University	

Underlined: Lead Principal Investigator

Project Title	Principal Investigators	Position and Institution	Abstract of Research Project
Interface Materials Informatics - A platform for semiconductor interface design and optimization in organic solar cells	<u>Daniel Packwood</u> (Japan)	Associate Professor, Institute for Advanced Study, Kyoto University	This collaboration research project aims to construct a materials informatics platform for optimizing semiconductor interface compositions by integrating first-principles calculations, machine learning, and experimentation. The Japanese team will focus on interface structure design and machine learning, the New Zealand team will work on charge and exciton transfer modeling, and the Thai team will concentrate on semiconductor fabrication and physical property evaluation, leveraging complementary expertise of each other to drive the project forward. This research is expected to improve the efficiency of light-to-power conversion in organic solar cells by identification of interface compositions through virtual screening, which minimize series resistance in organic solar cells. This research will maximize the use of a strong collaborative research framework, expanding upon Kyoto University's On-site Laboratory activities in a cross-disciplinary manner.
	Justin Hodgkiss (New Zealand)	Professor, School of Chemical and Physical Sciences, Victoria University of Wellington	
	Pichaya Pattanasattayavong (Thailand)	Assistant Professor, School of Molecular Science and Engineering, Vidyasirimedhi Institute of Science and Technology	

Underlined: Lead Principal Investigator

Appendix 4

Abstracts of the new projects – Agriculture (Food)

Project Title	Principal Investigators	Position and Institution	Abstract of Research Project
Speeding up rice mutation breeding to ensure food security under climate change using remote sensing and interpretable AI	<u>KATSURA Keisuke</u> (Japan)	Professor, Graduate School of Agriculture, Kyoto University	This collaborative research project aims to accelerate mutation breeding for sustainable crop production under climate change by development of interpretable AI to predict rice yield limiting factors from time-series canopy image and using latest genetic analysis technology. Specifically, the Japanese team will develop AI models to reveal yield limiting factors based on image analysis and identify mutation-causing gene regions by whole genome sequence analysis, while the Thai and Indonesian teams will conduct rice mutant screening field trials under various environmental stress conditions, such as drought stress, and collect image data and rice yield and related traits. Through joint research by the three teams, it is expected that not only will mutation breeding be accelerated, but also useful genes that have been overlooked by conventional screening methods will be discovered. It is also expected that Japanese researchers will be able to transfer their expertise in image analysis, machine learning and genetic analysis to researchers in other countries.
	Prakobkit Dangthaisong (Thailand)	Agricultural Research Officer, Rice Department, Khlong Luang Rice Research Center	
	Winda Puspitasari (Indonesia)	Researcher, Research Center for Food Crops, National Research and Innovation Agency	

Underlined: Lead Principal Investigator

Project Title	Principal Investigators	Position and Institution	Abstract of Research Project
CSA for small paddy farmers to reduce methane emissions and to increase yields in terraced paddy areas	KATO Tasuku (Japan)	Professor, Institute of Agriculture, Tokyo University of Agriculture and Technology	This collaborative research project aims to develop a Climate-Smart Agriculture (CSA) framework by utilizing dense spatiotemporal monitoring and accurate predictive modeling. Its goal is to enhance yields and mitigate methane emissions in terraced rice paddy regions with rich ecosystem services. This project specifically focuses on formulating guidelines for Alternate Wetting and Drying (AWD) irrigation to reduce methane emissions, enhance yields, and improve water efficiency in terraced rice paddies. This project will be piloted in Bali, Indonesia. At the watershed scale, water allocation and balance analyses will inform the deployment of AWD. The objective of this is to enhance the reliability of the AWD, ensuring that its benefits are realized while minimizing yield loss risks. Game theory analysis aims to outline basin-wide AWD scenarios achievable through collaboration with water management associations, thus facilitating broader social implementation.
	I Made Anom Sutrisna Wijaya (Indonesia)	Dean, Faculty of Agricultural Technology, Udayana University	
	Surat Bualert (Thailand)	Assistant Professor, Faculty of Environment, Kasetsart University	

Underlined: Lead Principal Investigator

Project Title	Principal Investigators	Position and Institution	Abstract of Research Project
Development of Diagnostics and Therapeutics to Mitigate the Impacts of Climate Change on Shrimp Health and Growth Dynamics	KOIWAI Keiichiro (Japan)	Associate Professor, Institute for Aquaculture Biotechnology, Faculty, Tokyo University of Marine Science and Technology	The research project introduces a groundbreaking single-virus analysis method for penaeid shrimp, vital for global aquaculture. Shrimp farming faces challenges from bacterial and viral diseases, necessitating precise and rapid detection and treatment methods. Conventional PCR-based detection lacks on-site feasibility, leading to the development of isothermal amplification techniques with chromatographic paper, ensuring rapid and accurate virus detection. Single-virus analysis provides crucial insights into mutations and strain diversity, aiding proactive risk assessment on climate change. Enhanced international collaboration will reinforce research outcomes, promoting sustainable shrimp farming practices worldwide. Studying different strains of viruses promotes effective treatment strategies, accelerating scientific exploration in shrimp disease management.
	Kunlaya Somboonwiwat (Thailand)	Associate Professor, Faculty of Science, Chulalongkorn University	
	Mary Beth Maningas (the Philippines)	Professor, College of Science, University of Santo Tomas	

Underlined: Lead Principal Investigator

Annex

Abstract of the joint call for proposals

(1) Proposal field application requirements (Japan side):
In addition to the Japanese team, the project consortium must include members from a minimum of two different countries listed as participating in the call.

(2) Applicant eligibility (Japan side):
Any independent researcher personally affiliated with and actively conducting research at a domestic Japanese research institution, regardless of nationality, is eligible to apply.

(3) Research period:
3 years (36 months)

(4) Amount of funding (JST):
Up to 35.1 million Japanese yen from JST to the researchers (Japan-based team) per project over three years, inclusive of overhead costs (30 percent of direct costs).

(5) Evaluation method:
Based on evaluation by experts from the countries which held the joint call, including Japan, and discussion by JST and other funding agencies.

(6) Evaluation criteria (JST):
The following were among the general criteria considered in the evaluation process:

1) Conformity with e-ASIA JRP aims such as regional relevance and designated research fields
2) Capability of the research leaders and relevance of their current research activities
3) Effectiveness and synergistic mutual benefit of the joint research activities
4) Validity of the research plan
5) Effectiveness and continuity of exchange
6) Validity of the exchange plan