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Japan Science and Technology Agency (JST)

# JST and DOST (Philippines) jointly to fund three research projects in the “Smart Agriculture” field under the NEXUS program

The Japan Science and Technology Agency (JST) has approved funding for three new international joint research projects under the framework of Networked Exchange, United Strength for Stronger Partnerships between Japan and ASEAN (NEXUS[*1]), “Japan-Philippines international joint research” in the field of Smart Agriculture (Appendix 1).

NEXUS is a flexible and multi-layered cooperative framework, leveraged by the long history of science and technology cooperation between Japan and ASEAN. It is aimed to further strengthen the cooperative research relationship between Japan and ASEAN as partners in co-creating innovations in science and technology.

One of the initiatives, “International Joint Research,” NEXUS supports international joint research in common priority challenges between both sides.

In collaboration with the Department of Science and Technology (DOST [*2]), JST has conducted a call for proposals for international joint research projects (Appendix 2).

We received 19 applications for this call, and after evaluation by experts from both countries and consultations between JST and DOST, we have decided to select three projects for funding. The research period is planned for three years (36 months).

*1 NEXUS: https://www.jst.go.jp/aspire/nexus/en/index.html

*2 DOST: https://www.dost.gov.ph/

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**“Empowering Science, Inspiring Futures”**

Our world faces unprecedented global challenges — such as climate change, energy crises, and emerging infectious diseases — that demand innovative solutions. JST will rise to these challenges through “Science and Technology,” as a national research and development agency that plays a central role in implementing Japan’s science, technology, and innovation policy. We support fundamental research and startups to create new value, develop R&D strategies, foster the next generation of talent, disseminate vital information, and manage the Japan University Fund. Like a compass guiding ships through turbulent waters, JST will chart the way towards a vibrant and secure future by empowering science through a multifaceted approach.

Appendix 1

**Abstracts of selected projects**

| No. | Title | Principal Investigator (Japan side)<br>Principal Investigator (Philippines side) | Research Abstract |
|---|---|---|---|
| 1 | Smart Seaweed Aquaculture: Bridging Unified Knowledge for Agarophyte Science - Merged Initiative for Resilient Agar Industry | UJI Toshiki<br>(Associate Professor, Faculty of Fisheries Sciences, Hokkaido University)<br><br>Victor Marco Emmanuel FERRIOLS<br>(Associate Professor, College of Fisheries and Ocean Sciences, University of the Philippines Visayas) | This collaborative research aims to secure a stable supply of high-quality agar and build a sustainable and resilient seaweed industry by integrating genetic improvement of agarophytes with smart aquaculture technologies. Agar is a polysaccharide derived from agarophytes and is used in applications such as food and medicine. In Japan, the demand for high-quality agar far exceeds supply, making agarophyte cultivation essential for maintaining the industry, while in the Philippines, cultivation has not become widespread due to the low quality of agar and other factors. To address this, the Japanese team will use breeding technologies such as genome editing to develop strains with superior agar properties, and the Filipino team will design and operate smart aquaculture systems utilizing environmental and other data. In addition, both teams will work on identifying optimal cultivation conditions through machine learning and improving post-harvest processing. Through this collaborative research, improvements in quality and stabilization of yields are expected, contributing to the sustainable development of the seaweed industries in both countries. |

| No. | Title | Principal Investigator (Japan side)<br>Principal Investigator (Philippines side) | Research Abstract |
|---|---|---|---|
| 2 | Integrated Smart Agriculture and Renewable Energy Management: AWD-Driven Carbon Sequestration and Solar PV Optimization in Rice Landscapes of the Philippines | TAKEUCHI Wataru<br>(Professor, Institute of Industrial Science, The University of Tokyo)<br><br>Jeark PRINCIPE<br>(Professor, Training Center for Applied Geodesy and Photogrammetry, University of the Philippines Diliman) | This research aims to develop and validate an integrated smart farming system that synchronizes Alternate Wetting and Drying (AWD) irrigation, soil carbon sequestration, and renewable energy (solar power). The goal is to establish a climate-resilient and sustainable agricultural model applicable to paddy fields in both Japan and the Philippines.<br>The Japanese team will focus on developing an IoT and AI-driven smart AWD system, leveraging satellite data to evaluate methane emission reductions at scale. Concurrently, the Filipino team will conduct GIS-based spatial optimization for solar power integration within agricultural landscapes. Through this bilateral collaboration, the project seeks to build a comprehensive decision-support tool for water, carbon, and energy management, ultimately providing evidence-based recommendations for agricultural and environmental policy. |

| No. | Title | Principal Investigator (Japan side)<br>Principal Investigator (Philippines side) | Research Abstract |
|---|---|---|---|
| 3 | Smart and Resilient Agricultural Modeling for Integrated Agroforestry and Rice-Fish Systems in the Sta. Cruz River Basin, Laguna | HOMMA Koki<br>(Professor, Graduate School of Agricultural Science, Tohoku University)<br><br>Roger Jr. LUYUN<br>(Professor, Institute of Agricultural and Biosystems Engineering, University of the Philippines Los Baños) | This project seeks to develop and pilot a climate-responsive, integrated agricultural model that combines agroforestry and rice-fish (*Palay-Isdaan*) systems in the Sta. Cruz River Basin in Laguna.<br>In the project, the Japanese team introduces monitoring sensors, analyzes data and develops the integrated model and decision-making tool. The Filipino team prepares pilot sites, conducts field investigations, farm trials and monitoring, and proposes political notes and regional application. The basin represents a typical tropical watershed with varied agroecological conditions. By linking upland and lowland systems through spatial modeling, field-based validation, and real-time monitoring, the project addresses the need for sustainable and resilient farming strategies under a changing climate.<br>The project promotes meaningful collaboration between Filipino and Japanese research teams through joint fieldwork. This project also contributes to long-term sustainability in rural communities. |

Appendix 2

**Abstract of the joint call for proposal**

(1) Partner funding agency
Organization name: Department of Science and Technology (DOST)
URL: https://www.dost.gov.ph/

(2) Research field
Smart Agriculture

(3) Researcher eligibility
Any independent researcher personally affiliated with a domestic Japanese research institution, including universities, independent administrative institutions, national/public testing and research institutions, specially authorized corporations, public-service corporations, and enterprises

(4) Research duration
Three years (36 months)

(5) Funding amount (by JST, per project)
- Direct expenses: up to 36 million Japanese Yen
- Indirect expenses: 30% of direct expenses

(6) Evaluation procedure
- Evaluation by independent committees consisting of experts from both countries.
- Discussion and decision by JST and DOST based on evaluation result.

(7) Evaluation criteria
- Relevance to the research field
  The proposal's alignment with the designated research area of the call and its potential to contribute to advancements in the field.
- Research leadership capacity
  Assessment of the capabilities and expertise of the research leaders involved, including their track record and ability to effectively lead the proposed project.
- Anticipated scientific outputs
  Evaluation of the expected scientific achievements resulting from the collaborative research effort.
- Synergistic impact of international collaboration
  Examination of the potential synergies and added value generated through the collaboration

between international partners with a focus on reciprocal/mutual and balanced contributions from both countries.

- Soundness of research and exchange plans
  Review of the validity and robustness of both the research and exchange plans outlined in the proposal.
- Anticipated economic and social benefits
  Consideration of the potential economic and societal impacts arising from the outcomes of the joint research initiative.
- Feasibility of implementation
  Assessment of the practical feasibility of implementing the proposed project, considering factors such as the proposed timeline, budgetary allocations, availability of facilities, and the mechanisms for cooperation among participating entities.

Appendix 3

**Experts for the evaluation (JST side)**

| Name | Position and organization | Role |
|---|---|---|
| OKAYASU Takashi | Professor, Faculty of Agriculture, Kyushu University | Program Officer |
| KONDO Naoshi | Professor Emeritus, Graduate School of Agriculture, Kyoto University | Advisor |
| TAIRA Eizo | Professor, Faculty of Agriculture, University of the Ryukyus | Advisor |
| TAKAYAMA Kotaro | Professor, Graduate School of Engineering, Toyohashi University of Technology | Advisor |
| NAKAGAWA Junichi | General Coordinator / Director General, Research Center for Agricultural Robotics, National Agriculture and Food Research Organization | Advisor |
| NOGUCHI Ryozo | Professor, Graduate School of Agriculture, Kyoto University | Advisor |
| HOSHI Takehiko | Professor, Faculty of Biology-Oriented Science and Technology, Kindai University | Advisor |
| MIZOGUCHI Masaru | Project Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo | Advisor |
| YASUTAKE Daisuke | Associate Professor, Faculty of Agriculture, Kyushu University | Advisor |
| YONEZAWA Chinatsu | Associate Professor, Graduate School of Agricultural Science, Tohoku University | Advisor |

(Advisors are listed in order of the Japanese syllabary.)

(Position and organization are as of the time of evaluation.)