

PROJECT PROPOSAL  
2023 DOST-GIA FUNDING

I. PROJECT PROFILE

(1) <b>Project Title:</b> Development of Thermally Processed Rice-Based Products for the Mobile Modular Food Processing Facility - Retort Module	
(2) <b>Project Leader/Sex:</b> JESSE M. PINE/ M <b>Agency:</b> PSTO-Oriental Mindoro <b>Address/Telephone/Fax/Email:</b> Brgy. Camilmil, Calapan City, Oriental Mindoro/(043)288-6791/ pstc.ormindoro@mimaropa.dost.gov.ph	
(3) <b>COOPERATING AGENCY/IES</b> FIC-MIMAROPA, Mindoro State University – Calapan Campus Provincial Government of Oriental Mindoro-Provincial Agriculture Office (PGOM-PAgO)	
(4) <b>SITE(S) OF IMPLEMENTATION</b> <b>Base Station:</b> FIC-MIMAROPA, Mindoro State University-Calapan Campus, Brgy. Masipit, Calapan City, Oriental Mindoro <b>Provincial Demo Farm, Brgy. Merit, Victoria, Oriental Mindoro</b>	
(5) <b>Project Duration:</b> January 2024 – December 2024	
(4) <b>TYPE OF RESEARCH</b> <input type="checkbox"/> Basic <input checked="" type="checkbox"/> Applied	(5) <b>R&amp;D PRIORITY AREA &amp; PROGRAM (based on HNRDA 2017-2022)</b> <input type="checkbox"/> Agriculture, Aquatic and Natural Resources Commodity: _____ <input type="checkbox"/> Health Priority Topic: _____ <input checked="" type="checkbox"/> Industry, Energy and Emerging Technology Sector: <u>Food &amp; Nutrition Security</u> <input type="checkbox"/> Disaster Risk Reduction and Climate Change Adaptation <input type="checkbox"/> Basic Research Sector: _____
<b>Sustainable Development Goal (SDG) Addressed</b>	SDG 2 – Zero hunger; SDG 3 – Good health and well-being; SDG 12 – Responsible consumption and production

(6) EXECUTIVE SUMMARY

The "Development of Ready-to-Eat Rice-Based Meals Utilizing Mobile Processing Facility-Water Retort Module" aims to provide value-addition services for the local farmers in the region particularly in the province of Oriental Mindoro while simultaneously providing consumers with nutritious, convenient, and locally sourced food options.

In 2020, the Department of Science and Technology - Industrial Technology Development Institute (DOST-ITDI) in partnership with DOST-MIMAROPA, and the Provincial Government of Oriental Mindoro-Provincial Agriculturist's Office (PGOM-PAgO) collaborates in the development of the Mobile Modular Food Processing Facility-Water Retort Module. A water retort is a food processing equipment that applies heat treatment in processing to produce shelf-stable products by shelf-life extension.

Since rice is one of the top commodities in the province, the project will prioritize the processing of rice into ready-to-eat products. RTE Arroz caldo, for one, will be developed. This research and development will be done in the Food Innovation Center-MIMAROPA. Once RTE Arroz caldo is standardized and tested, it will be mass-produced in the MMFPF-Water Retort Module.

RTE Arroz caldo will then be integrated into the market as an emergency food reserve which can be distributed by the LGUs during calamity or be used by other NGAs, and NGOs in feeding programs.

(7) INTRODUCTION

The agricultural sector in the region faces a recurrent challenge—periodic surpluses of raw materials resulting from the overproduction of fresh produce and fluctuating prices. These surpluses necessitate additional processing steps to cut back food wastage.

In response to these challenges, the Mobile Modular Food Processing Facility-Retort Module (MMFPF-Retort Module) was established. This initiative will be beneficial in mitigating food waste while facilitating the conversion of surplus into innovative products.

Rice is one of the region's abundant staples. The application of the retort technology can transform ordinary rice into shelf-stable, ready-to-eat products such as porridge. Such products prove invaluable as emergency food during calamities or in supplementary feeding programs conducted by Local Government Units (LGUs), National Government Agencies (NGAs), and Non-Governmental Organizations (NGOs).

The presence of water retort facilities in the region provides a competitive advantage. Harnessing this equipment for product development and mass production is economically favorable for farmers, allowing them to circumvent post-harvest losses and secure a stable income. Moreover, the extended shelf life of retorted products allows it to integrate into a broader value chain.

Given the goals of the MMFPF, it is imperative to undertake research and development (R&D) activities. These activities will culminate in the creation of food products specifically tailored for mass production, optimizing resource utilization, and reinforcing the facility's capacity to offer secure, sustainable, and accessible food solutions to the MIMAROPA region.

The theoretical framework underpinning this endeavor draws strength from the region's abundant raw materials, existing food processing technologies, and facilities. These elements form the bedrock for conducting R&D activities encompassing product formulation, process standardization, and rigorous laboratory analyses.

These measures ensure the quality, safety, and adherence to regulatory standards of the developed product. The anticipated outcome of the project is the region's enhanced capacity to undertake mass production of RTE Arroz caldo, protected by a Utility Model application.

**(7.1) Rationale**

MIMAROPA region is shifting towards sustainable and adaptable processing through cutting-edge technologies. This is significant given the abundant agricultural commodities in the region. Oriental Mindoro, for example, is recognized as the "Food Basket of the Region," the "Rice Granary," and the "Banana King" of MIMAROPA, and even gained the title of "Calamansi King" of the Philippines.

However, the agricultural sector experienced a surplus of raw materials from time to time given by the overproduction of fresh produce and low prices. This requires additional processing steps to mitigate food wastage, given the susceptibility of these materials to spoilage.

To address these challenges, the MMFPF-Retort Module was established. This pioneering approach promises numerous advantages, including efficient sterilization and extended shelf life for food products, thus mitigating spoilage and food waste. Additionally, it empowers the conversion of surplus agricultural resources into innovative and value-added food products.

Rice, being abundant in the province, and a staple food among Filipinos, could undergo processing. The application of the retort could turn the usual rice menu into a product with a longer shelf-life like ready-to-eat porridge, which could be used as emergency food during calamities, or in supplementary feeding programs conducted by LGUs, NGAs, and NGOs.

The water retorts in the region offers a competitive advantage. Utilizing the equipment through product development and mass production is advantageous for the farmers to avoid post-harvest losses, ensuring a stable income. The shelf life of retorted products renders it stable and ready for integration into the value chain for broader distribution.

Considering the MMFPF's goals, it is imperative to conduct research and development activities. These will culminate in the creation of food products specifically designed for mass production, optimizing resource utilization, and reinforcing the facility's capacity to offer secure, sustainable, and accessible food solutions to the MIMAROPA region.

## (7.2) SCIENTIFIC BASIS/THEORETICAL FRAMEWORK

## Input Variables

- Availability of processing facility
- Abundant raw materials
- Food processing technologies

## Mediating Variables

- Conduct of R&D
- Process standardization
- Laboratory analyses

## Outcome Variables

- Developed RTE Arroz caldo
- 1 Utility Model application
- Mass production capability

The theoretical framework is rooted in the abundant raw materials, existing food processing technologies, and facilities. These serve as the foundation for the conduct of R&D for product formulation, and process standardization followed by laboratory analyses to ensure the quality, safety, and adherence to set regulatory standards of the developed product. It is expected that at the end of the project, the region will be capable of conducting mass production of RTE Arroz caldo with a Utility Model application.

### (7.3) OBJECTIVES

General: This project aims to develop thermally processed rice-based products optimized for the Mobile Modular Food Processing Facility - Retort Module.

Specific:

1. To conduct product formulation and standardization of ready-to-eat arroz caldo;
2. To conduct process optimization using the water retort installed at the FIC-MIMAROPA and MMFPF-MIMAROPA;
3. To conduct laboratory analysis to determine the product quality and establish safety parameters;
4. To provide farmers access to stable markets through the generated technologies.

## (8) REVIEW OF LITERATURE

## Agricultural Surplus and Food Waste

Agricultural surpluses and food waste constitute pressing global issues with significant economic and environmental implications. These challenges occur in regions characterized by seasonal variations in crop production. The surplus crops often go unharvested or unsold, resulting in significant financial losses for farmers (Gustavsson et al., 2011). This issue not only affects individual livelihoods but also impacts the broader agricultural sector, making agriculture less economically sustainable.

The environmental consequences of agricultural surplus and food waste are substantial. The resources invested in cultivating surplus crops will be wasted, and the decomposition of organic food waste in landfills produces greenhouse gases contributing to climate change. Therefore, addressing food waste is paramount for reducing the environmental footprint of agriculture.

## Technological Advances in Mobile Food Processing

The development of the Mobile Modular Food Processing Facility with a Retort Module represents a substantial technological advancement in food processing (Balasubramaniam et al., 2018). Mobile processing units offer the advantage of bringing processing capabilities closer to agricultural areas, reducing post-harvest losses, and enhancing the overall efficiency of the food supply chain (Mazhar and

Mistry, 2016). This innovation holds great promise for optimizing resource utilization and reinforcing the capacity to offer secure, sustainable, and accessible food solutions.

### Mobile Processing Facilities

Mobile processing facilities are recognized tools to aid in food loss reduction and income generation. Countries like India and Kenya studied the potential of these units to bring food processing capabilities closer to agricultural areas (FAO, 2019). These facilities offer adaptability and cost-effectiveness, making them suitable for regions with limited infrastructure.

### Ready-to-Eat Meals and Consumer Trends

The global demand for ready-to-eat meals is growing rapidly with consumers prioritizing nutrition, flavor, and convenience (Mintel, 2021). This presents significant opportunities for the development of ready-to-eat meals, particularly those inspired by local and traditional cuisines like "arroz caldo." Such meals resonate with consumers seeking authentic cuisines and reflect the growing interest in diverse food options from around the world.

Developing ready-to-eat meals that cater to these consumer preferences can not only satisfy market demand but also contribute to economic growth, especially when utilizing locally sourced ingredients and traditional recipes.

### Food Product Development and Innovation

Food product development encompasses various stages, including concept development, formulation, sensory analysis, and quality assurance (Heldman & Hartel, 2019). Innovation in food processing such as water retort technologies is significant in leveraging food safety, extending shelf life, and preserving nutritional quality (Zhou et al., 2018). This innovation is crucial for reducing food losses and ensuring the availability of safe and nutritious food products.

Incorporating innovative food processing technologies not only reduces waste but also supports the creation of high-quality food products that meet consumer expectations for safety, flavor, and nutrition. These innovations are indispensable in the battle against food loss.

### Water Retort Processing

Water retort processing is a well-established thermal preservation method to produce shelf-stable, ready-to-eat (RTE) products (Smith et al., 2018). The technique involves sealing food products in airtight containers and subjecting them to high-temperature steam treatment, effectively eliminating harmful microorganisms and enzymes (Balasubramaniam et al., 2018). The resulting RTE products have an extended shelf life, making them convenient and safe for consumers.

The equipment applies principles of heat sterilization to achieve the preservation of food products (Heldman & Hartel, 2019). The process involves several key steps: container sealing, and application of heat to destroy bacteria, yeasts, molds, and enzymes that could cause spoilage; cooling to prevent overcooking and maintain product quality; and shelf stability so the product can be stored at room temperature for an extended period (Balasubramaniam et al., 2018).

Water retort processing is widely applicable in the development of RTE products, spanning various categories such as soups and stews, and sauces, complete RTE meals, baby food, and emergency and military rations (Smith et al., 2018). These products offer consumers convenience, extended shelf life, and maintained nutritional quality, satisfying preferences for safe, flavorful, and easy-to-prepare meals.

### Cultural Preservation through Food

The preservation of traditional cuisines is essential for cultural heritage. UNESCO recognizes the cultural significance of traditional meals and their role in preserving cultural identity (UNESCO, 2021). Local food products that showcase cultural heritage can attract tourists and support efforts to safeguard culinary traditions. This not only enriches the local cultural experience but also promotes cultural exchange and understanding.

### Advantages and Positive Impact of Value Addition in Agriculture

There are numerous advantages and positive impacts of value addition that extend beyond individual farmers to benefit entire communities and economies. One of the primary benefits of value addition is the potential for increased income generation for farmers by fetching higher prices of goods (Swinnen et al., 2019).

Value addition encourages farmers to diversify their product range (Reardon et al., 2019). Instead of relying solely on raw commodity prices, it reduces income volatility, providing a more stable income for farmers. Additionally, it opens opportunities for farmers to cater to diverse consumer preferences.

According to Jayne et al. (2019), value-added products, such as fortified foods or processed goods with extended shelf life, can be stored and distributed more effectively. This ensures a more stable food supply, even during periods of scarcity, contributing to overall food security.

The incorporation of surplus rice into this project aligns with sustainable agricultural practices, as it transforms excess raw materials into value-added food products. The potential for this project is to address various challenges, including the development of convenient RTE meals, reducing food wastage, and contributing to local food security and emergency preparedness in the Oriental Mindoro region. The synthesis of historical knowledge, technological innovations, and consumer preferences provides a robust foundation for the proposed research and development activities.

**(9) METHODOLOGY**

Upon approval of the project, DOST-MIMAROPA through PSTO-Oriental Mindoro will facilitate the procurement of raw and packaging materials, equipment, and analytical tools to lead, conduct, and manage the R&D project implementation. FIC-MIMAROPA will be tapped to provide technical assistance and fuse its food processing facility during the entire duration of the study.

Representatives of PSTO-Oriental Mindoro, PGOM-PAgO, and FIC-MIMAROPA staff will compose the Management Team (PMT) which will oversee and ensure the successful implementation of the project.

Raw materials will be procured within the province, while packaging materials will be from a known supplier based in Manila as well as the analytical devices that will be used during the study.

Product development will be done in small batches during the initial stage of formulation. The samples will then undergo sensory analysis by trained panels from TWG and SUC. After the determination of the most acceptable formulations, the TWG will then proceed to process standardization using the water retort installed in the FIC-MIMAROPA. This stage will include heat distribution tests (HDT) and heat penetration tests (HPT).

The MMFPF-MIMAROPA Retort Module will be used in the process optimization for mass production of the developed RTE products. Another set of HDT and HPT will be conducted for the module and standardization. The resulting products will undergo laboratory analyses necessary to ensure safety and product stability- commercial sterility, shelf-life, and nutritional tests.

Cost analysis will be conducted in between product standardization and formulation. Upon finalization, IP registration will be filed for the developed product prior to marketing.

**(10) TECHNOLOGY ROADMAP** (if applicable) (use the attached sheet)  
Please see Annex A

**(11) EXPECTED OUTPUTS (6Ps)**

**Publication:**

One (1) article on success stories of projects in MIMAROPA STARS.

**Patent/Intellectual Property:**

One (1) utility model application for RTE Arroz Caldo.

Both Utility Model applications will grant DOST-MIMAROPA, FIC-MIMAROPA, and PGOM-PAgO shared Intellectual Property Rights over the developed technologies.

**Product:**

This project will result in optimization and standardized rice-based RTE Arroz caldo.

**People Service:**

This project aims to benefit consumers, by providing them with a RTE meal during calamities. The product may also be used in government feeding programs. Furthermore, rice farmers will benefit from the increasing demand for raw materials once the developed technologies are fully utilized and commercialized. Potential technology adaptors will be local cooperatives, associations, technopreneurs, LGUs, and MSMEs.

<p><b>Place and Partnership:</b> This project will be a collaborative undertaking between DOST-MIMAROPA, PGOM-PAgO, and the FIC-MIMAROPA. The anticipated development of the product will provide rice farmers with a steady market for their products.</p> <p><b>Policy:</b> This project can be set as a basis for the development and standardization of thermally-processed food products.</p>								
<p><b>(12) POTENTIAL OUTCOMES</b></p> <p>The proposed Research and Development project is anticipated to yield innovative and high-value products from rice, determine and compare the profitability of processing rice vis-à-vis commercially available products, and provide farmers access to stable markets through the technologies to be generated.</p>								
<p><b>(13) POTENTIAL IMPACTS (2Is)</b></p> <p><b>Social Impact</b></p> <p>With this project, it is envisioned that the developed technology will be adopted by local food processors. This will also encourage Mindoreños to continue patronizing and promoting locally-made products and support rice farmers in the province.</p> <p><b>Economic impact</b></p> <p>This research aims to develop value-adding technology for rice. Processed rice will potentially generate an increase in the profit of farmers.</p>								
<p><b>(14) TARGET BENEFICIARIES</b></p> <p>Local farmers, particularly in Oriental Mindoro and nearby provinces will gain significantly from the project. Processing agricultural resources will provide a stable market which in turn enhances income despite the soaring prices of agricultural inputs and low prices of output in times of overproduction.</p> <p>LGUs and other NGAs will also benefit from the project since the product could be used in various feeding programs and even as emergency food during calamity.</p>								
<p><b>(15) SUSTAINABILITY PLAN</b> (if applicable)</p> <p>The output of the project would enable farmers to gain a steady income despite the possible occurrence of a surplus in the region. The project team could forge partnerships with the LGUs to comply with its need for emergency food production and distribution. There could also be forged collaboration between NGAs and farmers for community-driven feeding programs.</p>								
<p><b>(16) GENDER AND DEVELOPMENT (GAD) SCORE</b> (refer to the attached GAD checklist)</p>								
<p><b>(17) LIMITATIONS OF THE PROJECT</b></p> <p>While the proposed project holds significant promise and potential for addressing critical food processing and food security challenges in the MIMAROPA region, it is essential to acknowledge certain limitations that may impact its scope and outcomes.</p> <p>The project will focus mainly on product development – standardization of formulation, process optimization utilizing the installed water retort in FIC-MIMAROPA and MMFPF-MIMAROPA, and analyses.</p>								
<p><b>(18) LIST OF RISKS AND ASSUMPTIONS RISK MANAGEMENT PLAN</b> (List possible risks and assumptions in attaining target outputs or objectives.)</p> <table><tr><th>Risks</th><th>Assumptions</th></tr><tr><td>Delayed procurement of materials</td><td>Early and continuous coordination with various suppliers to ensure the availability of necessary materials when needed</td></tr><tr><td>Interruption of the conduct of R&amp;D due to factors such as power supply</td><td>Utilization of the backup power supply</td></tr><tr><td>Late conduct of product analysis due to unavailability of laboratory services</td><td>Coordinate with FDA-accredited laboratories ahead of time to ensure a flawless transaction</td></tr></table>	Risks	Assumptions	Delayed procurement of materials	Early and continuous coordination with various suppliers to ensure the availability of necessary materials when needed	Interruption of the conduct of R&D due to factors such as power supply	Utilization of the backup power supply	Late conduct of product analysis due to unavailability of laboratory services	Coordinate with FDA-accredited laboratories ahead of time to ensure a flawless transaction
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**(19) LITERATURE CITED**

Appert, N. (1810). The Art of Preserving Animal and Vegetable Substances for Several Years. Cadell and Davies.

Balasubramaniam, V. M., Barbosa-Cánovas, G. V., & Lelieveld, H. L. M. (Eds.). (2018). Food Engineering: Integrated Approaches. Springer.

Food and Agriculture Organization (FAO). (2019). Mobile Processing Units in Action: Bringing the Processing Plant to the Crop. Retrieved from <http://www.fao.org/3/ca6200en/ca6200en.pdf>

Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). Global food losses and food waste: Extent, causes and prevention. FAO.

Heldman, D. R., & Hartel, R. W. (2019). Principles of Food Processing. Springer.

Jayne, T. S., Chamberlin, J., & Headey, D. D. (2019). Land pressures, the evolution of farming systems, and development strategies in Africa: A synthesis. Food Policy, 83, 307-318.

Mazhar, H., & Mistry, V. V. (2016). Mobile food processing—a review. Journal of Food Science and Technology, 53(1), 34-46.

Mintel. (2021). The Future of Ready Meals 2021. Mintel Group Ltd.

Reardon, T., Bellemare, M. F., & Zilberman, D. (2019). Policy evolution in times of globalization: A conceptual framework with reference to food value chains and implications for food security. World Development, 120, 1-14.

Smith, A., Johnson, D., & Jones, E. (2018). Advances in Retort Processing: A Review. Food and Bioprocess Technology, 11(5), 951-971. <https://doi.org/10.1007/s11947-017-2027-y>

Swinnen, J., Vandeplas, A., Maertens, M., & Mathijs, E. (2019). Political economy, structural change, and economic policy in Africa: Sources of agricultural and rural development policies. World Development, 122, 1-1.

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2021). Traditional Cuisine of Mexico's ancestral, ongoing community culture, the Michoacán paradigm. Retrieved from <https://ich.unesco.org/en/RL/traditional-cuisine-of-mexicos-ancestral-ongoing-community-culture-the-michoacan-paradigm-01616>

Zhou, C., Yang, J., & Zhu, Z. (2018). Recent Advances in High-pressure Processing of Foods for Improving Quality and Shelf Life. Comprehensive Reviews in Food Science and Food Safety, 17(3), 857-877.

**(20) PERSONNEL REQUIREMENT**

Position	Percent Time Devoted to the Project	Responsibilities
Project Leader	20%	Responsible for the overall technical and administrative management of the project to attain its objectives
Project Staff	20%	Assist the project leader in overseeing project deliverables
Project Technical Specialist	100%	Responsible for the conduct of research and development
Project Technical Specialist	100%	Responsible for the equipment operation, maintenance, and troubleshooting during the conduct of R&D

<b>(21) BUDGET BY IMPLEMENTING AGENCY</b>				
<b>IMPLEMENTING AGENCY</b>	<b>PS</b>	<b>MOOE</b>	<b>EO</b>	<b>Total</b>
Year 1		989,276.00	240,120.00	1,229,396.00
<b>TOTAL</b>		989,276.00	240,120.00	1,229,396.00
<b>(22) OTHER ONGOING PROJECTS BEING HANDLED BY THE PROJECT LEADER: _____ (number)</b>				
<b>Title of the Project</b>		<b>Funding Agency</b>	<b>Involvement in the Project</b>	
n/a				
<b>(23) OTHER SUPPORTING DOCUMENTS</b> (Please refer to page 2 for the additional necessary documents.)				

I hereby certify the truth of the foregoing and have no pending financial and/or technical obligations from the DOST and its attached Agencies. I further certify that the programs/projects being handled is within the prescribed number as stipulated in the DOST-GIA Guidelines. Any willful omission/false statement shall be a basis of disapproval and cancellation of the project.

	<b>SUBMITTED BY (Project Leader)</b>	<b>ENDORSED BY (Head of the Agency)</b>
Signature		
Printed Name	<b>JESSE M. PINE</b>	<b>DR. MA. JOSEFINA P. ABILAY</b>
Designation/Title	<b>Provincial S&amp;T Director</b>	<b>Regional Director</b>
Date		

*Note: See guidelines/definitions at the back.*



**DOST Form 2 (for Basic/Applied Research)**  
**DETAILED R & D PROJECT PROPOSAL**

**I. General Instruction:** Submit through the DOST Project Management Information System (DPMIS), <http://dpmis.dost.gov.ph>, the detailed R&D proposal for the component project together with the detailed proposal of the whole Program, project workplan, line-item budget (LIB), 1-page curriculum vitae of the Project Leader, and Certificate of Incorporation or DTI Registration (if applicable) and other applicable supporting documents required under item II.23 below. Also, submit four (4) copies of the proposal together with its supporting documents. Use Arial font, 11 font size.

**II. Operational Definition of Terms:**

**1. Title-** the identification of the Program and the component projects.

**Project-** refers to the basic unit in the investigation of specific S&T problem/s with predetermined objective/s to be accomplished within a specific time frame.

**Project Leader-** refers to a project's principal researcher/implementer.

**Project Duration-** refers to the grant period or timeframe that covers the approved start and completion dates of the project, and the number of months the project will be implemented.

**Implementing Agency-** the primary organization involved in the execution of a program/project which can be a public or private entity

**2. Cooperating Agency/ies-** refers to the agency/ies that support/s the project by participating in its implementation as collaborator, co-grantor, committed adopter of resulting technology, or potential investor in technology development or through other similar means.

**3. Site/s of Implementation-** location/s where the project will be conducted. Indicate the barangay, municipality, district, province, region, and country.

**4. Type of Research-** indicates whether the project is basic or applied.

**Basic research-** is an experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular or specific application or use in view.

**Applied research-** is an investigation undertaken in order to utilize data/information gathered from fundamental/basic researches or to acquire new knowledge directed primarily towards a specific practical aim or objective with direct benefit to society.

**5. R&D Priority Area and Program-** based on the Harmonized National R&D Agenda 2017-2022, indicates which R&D agenda the project can be categorized in: Agriculture, Aquaculture and Natural Resources; Health; Industry, Energy, and Emerging Technology; Disaster Risk Reduction and Climate Change Adaptation; and Basic Research. Indicate also the specific Commodity/Sector, whether crops, livestock, forestry, agricultural resources or socio-economics; fisheries or aquatic resources; biotechnical, pharmaceutical, or health services; biotechnology, information technology, material science, photonics or space technology; industry, energy, utilities or infrastructure.

**Sustainable Development Goal (SDG) Addressed-** indicates which among the 17 SDGs adopted by the United Nations Members States are addressed by the project

**6. Executive Summary-** briefly discusses what the whole proposal is about

**7. Introduction-** a formally written declaration of the project and its idea and context to explain the goals and objectives to be reached and other relevant information that explains the need for the project and aims to describe the amount of work planned for implementation; refers to a simple explanation or depiction of the project that can be used as communication material.

**7.1. Rationale-** brief analysis of the problems identified related to the project

**Significance-** refers to the alignment to national S&T priorities, strategic relevance to national development and sensitivity to Philippine political context, culture, tradition and gender and development.

**7.2. Scientific Basis-** other scientific findings, conclusions or assumptions used as justification for the research

**Theoretical Framework-** the structure that summarizes concepts and theories that serve as basis for the data analysis and interpretation of the research data.

**7.3. Objectives-** statements of the general and specific purposes to address the problem areas of the project.

**8. Review of Literature-** refers to the following: (a) related researches that have been conducted, state-of-the-art or current technologies from which the project will take off; (b) scientific/technical merit; (c) results of related research conducted by the same Project Leader, if any; (d) Prior Art Search, and; (e) other relevant materials.

**9. Methodology-** discusses the following: (a) variables or parameters to be measured and evaluated or analyzed; (b) treatments to be used and their layout; (c) experimental procedures and design; (d) statistical analysis; (e) evaluation method and observations to be made, strategies for implementation (Conceptual/Analytical framework).

**10. Technology Roadmap** (if applicable)- a visual document that communicates the plan for technology. It is a flexible planning technique to support strategic and long-range planning by matching short- and long-term goals to specific technology solutions.

**11. Expected Outputs (6Ps)-** deliverables of the project based on the 6Ps metrics (Publication, Patent/Intellectual Property, Product, People Service, Place and Partnership, and Policy).

*Publication-* published aspect of the research, or the whole of it, in a scientific journal or conference proceeding for peer review, or in a popular form.

*Patent/Intellectual Property-* proprietary invention or scientific process for potential future profit.

*Product-* invention with a potential for commercialization.

*People Service-* people or groups of people, who receive technical knowledge and training.

*Place and Partnership-* linkage forged because of the study.

*Policy-* science-based policy crafted and adopted by the government or academe as a result of the study.

**12. Potential Outcomes-** refer to the result that the proponent hopes to deliver three (3) years after the successful completion of the project.

### **13. Potential Impacts**

*Social Impact-* refers to the effect or influence of the project to the reinforcement of social ties and building of local communities.

*Economic Impact-* refers to the effect or influence of the project to the commercialization of its products and services, improvement of the competitiveness of the private sector, and local, regional, and national economic development.

**14. Target Beneficiaries-** refers to groups/persons who will be positively affected by the conduct of the project.

**15. Sustainability plan-** refers to the continuity of the project or how it shall be operated amidst financial, social, and environmental risks.

**16. Gender and Development (GAD) Score-** refers to the result of accomplishing GAD checklists (for project monitoring and evaluation/project management and implementation) to highlight the contribution of the project in the achievement of the objectives of Republic Act 7192, "Women in Development and Nation Building Act," interpreted as gender-responsive, gender-sensitive, has promising GAD concepts, or GAD is invisible.

**17. Limitations of the Project-** refer to restrictions or constraints in the conduct of the project.

**18. Risk-** refers to an uncertain event or condition that its occurrence has a negative effect on the project.

**Assumption-** refers to an event or circumstance that its occurrence will lead to the success of the project.

**19. Literature Cited-** an alphabetical list of reference materials (books, journals and others) reviewed. Use standard system for citation.

**20. Personnel Requirement-** details on the position of personnel to be involved in the project, percent time devoted to the project, and responsibilities.

**21. Budget By Implementing Agency-** personnel services (PS), maintenance and other operating expenses (MOOE), and equipment outlay (EO) requirement of the project by implementing agency for Year

1 and for the whole duration of the project. Please refer to the DOST-GIA Guidelines for the details (Section IX.B of DOST Administrative Order (A.O.) 011, s. 2020).

- a. **PS-** total requirement for wages, salaries, honoraria, additional hire and other personnel benefits.
- b. **MOOE-** total requirement for supplies and materials, travel expenses, communication, and other services.
- c. **EO-** total requirement for facilities and equipment needed by the Program.

**22. Other Ongoing Projects Being Handled By the Project Leader-** list of ongoing projects being handled by the Project Leader funded by the DOST-GIA Program and other sources, and the accompanying responsibilities relevant to the project.

**23. Other supporting documents required-** as stated in Section VII of DOST A.O. No. 011, Series of 2020 – Revised Guidelines for the Grants-in-Aid Program:

- a. Detailed breakdown of the required fund assistance to indicate the counterpart of the proponent and other fund sources including letter/s of commitment from the implementing, collaborating and coordinating agency/entity/ies;<sup>1</sup>
- b. A counterpart fund, in kind and/or in cash, shall be required from the implementing agency/entity as one of the application requirements. All projects must have a minimum of 15% counterpart contribution except for projects involving public good;<sup>1</sup>
- c. Curriculum Vitae or Personal Data Sheet (PDS) of Project Leader and other co-researchers/implementers. The service record may be requested if needed;<sup>1</sup>
- d. Clearance from the DOST or the Funding Agency (e.g., DOST Councils) on previously funded completed projects handled by the Project Leader;<sup>1</sup>
- e. Approval from the institution’s ethics review board for research involving human subjects or in the case of animal subjects, approval from the Bureau of Animal Industry (BAI) (for PCAARRD- and PCHRD-monitored projects);
- f. Clearance from the DOST Biosafety Committee (DOST-BC) shall be required for research proposals involving the use of GMOs under contained use (i.e., experiments done in laboratories, screen house, green house). For projects other than contained use, they shall be referred to the appropriate agency. The DOST Sectoral Councils, after determination as to whether or not the proposal has biosafety implications, shall endorse the same to the DOST-BC in accordance with the prescribed format under Annex 3 of the Philippine Biosafety Guidelines for Contained Use of Genetically Modified Organisms (series of 2014) (if applicable); and
- g. For the private non-profit/non-government/people’s organizations and startups:
  - i. Up-to-date Securities and Exchange Commission (SEC) registration, or Department of Trade and Industry (DTI) registration, or Cooperative Development Authority (CDA) registration certificate, or other authenticated copy of latest Articles of Cooperation and other related legal documents;
  - ii. Co-signers Statement (if applicable);
  - iii. Copy of latest Income Tax Return;
  - iv. Mayor’s permit where the business is located;
  - v. Audited Financial Statements for the past three (3) years preceding the date of project implementation or in case of those with operation of less than 3 years, for the years in operation and proof of previous implementation of similar projects (or in the case of startups, at least for one (1) year);
  - vi. Document showing that NGO/PO has equity to 20 percent of the total project cost, which shall be in the form of labor, land for the project site, facilities, equipment and the like, to be used in the project;
  - vii. Disclosure of other related business, if any;
  - viii. List and/or photographs of similar projects previously completed, if any, indicating the source of funds for implementation;
  - ix. Sworn affidavit of secretary of the NGO/PO that none of its incorporators, organizers, directors or officers is an agent of or related by consanguinity or affinity up to the fourth civil degree to the official of the agency authorized to process and/or approved the proposed MOA, and release of funds;
- h. For CSOs, compliance to regulations as required by the General Appropriations Act (GAA) pertaining to fund transfers to Civil Society Organizations (CSOs); and
- i. For foundations, DOST certification as accredited by the Science and Technology Foundation Unit

<sup>1</sup> required of all proposals

III. Criteria for Evaluation:

A. Criteria for Evaluating Proposals

Criterion	Definition
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Relevance or Significance	Aligned to national S&T priorities, strategic relevance to national development and sensitivity to Philippine political context, culture, tradition and gender and development
Technical / Scientific Merit	Sound scientific basis to generate new knowledge or apply existing knowledge in an innovative manner
Budget Appropriateness	The proposed budget is commensurate to the proposed work plan and deliverables.
Competence of Proponent	Proponent's expertise is relevant to the proposal and with proven competence to implement, manage and complete R&D programs/projects within the approved duration and budget.

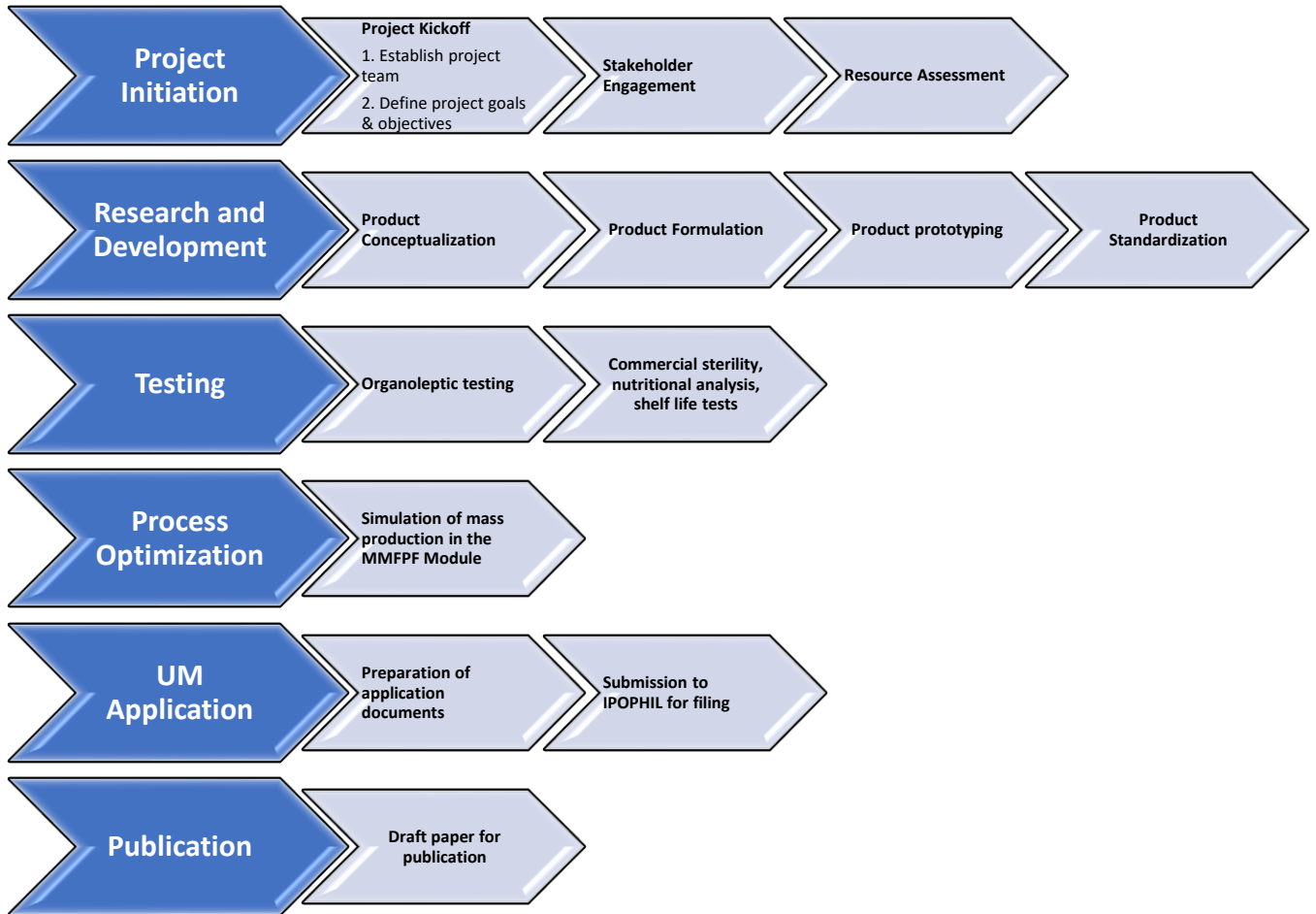
**B. Governing Council / Board and EXECOM’s Evaluation Criteria**

Criteria	Indicators	Raw Score
A. Soundness of Proposal (20%)	R&D addresses relevant sectoral need (applicable to pressing concern)	5
	Solution provided is most effective (compared to other proposed solutions)	5
	Proposed budget is reasonable (project is not expensive vis-a-vis output)	5
	Work plan is doable in a given timeframe	5
B. Suitability of Output (30%)	R&D output is cost-effective (cost is competitive in relation to new or existing products or process)	5
	Has identified partners to adopt the technology (with letter of support from the head of the company)	5
	Output can be commercialized (through an existing manufacturer, spin-off or start-up company)	5
	R&D utilization is timely (output should not be overtaken by other solutions)	5
C. Significance of Outcome (30%)	Economic: increase in productivity, increase in income, new jobs generated, high return of investment (ROI)	5
	Social: working partnerships established, training opportunities provided, policies adopted, increased access to basic services (i.e., food, health, education); political, cultural, gender sensitivity and inclusivity	5
	Environment: enhanced environmental health standards, no adverse effect to the environment	5
	Sustainability: sustainability mechanisms established in terms of institutional, financial and human resources capability (submission of a new proposal to sustain a completed or ongoing proposal does not constitute sustainability of the project)	5
D. Competence of Proponent (20%)	Proponent's expertise aligned with the proposal	5
	Collaboration with relevant agencies and/or industry partners	5
	Thorough understanding of the proposal's deliverables	5
	DOST has good experience with the proponent	5

**C. Additional Criteria on Gender and Development (GAD)**

## TECHNOLOGY ROADMAP

### Annex A



# QUOTATION

Date: August 24, 2023  
Quote Validity: September 07, 2023

Customer: Jesse M. Pine\_  
[pstc.ormindoro@mimaropa.dost.gov.ph](mailto:pstc.ormindoro@mimaropa.dost.gov.ph)

Dear Sir:

In response to your request for a quotation, we are pleased to submit our quotation below.

Material Specification	Thickness (microns) +/- 5%	Variant	Size	Mould fee per color	Order Qty (pcs)	Unit Cost (Php)	Total Cost (Php)
<b>EP-KPA001 (11*18 cm) – Pet/NY/AL/RCPP (boilable) 121°C</b>							
Pet/NY/AL/RCPP (boilable) 121°C	120	Stand Up Pouch (w/o Zip)	11*18 +6CM	5987.04	60,000	6.69	<b>401,400.00</b>

## ENTREPOUCH

+63 9062255909 | +63 9232627722 | (02) 8-3535428 | (02) 8-4007896 | (02) 8-4007869 | [entrepouch@gmail.com](mailto:entrepouch@gmail.com) | Unit 107 Pearl of the Orient Tower, Roxas Blvd., Ermita, Manila, Philippines, 1000

## Agreement, Terms & Condition

Mould fee:	Rotogravure print: The number of colors in this quotation is only an estimate based on the photo of your artwork. We will provide you with the final mould fee costing once you have provided us the high resolution raw files. This is only a one-time payment.
Quantity:	Min order qty is 5,000pcs (Rotogravure print) Min order qty is 1,000pcs (Digital Print) +/- 15% allowance per size
Sizes:	Size of the pouch is +/- 1cm from the size provided
Thickness:	Thickness of the pouch is +/- 0.05 microns from agreed thickness
Sealing size:	+/-3mm from the size provided
Payment Terms:	Downpayment: 50% of Total Amount. Remaining balance will be collected before complete delivery.
Company name:	All payments are to be paid under HIWAGA NG DAGAT CORP.
Quote validity:	14 days
Price:	VAT inclusive
Lead Time:	Digital Print – 3 to 7 weeks Rotogravure Print – 5 to 9 weeks
Free Shipping	Free shipping nationwide for orders 5,000 pcs and above.  Roll labels – Free shipping nationwide for orders Php 100,000 and above.

### ENTREPOUCH

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## Agreement, Terms & Condition

**NO PROVIDED LAYOUT**

Prepared by:

Wilén Grace Soriano  
Entrepouch

**ENTREPOUCH**

+63 9062255909 | +63 9232627722 | (02) 8-3535428 | (02) 8-4007896 | (02) 8-4007869 | [entrepouch@gmail.com](mailto:entrepouch@gmail.com) | Unit  
107 Pearl of the Orient Tower, Roxas Blvd., Ermita, Manila, Philippines, 1000



August 29, 2023

RFQ Reference No. POMJATGF 23-0988

**PSTO-ORIENTAL MINDORO**

Calapan City

Attention: **Ms. Christine Caringal**

Dear Madam:

Please find below our product offer and price quotation for your requirement.

No.	Item Description	Unit Price
1	<b>Digital pH Meter DPH-2</b> The DPH-2 is extremely easy to use. It has a compact, portable design and is water resistant (IP67), so it can be cleaned under running water and submersed into water without any negative effects. It has an Automatic Temperature Compensation mechanism that function from 0 to 50°C. With these features, the DPH-2 is perfect for many different applications including food and beverage production control, brewing and fermentation, soil and hydroponics, cutting oils, alkali washing liquids, and other soluble solutions.	Php 8,800.00
2	<b>(Optional) DPH-2 Calibration Certificate per item</b>	Php 4,000.00

**Note:**

- Price is VAT Inclusive
- Terms: Advance Payment
- ***Delivery Leadtime: 45 to 60 days upon receipt of order and payment  
Additional 5 days if with calibration certificate***
- Validity: 30 days
- Incoterms: DDP
- 1 year warranty upon registration to ATAGO website
- ***Supply of Unit Only***

We look forward to supplying your requirement. For orders always send a copy at [orders@rocfsi.com.ph](mailto:orders@rocfsi.com.ph)

Very truly yours,

**Jennah B. Arocena**

Sales Supervisor

## TECHNOLOGY ROADMAP

### Annex A

