

Futures of Langka: Langka All You Can

Jackfruit Futures Project Proposal 2

Delivering Department Unit	Department of Business and Management Department of Food Science and Technology Department of Agricultural and Biosystems Engineering Department of Geodetic Engineering College of Veterinary Medicine Department of Computer Science and Technology College of Management and Economics
Project Title	Product Development and Profiling of Major Jackfruit Production Systems in the Philippines Objectives: <ol style="list-style-type: none">1. Assessment, improvement and evaluation of DFST developed jackfruit technology and development of jackfruit vegetarian food product;2. Establish suitability profile of major jackfruit production systems in the Philippines;3. Assessment study on the innovation capacities of the stakeholders of the Jackfruit industry in Eastern Visayas Philippines.
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Project Collaborators	<p>DA Regional Field Office 8 (DA-RFO 8) Local Agriculture Offices (PAO, MAO, CAO) LGUs DOST DTI</p>

	<p>Manufacturers, Traders, Processors Industry Associations/Cooperatives Jackfruit Farmers Associations</p>
Rationale	<p>Region 8 is developed to be the jackfruit capital in the country. More research endeavors have been done by different Institutions including DA and SUC's to strengthen the jackfruit Industry in the region. Efforts were done on the production to increase the yield, varietal improvement, disease protection and even food processing. However, during our literature search, very scanty data on production was observed. Minimal data for production, no. of hectares planted with jackfruit, number of farmers engaged in jackfruit farming, number of bearing trees, number of yield per tree, major season production, minor season production, researches on jackfruit conducted in the past years and other relevant data important in figuring out the status of jackfruit industry in the region.</p> <p>In this connection, it is necessary then to establish baseline information for us to understand the status of jackfruit production not only in Eastern Visayas but in the country as a whole and see what still remains undone. This can be done by generating a systematic baseline information database and suitability maps reflecting the status of jackfruit production in the Philippines as influenced by different external and intrinsic factors affecting jackfruit yield. Moreover, it is a very necessary move to visualize the status of the jackfruit industry in the country especially in its preparedness to go global since the internationalization plan to export food products globally can only be sustainable if we have enough raw material supply.</p> <p>On the other hand, according to USDA, one hundred sixty-five grams of raw jackfruit contains calories of 157 g, fat of 1.1 g, sodium of 3.3 mg, fiber of 2.5 g, sugars of 32 g, protein of 2.8 g, vit C of 22.6 mg, potassium of 739 mg, an amount of Vitamin A and magnesium. It also contains antioxidants which supports heart health, enhances immunity, may improve sleep, strengthen bones and lowers risks of Type 2 diabetes. Generally, these components are all good for the health and wellness of food consumers.</p> <p>This product is a good material for food processing which includes vacuum fried jackfruit, dehydrated jackfruit, jackfruit jam, marmalade using the main pulps that constitute 30% of the fruit weight. However other parts of the fruit which constitute 70% including seeds, rags, pith, sees coat and peel, can also be processed into food products like jackfruit seed flour (Cuadra and Galvez, 2017), jackfruit rags meatloaf (Cortes & Galvez, 2015), jackfruit patty, jackfruit rags-tuna canned product (Bornias & Lauzon, 2017), jackfruit sauces, vinegar, wine, coffee-like product, vacuum</p>

	<p>fried jackfruit seeds (Montajes & Lauzon, 2014), etc. If zero waste processing can be done then there is a big margin for the farmers.</p> <p>In the current market the demand for healthy food to the vegan/vegetarian consumers is high. Since these types of consumers will not eat meat, they need to use a raw material that can replace meat in developing their food products. Jackfruit is a good raw material since it has a bland taste that can easily absorb or blend with other flavors. Aside from that it also has a feature that mimics the physical appearance of meat. It can substitute meat in any meal that features pulled or shredded meat. It can also be used as a vegetarian alternative to pull-apart pork for street tacos. Cooked jackfruit can also be marinated in a buffalo or Caesar dressing, shred & stuff in a wrap. Nachos, salads & loaded baked potatoes are all additional opportunities for using jackfruit in place of pulled meats (https://www.verywelllift.com).</p> <p>Despite the current and emerging potential of jackfruit as a profitable agribusiness enterprise, there is still a dearth of systematic albeit specific production and market information supportive of the need for a targeted and competitiveness-enhancing investment of the industry addressing both the local and global demand. In Eastern Visayas alone, there is a shortage of 85.35% for fresh jackfruit demanded from the region while 99.97% for processed forms (dehydrated and vacuum-fried) to cater the demand within and outside the region (DARFO VIII, 2018). This market opportunity could easily translate to generate remunerative options for value chain operators.</p> <p>Moreover, in order to maximize the potential of jackfruit production and processing technology, it is doubly important to assess the strategic position of the jackfruit within the backdrop of steadily emerging albeit inevitable disruptive technologies of the 4IR. Hence, it is a proactive direction if we also assess the innovation capacities of the farmers and MSMEs/trader processors and see if they are positioned well in terms of the technological demands of Industry 4.0. In this way, we ensure a more flexible fit of the jackfruit industry vis a vis a competitively volatile market demand in the near future.</p> <p>Finally, it is then important to document the supply, the production and consumptive utilization of jackfruit so that processing of diversified product formats enables the industry to strategically catch up with market demand not only in the Philippines but other countries of Southeast Asia as well. Hence, this study, strengthens the product-market information support for a more comparatively advantageous jackfruit industry for the future.</p>
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Project Duration	One (1) year
Total Budget <ul style="list-style-type: none"> • VSU • Collaborating partner 	<p>Php 1,500,000.00</p> <p>For negotiation</p>

I. Proposal Details

Logical Framework					
Objectives	Activities	Outputs	Verifiable Indicators	Means of Verification	Assumptions
1. Assessment, improvement and evaluation of DFST developed jackfruit technology and development of jackfruit vegetarian food product	<ul style="list-style-type: none"> • <u>Phase 1</u> Assessment of Vacuum Fried Jackfruit Technology in Baybay > Meet with LGU on the planned spot audit > Spot audit at Jackfruit Processing Center Baybay > Gap analysis and report preparation > Discussion meeting of the audit result 	<ul style="list-style-type: none"> • On-Site Visit • Audit Result 	<ul style="list-style-type: none"> • Audit Report • Recommendation Report 	<ul style="list-style-type: none"> • Documented Audit Report • Minutes of meeting with LGU • Minutes of meeting with Cooperator • Photo Documentation 	<ul style="list-style-type: none"> • RA can be hired immediately • Project staff and field researchers are fully vaccinated • Readily accessible funds for paying small amount expense • Jackfruits are available • No delay in the procurement process of the reagents, raw materials and other supply needed in the study
	<ul style="list-style-type: none"> • <u>Phase 2</u> Improvement and evaluation of existing jackfruit technology in DSFT 	<ul style="list-style-type: none"> • Shortlist of developed products • One identified product 	<ul style="list-style-type: none"> • Product Listing • Product Identified 	<ul style="list-style-type: none"> • Product List • Minutes of Meeting of the Core Group • Activity report 	<ul style="list-style-type: none"> • Respondents are supportive to the conduct of the quantitative

	<ul style="list-style-type: none"> > Archiving of existing jackfruit studies > Selection of product for improvement > Validate optimum product formulation > Consumer testing 	<ul style="list-style-type: none"> ● Optimum formulation of the identified product ● Consumer Acceptability Result 	<ul style="list-style-type: none"> ● Consumer Test Result 	<ul style="list-style-type: none"> ● Photodocumentation ● Attendance sheet 	and qualitative surveys
	<ul style="list-style-type: none"> ● <u>Phase 3</u> Development of jackfruit vegetarian food product > Literature search > Focus Group Discussion > Market study of the pre identified product > Variable screening > Process and product optimization > Verification of the optimum formulation > Identify and finalize product packaging 	<ul style="list-style-type: none"> ● Collated literatures related to vegetarian food products ● Identified Top two products ● Market potential ● Top three variables ● Optimum formulation ● Predictive ability of the model generated ● Nutritional facts ● Shelf-life of the products ● General consumer acceptability of the Product 	<ul style="list-style-type: none"> ● Summary report on related literatures ● Summary of the FGD result ● Sensory evaluation ● Physico-chem analysis ● Laboratory analysis ● Product costing ● Funds ● Personnel ● Raw Materials 	<ul style="list-style-type: none"> ● Printed/e-copy of the report ● Documentation of the FGD ● Summary of the respondent's feedback ● Statistical analysis results ● Summary of the results ● Contour map of the optimum region ● Certificate of Analysis ● Answered score sheet 	

	<ul style="list-style-type: none"> > Nutritional Analysis > Accelerated shelf life study > Consumer testing 				
2. Establish suitability profile of major jackfruit production systems in the Philippines.	<ul style="list-style-type: none"> ● Development of framework/algorithm for Jackfruit Suitability Map ● Coordination with stakeholders (communication letters, virtual meetings, MOA) ● Online Survey (using Google Forms) ● On-site data gathering (if deemed necessary) ● Consolidation of data 	<ul style="list-style-type: none"> ● Framework for Jackfruit Suitability Analysis ● Database of quantitative and qualitative data for Suitability Analysis 	<ul style="list-style-type: none"> ● Identified suitability criteria and indicators ● Inventory of baseline information 	<ul style="list-style-type: none"> ● Notice of Meeting for Conceptualization and Development of Jackfruit Suitability Framework ● Minutes of Meeting ● Certificate of Confirmation from Experts ● Official communication documents ● Documentation of actual visits/interviews /consent/etc 	<ul style="list-style-type: none"> ● Technical Experts are responsive and supportive to the attainment of the project's objective ● Accessible cross-border travel ● Project staff and field researcher are fully vaccinated ● Respondents and key informants are supportive to the conduct of the quantitative and qualitative surveys
	<ul style="list-style-type: none"> ● Jackfruit Suitability Analysis 	<ul style="list-style-type: none"> ● Suitability Maps for Jackfruit Production 	<ul style="list-style-type: none"> ● Suitability Indicators 	<ul style="list-style-type: none"> ● Database of Raw Data 	<ul style="list-style-type: none"> ● All relevant primary and secondary data are available and complete ● Accessible cross-border travel ● Project staff and field researcher are

					fully vaccinated • Respondents and key informants are supportive to the conduct of the quantitative and qualitative surveys
3. Assess the innovation readiness for industry 4.0 of Jackfruit in selected areas in the Philippines.	<ul style="list-style-type: none"> • Preparation of survey questionnaire compliant with IMPULS instrument • Migrate the survey instrument to conform with ODL (Online Data Kit) environment • Pretest • Recruit enumerators • Orientation of enumerators in the conduct of paperless research survey • Conduct of survey • analysis of results. 	<ul style="list-style-type: none"> • refines and pretested survey questionnaires • trained enumerators for the survey • Completed questionnaire and stored in the computer server • tabulation of results • terminal report. 	<ul style="list-style-type: none"> • completed questionnaire • recruited enumerators • questionnaire in ODK format • Fully analysed data • Printer-ready report 	<ul style="list-style-type: none"> • Edited and updated for ODK format • contract of enumerators • questionnaire already in the individual smart fones of enumerators. • Printer-ready first draft of te TR 	<ul style="list-style-type: none"> • stable internet • ready recruitable enumerators • ODK compatible smart fones of enumerators • Edited report

II. Project Details

Target Beneficiaries	Jackfruit growers (Individual /Association) LGUs DA-RFO 8 DOST, DTI, DAR & other line Agencies NGOs, POs
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		Jackfruit Food Processors Vegan Community
Discipline (check all that apply)		
<input type="checkbox"/> Education Science, Teacher Training <input type="checkbox"/> Fine, Applied Arts <input type="checkbox"/> Humanities <input type="checkbox"/> Religion, Theology <input type="checkbox"/> Social, Behavioral Sciences <input type="checkbox"/> Business Administration Related <input type="checkbox"/> Law, Jurisprudence <input type="checkbox"/> Natural Science <input type="checkbox"/> Mathematics <input checked="" type="checkbox"/> IT-Related	<input type="checkbox"/> Mass Communication, Documentation <input type="checkbox"/> Medical, Applied Professions <input checked="" type="checkbox"/> Trade, Craft, and Industrial Engineering <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> Architectural, Town Planning <input checked="" type="checkbox"/> Agricultural, Forestry, Fisheries <input type="checkbox"/> Home Economics <input type="checkbox"/> Service Trades <input type="checkbox"/> Maritime <input type="checkbox"/> Others (specify) _____	
Priority Area (Check all that apply).		
<input checked="" type="checkbox"/> Health, Life Sciences <input checked="" type="checkbox"/> Improving environmental resilience <input type="checkbox"/> Improving energy security	<input type="checkbox"/> Future cities <input checked="" type="checkbox"/> Agritech <input checked="" type="checkbox"/> Digital, innovation, and creativity	
Responsiveness to UN Sustainable Development Goals (Depending on the research type and platform, you may check more than one (1) SDG)		
<input checked="" type="checkbox"/> SDG 1. End poverty in all its forms everywhere. <input checked="" type="checkbox"/> SDG 2. End hunger, achieve food security, and improve nutrition and promote sustainable agriculture. <input checked="" type="checkbox"/> SDG 3. Ensure healthy lives and promote well-being for all at all ages. <input type="checkbox"/> SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities at all. <input checked="" type="checkbox"/> SDG 5. Achieve gender equality and empower all women and girls. <input type="checkbox"/> SDG 6. Ensure availability and sustainable management of water and sanitation for all. <input type="checkbox"/> SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all. SDG 8. Promote sustained, inclusive and sustainable economic growth,	<input type="checkbox"/> SDG 10. Reduce inequality within and among other countries <input type="checkbox"/> SDG 11. Make cities and human settlements inclusive, safe, resilient, and sustainable <input checked="" type="checkbox"/> SDG 12. Ensure sustainable consumption and production patterns <input checked="" type="checkbox"/> SDG 13. Take urgent action to combat climate change and its impacts <input type="checkbox"/> SDG 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development <input checked="" type="checkbox"/> SDG 15. Protect, restore and promote sustainable use of terrestrial systems, sustainable manage forests, combat desertification and reverse land degradation and halt biodiversity loss. SDG 16. Promote peaceful and inclusive societies for sustainable	

<p><input checked="" type="checkbox"/> full productive employment, and decent work for all.</p> <p><input type="checkbox"/> SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.</p>	<p><input type="checkbox"/> development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.</p> <p><input checked="" type="checkbox"/> SDG 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.</p>
<p>Explain how the project responds to SDG selected above.</p>	<p>SDG 1: Provides sustainable livelihood to jackfruit farmers through domestic market and export opportunities.</p> <p>SDG 2: Jackfruit production and processing augment family income which caused them to be more secure in accessing nutritious food on the table.</p> <p>SDG 3: If every family has enough income for the family the health and well-being of the family members are assured. This can be achieved through jackfruit production and processing.</p> <p>SDG 5: In the Jackfruit industry, the women are given equal opportunity with men, be it in the production, processing or distribution in the food value chain.</p> <p>SDG 8: The jackfruit industry will provide employment especially in the production, processing and marketing.</p> <p>SDG 12: Integrating the influence of the different stakeholders (producers, policymakers, government agencies, consumers, processors, etc.) of the jackfruit industry will ensure sustainable consumption and production patterns.</p> <p>SDG 13: The identification of the most adaptable jackfruit variety to the climate of Eastern Visayas will ensure that jackfruit production will be sustainable despite the threats of climate change.</p>

	<p>SDG 15: Identification of the most suitable areas for jackfruit production ensures the sustainable use of terrestrial systems.</p> <p>SDG 17: The conduct of research on increasing jackfruit production and market, and distribution of jackfruit products to the global market will initiate and strengthen collaboration with international partners.</p>
<p>Explain how the project responds to the <i>Ambisyon 2040</i>.</p>	<p>Matatag The project could help to build a high-trust society with a strong sense of community among local farmers including jackfruit farmers, processors, manufacturers, and other stakeholders. It could also create volunteer opportunities, and encourage Filipinos to spend time to serve the community, help others who are in need, and contribute to various causes.</p> <p>Maginhawa The project could lead to the opening of opportunities for decent jobs that bring sustainable income, including opportunities for entrepreneurship.</p> <p>Panatag The project could help local farmers and consumers to live a productive and healthy lifestyle (physically and economically) in order to achieve their goal to live long and enjoy a comfortable life upon retirement. It could also open opportunities for them to supplement their resources to cover unexpected expenses, and accrue savings.</p>

III. Schedule of Activities.

Main Activities	No. Mo	Months											
		1	2	3	4	5	6	7	8	9	10	11	12
Obj. 1: Assessment, improvement and evaluation of DFST developed jackfruit technology and development of jackfruit vegetarian food product													

[illegible]

4	Data management, transcription, coding, and analysis	2												
5	Synthesis and writing of results to be presented during multi-stakeholder dialogues	1												
6	Preparation of Progress/Final report and scientific publication	2												

IV. Work and Financial Plan

I. Work Plan for the Project		
Activity	Output	Date
Hiring of Research Assistants. Research team meetings for specific project planning activities.	Identify the RA Project plan details	February 2022 - March 2022
Phase 1 Assessment of Vacuum Fried Jackfruit Technology in Baybay	Audit and Recommendation Report	June 2022 - July 2022 November 2022
Phase 2 Improvement and evaluation of existing jackfruit technology in DSFT	Improved product from the list of existing technology developed in DFST	June 2022 - August 2022
Phase 3 Development of jackfruit vegetarian food product	New vegetarian food product	April 2022 - December 2022
Final Report	Terminal Report	December 2022 - January 2023

	Technical or scientific paper for publication	
Development of framework/algorithm for Jackfruit Suitability Map	Framework for Jackfruit Suitability Analysis	February 2022 - March 2022
Coordination with stakeholders (communication letters, virtual meetings, MOA)	Established linkages and agreements	March 2022 - April 2022
Online Survey (using Google Forms)	Quantitative and Qualitative data for CRVA	April 2022 - August 2022
On-site data gathering (if deemed necessary)	Verified quantitative and qualitative data for CRVA	April 2022 - August 2022
Consolidation of Data	Database of quantitative and qualitative data for Jackfruit Suitability Analysis	September 2022
Jackfruit Suitability Analysis	Suitability Map for Jackfruit Production	October 2022 - November 2022
Online survey using web-based data gathering tool (ODK)	Survey report on stakeholders perceptions	February, 2022 – April, 2022
Dialogue and validation of results with the industry players and stakeholders	Multi-stakeholder recommendations built from collective goals and shared interests, identified constraints, and designed solution pathways	October, 2022
Crafting one document from multi-stakeholder dialogues	Summary report of multi-stakeholder dialogues	November, 2022
Preparing final project reports and scientific publications	Terminal Report Technical or scientific paper for publication	November, 2022

II. Line Item Budget


Items / Particulars	Q1	Q2	Q3	Q4	Total
Personnel Services					
1) SRAs @ 23,400K per month	70,200.00	70,200.00	70,200.00	70,200.00	280, 800.00
Food Technology (Q1-Q4)	70,200.00	70,200.00	140,400.00	140,400.00	421,200.00
Geodetic Engineering (Q1-Q4)					
Agri. Biosystems Eng'g (Q3-Q4)					
Enumerators (for 5 Regions)		188,000.00	128,000.00		316,000.00
Trainings (for enumerators in 5 Regions)		32,000.00	22,000.00		54,000.00
MOOE					
Travel (3 RAs x 3 days x 5 Regions x Php 11,500 per diem and transportation (air and land))		110,000.00	110,000.00		220,000.00
Supplies and materials (raw materials, ingredients, Agar, LPG, chemicals, Cans, pouches , office supplies, etc.	100,000.00				100,000.00
Shelf-life of the product					30,000.00
Packaging materials					100,000.00
Nutritional Analysis			60,000.00		60,000.00
Communication	2,000.00	2,000.00	2,000.00	2,000.00	8,000.00
Representation (paper presentation, on call labor services, token incentives for sensory panellists, etc.)	10,000.00	10,000.00	10,000.00	10,000.00	40,000.00
TOTAL	252400.00	482400.00	542600.00	222600.00	1,500,000.00

III. Summary of Expected Outputs

Category / Item/ Description	Quantity
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Publications	2
Optimized process and product	1
Presentation of results	2
Utility Model	2
Terminal Report	1
Jackfruit Suitability Map	1
Report on stakeholders perception on emerging product and market for jackfruit in Southeast Asia	1
Report on multi-stakeholder recommendations for the future of the jackfruit industry	1
Terminal Report	1

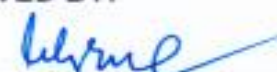
SUBMITTED BY:


ANTONIO P. ABAMO
 Over-all Project Leader

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 Vice President for Research,
 Extension, and Innovation

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EDGARDO E. TULIN
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