

# RESEARCH FOR DEVELOPMENT BARDIGEST

The official magazine of the Department of Agriculture-Bureau of Agricultural Research



VOL. 26 NO. 1  
JAN-MAR 2024  
ISSN 1655-3934

*Empowering women  
in agriculture-fisheries through an inclusive  
and progressive R4D system*

# CONTENTS

## R4D NOTES

**3** Empowering women of agri-fisheries through an inclusive and progressive agri-fisheries R4D system



**4** Gender and development mainstreaming efforts of the Department of Agriculture



**6** Women and households gain access to banana planting materials



**10** Coconut-based Farming Systems: A springboard towards productivity and sustainability



**12** Pili Milk: A novel plant-based milk product



**14** Revitalizing the century-old peanut industry through processing



**18** Hunting the sources of *E. coli* in vegetables in Metro Manila



**20** Potato farmers in Benguet and Mountain Province benefit from disease-free seed potato



**22** From waste to wealth: Utilizing waste onion leaves for various food applications



**24** Passion and devotion: The creation of a model farmer and a good leader



**26** Tagkawayan blooms: Where women turn herbs into hope



**28** DA-BAR: Evolving R4D management in agri-fishery

**8** INFOGRAPHICS 1: Banana facts and propagation techniques

**16** INFOGRAPHICS 2: Increasing yield and income of rice farmers

**30** INFOGRAPHICS 3: Soya Nuggets financial viability

## ABOUT THE COVER



The DA-Bureau of Agricultural Research (BAR) has always been one to promote inclusivity in all its undertakings. To a large extent, the bureau strongly supports and promotes gender equality and fairness within and outside the four corners of its halls. Hence, in our efforts to drive the bureau towards progress, we consistently provide equal opportunities for our partner research for development (R4D) stakeholders, setting aside their gender, race, social status, among other things.

This magazine is copyrighted by the DA-Bureau of Agricultural Research. No parts of this publication may be reproduced and distributed without the permission from the management and proper attributions from its original source.

We welcome and appreciate your comments and suggestions. Reach us via email [ikm@bar.gov.ph](mailto:ikm@bar.gov.ph).

© 2024  
DA-Bureau of Agricultural Research

# R4D NOTES

## *Empowering women in agri-fisheries through an inclusive and progressive agriculture-fisheries R4D system*

JUNEL B. SORIANO, PHD

Gone are the days when society heavily relied on traditional gender-based roles and practices—specifically in the field of science and technology, emphasizing the sector of agri-fisheries, where patriarchy has always been dominant. Long hours of arduous labor in the field and equally long, painstaking hours in laboratories are usually among those that are expected to be played by men—to which time has proven that women also can.

Acknowledging that women’s participation in the field offers a significantly diverse spectrum—from conducting innovative research, to providing extension services, and engaging in entrepreneurial opportunities, among others—we underscore that these contributions are indispensable for achieving food security, reducing poverty, and realizing the sustainable development goals.

The DA-Bureau of Agricultural Research (BAR) has always been one to promote inclusivity in all its undertakings. To a large extent, the bureau strongly supports and promotes gender equality and fairness within and outside the four corners of its halls. Hence, in our efforts to drive the bureau towards progress, we consistently provide equal opportunities for our partner research for development (R4D) stakeholders, setting aside their gender, race, social status, among other things.

In this issue of BAR R4D Digest, we highlight distinct women-led or women-partnered R4D initiatives that provided an impact in the sector. As we respond to and address the gaps and challenges faced by women in agriculture, in hopes of uplifting gender equality in the sector, we give due recognition to their substantial and invaluable contributions in the development and implementation of these R4D interventions. More than this, we reaffirm our commitment towards eradicating the gender stigma and biases surrounding the women of agriculture allowing them access to various resources, opportunities, and decision-making power.

EDITOR  
Ma. Eloisa H. Aquino

CONSULTING EDITOR  
Salvacion M. Ritual

WRITERS  
Ma. Eloisa H. Aquino  
Lea B. Calmada  
Alexis B. del Mar  
Maria Elena M. Garces  
Lara Abegail S. Espiritu  
Rena S. Hermoso  
Evelyn H. Juanillo  
Geline Nicole A. Morillo  
Angelo N. Padura  
Salvacion M. Ritual  
Irish Mikee W. Wigwigan

CONTRIBUTORS  
Kevin G. Biol  
Doris Nase-Gatus  
Usec. Agnes Catherine T. Miranda

LAYOUT AND DESIGN  
Irish Mikee W. Wigwigan

INFOGRAPHICS  
Ricardo G. Bernardo  
Alexis B. del Mar  
Irish Mikee W. Wigwigan

CIRCULATION MANAGER  
Venus Kim H. Bania

ADVISERS  
Junel B. Soriano, PhD  
Joell H. Lales



**Agricultural Magazine  
of the Year**



**Best News Magazine**

# GENDER AND DEVELOPMENT MAINSTREAMING EFFORTS OF THE DEPARTMENT OF AGRICULTURE

USEC. AGNES CATHERINE T. MIRANDA, CESO III  
Chair, DA-GAD Focal Point System

The Department of Agriculture Gender and Development (DA GAD) Program harnesses the untapped potential of women by creating a level playing field for opportunities in the agriculture and fisheries (A&F) sector. This initiative empowers women to enhance productivity and innovation in the field, thereby contributing to economic growth.

In the first quarter of 2023, the Registry System for Basic Sectors in Agriculture (RSBSA) recorded a total of 2,663,663 women farmers, fisherfolk, and agricultural laborers or 42.9% of those registered in the RSBSA. However, according to the Philippine Commission on Women (PCW), a lot of women working in the agriculture and fisheries sector are unrecognized since the work of women is often considered informal and only an “extension” of their household work. As a consequence, women often encounter fewer opportunities in the sector, including access to government interventions.

To honor the invaluable contributions of rural women in the A&F sector, the DA GAD Focal Point System organizes an annual

awards ceremony that champions empowerment of rural women and their achievements. Since 2003, the Search for Outstanding Rural Women (SORW) has acclaimed women who have driven innovation and positive change in agriculture thus improving the lives of rural communities. The SORW not only showcases inspiring stories of overcoming challenges that come with being a woman, but also provides winners with cash prizes and assistance for their projects. It is an event that people look forward to as it not only recognizes small scale women farmers and fisherfolk, but also provides necessary services and interventions in their respective communities.

The DA continues to make efforts in mainstreaming GAD in its regular activities. An exemplar is the Philippine Rice Research Institute (PhilRice), an attached corporation of the DA that received the GADtimpala Silver for Outstanding Gender-Responsive Government Agency in 2023. PhilRice received the GADtimpala award from the PCW for successfully promoting GAD mainstreaming through the four

key entry points: policies, people, enabling mechanisms, as well as programs and projects.

## 1. Policy and Management

**Support:** The PCW evaluators noted that DA-PhilRice successfully addressed gender-specific requirements through the implementation of its policies. PhilRice creates supportive policies that keep gender streamlined in the whole organization.

## 2. Customized Capacity

**Development:** DA-PhilRice produces capacity development materials specific to the needs and context of their stakeholders. In this way, GAD principles are efficiently integrated in program implementation.

## 3. Gender-Responsive Database Management:

The database management systems incorporated sex-disaggregated data (SDD) as the foundation for gender-responsive planning, monitoring, and evaluation. PCW also affirmed that PhilRice has integrated GAD into its institutional strategic plan, mainstreaming a gender



perspective throughout its entire operation. To add, DA-PhilRice successfully disseminates SDD and gender-related statistics through online platforms, as well as during knowledge-sharing and learning events.

#### 4. Project Review and Evaluation Committee:

This committee is in charge of the assessment of project proposals to ensure the integration of gender dimensions. This mechanism is in parallel with the increase of gender-sensitive/responsive projects, augmenting the budget allocation and, consequently, PhilRice's impactful initiatives catering to the gender-specific needs of rice farmer-beneficiaries. These innovations go beyond the traditional initiatives for GAD but rather break barriers, enabling a gender-inclusive paradigm for the A&F sector.

The efforts of PhilRice towards gender mainstreaming have empowered women farmers, which is a significant shift from women being underrecognized in the A&F sector. For one, GAD mainstreaming empowers women to take on leadership positions within their associations. Moreover, as indicated by the Development Academy of the Philippines

(2023), GAD mainstreaming creates significant benefits as the active engagement of women in the program's capacity-building activities correlates with a 12% increase in yield and a 6-8% reduction in the cost per kilogram of rice production among women farmers. Such efforts enhance the economic sustainability of their agricultural pursuits and contribute to broader development goals. Approximately 50% of women participants have diversified into other enterprises, providing an additional income source and generating a combined net income of USD 12.3 thousand. GAD mainstreaming ensures the acknowledgment of women's pivotal roles in food production.

At the moment, other operating units of the DA are taking measures to be GADtimpala awardees and further promote GAD mainstreaming in their own capacities. Ultimately, mainstreaming GAD in the A&F sector not only empowers women but also creates a ripple effect, positively impacting economic development and national food security. ♦

#### References:

Carrera, G. (2023). Women commission recognizes PhilRice's GAD mainstreaming initiatives. *Rice Matters - Bi-monthly Newsletter of the DA-Philippine Rice Research Institute*, 3(3). <https://www.philrice.gov.ph/wp-content/uploads/2023/08/DA-PhilRice-Newsletter-2023-May-June.pdf>

Department of Agriculture - AFID. (2022, December 9). *DA hails outstanding women in agriculture for 2022*. Retrieved from <https://www.da.gov.ph/da-hails-outstanding-women-in-agriculture-for-2022/>

Development Academy of the Philippines. (2023, December). *Sowing Gender Equality: PhilRice GAD Mainstreaming Initiatives Towards Inclusive Agriculture and Productivity*. Retrieved from <https://coe-psp.dap.edu.ph/compedium-innovation/philrice-gender-and-development-gad-mainstreaming/>

Diamsay, J. (2023, October). *PhilRice GAD Mainstreaming & 2023 Midyear Accomplishment*. [PowerPoint slides]. Philippine Rice Research Institute, Nueva Ecija. Retrieved from [https://docs.google.com/presentation/d/1yJ-DJRrJPJ8PMvJcsAUo2IYWntJT\\_jKh/edit#slide=id.p1](https://docs.google.com/presentation/d/1yJ-DJRrJPJ8PMvJcsAUo2IYWntJT_jKh/edit#slide=id.p1)

Philippine Commission on Women. (2020). *Agriculture, Fisheries and Forestry Sector*. Retrieved from <https://pcw.gov.ph/agriculture-fisheries-and-forestry/>

Vergara, K. (2022, March 7). *DA celebrates women empowerment, social inclusivity at NMMC 2023*. Retrieved from <https://www.da.gov.ph/da-celebrates-women-empowerment-social-inclusivity-at-nmmc-2023/>

# Women and households gain access to banana planting materials

MA. ELOISA H. AQUINO



*“Napatunayan kong iyong aking itinanim na tissue cultured banana mula sa DA ay nakapagbibigay ng mas malaki at maraming bunga kumpara sa dati kong itinanim,”* Ellen Balbin said, one of the women farmer-partners in Purok 2, Malasin, Ilagan City, Isabela.

With funding support from the DA-Bureau of Agricultural Research (BAR), DA-Cagayan Valley Research Center (CVRC) introduced the mass production of banana through tissue-culture and macro-propagation techniques to farmers in the year 2020 to 2021.

Nueva Vizcaya State University was instrumental in the capacity building of DA-CVRC staff in macro-propagation technology. Meanwhile, the Local Government Units of Aurora, Burgos, and Ilagan were responsible in identifying, validating, and monitoring the project beneficiaries. Non-banana-producing municipalities were identified to provide them source of fresh produce from backyard production.

## **Tissue culture vs macro-propagation**

Considered as a rapid propagation technique, tissue culture technique utilizes isolated banana plant parts such as suckers and grown in artificial medium under sterile germ-free conditions. “When this technique is properly applied, large number of disease-free plantlets can be produced in a short period of time,” Jessica I. Bernardo, project assistant leader, said.

Meanwhile, macro-propagation is a more simple propagation technique. With minimal inputs and can be done at farmer’s level, this technique uses a whole sucker to produce more planting materials.

Tissue cultured Lakatan banana plants applied with recommended fertilizers produce flower/blossoms earlier than those without fertilizer application. “It started to blossom at 240-270 days (8-9 months) from planting, which is a month earlier than the 9-10 months in unfertilized tissue culture bananas,” Bernardo

said. Tissue cultured bananas have higher growth rate (plant height) compared with macro-propagated and conventional sucker planting materials. “This is because the tissue cultured planting materials already possessed an active root system and shoot system at planting that resulted to more vigorous growth and shorter reproductive cycle,” she further explained.

## **Promoting backyard cultivation**

“Backyard cultivation of tissue-cultured Lakatan along with recommended cultural practices such as desuckering, debelling, fertilization among others in non-banana-producing municipalities helps ensure the availability and accessibility to good quality planting materials and fresh produce,” Ibarra explained.

*“Mabilis itong mamunga at paramihin depende sa pag-aalaga at ganda ng lupa na tinaniman,”* Balbin seconded.

A banana backyard farmer for 10 years, Balbin attended a training that equipped her with knowledge on appropriate

production and cultivation management of Lakatan.

*“Sinunod ko ang paraan ng pagtatanim sa amin, tamang distansiya na 3m x 4m, pagdidilig lalo sa panahon ng tagtuyot, pag-aabono at pag-harvest,”* Balbin shared what she did upon receiving the initial five tissue culture banana seedlings from DA-CVRC.

Bernardo explained that production of Lakatan requires proper care and nutrient management for it is often sensitive to diseases, specially after the third harvesting from the same mat. Proper and early detection of disease is also very important in order to address immediately. “The plant usually decreases its vigor. Sourcing the planting materials from a reliable source is very important to ensure a good start in farming, and proper care and maintenance will ensure good quality harvest,” she added.

Produced at DA-CVRC tissue culture laboratory, a total of 20,330 pieces of tissue cultured Lakatan was distributed to 10 barangays with a total of 1,367 households beneficiaries.

*“Sa pagtatanim namin ng saging, nagkaroon kami ng sariling suplay ng Lakatan na dati’y kung bibilhin sa palengke ay napakamahal. Dahil dito, hindi na kami gumagastos para sa pagbili*

*“Aside from providing quality planting materials, the project fosters local food production and addresses immediate food needs.”*

*ng saging. Sa halip, nagagamit namin ang natipid para sa ibang pagkain at allowance ng mga anak ko. At kung sobra ang aming produksyon, ito ay binebenta namin sa aming komunidad, kaya dagdag kita rin sa amin,”* she shared.

Providing safer and quality food for the family, Balbin and other members of the Ilagan Women’s Association (ILAW) gain access to planting materials, no longer leading them to buy bananas at not less than PHP 70 per kilo.

*“Magandang magkaroon kami ng pananim na saging na makapagbibigay ng karagdagang pagkakakitaan sa aming baranggay. Marami pa ang kabaranggay na interesadong magtanim din kaya’t binabahaginan ko din sila ng subwal (sucker) ng saging mula sa aking tanim. Kada isang puno ng saging na tanim ko ay nagkakaroon ng 7-13 na subwal (sucker),”* she shared.

The project encompassed a consolidated backyard garden area of 92,970 sqm, resulting to a

substantial yield of 155,256.96 kg of bananas. A total of 2,037 suckers were produced by beneficiaries and 509 were shared to others with a total of 32,592 sqm of expansion.

Greenhouse and nursery were also provided for the expansion of planting material production. The communal garden specifically in Brgy. Carikkikan, which is being managed by ILAW are gaining profit from their produce. The profit from their sales within the community are also being utilized for funding projects in the barangay.

“Aside from providing quality planting materials, the project fosters local food production and addresses immediate food needs,” Bernardo shared. The project was conceptualized under the DA’s Plant Plant Plant Program. A response to COVID-19 pandemic effects such as worldwide economic hardship and food shortage due to restrictions on food movement, the said program aimed to ensure food availability and affordability in every Filipino household. ♦

For more information:  
**ENGR. WILLIAM V. CONTILLO**  
DA-CVRC  
cvrchvcdp02@gmail.com

**JESSICA I. BERNARDO**  
DA-CVRC  
jessicagnacio1095@gmail.com



# Why banana ?

Bananas are one of the most significant fruit crops in the Philippines. The Philippines maintained its standing as the world's second-largest exporter of bananas for the fourth consecutive year in 2021, according to the data from the Food and Agriculture Organization of the United Nations.



**9.06M**  
METRIC TONS  
VOLUME OF  
PRODUCTION<sup>1</sup>

**451.18**  
THOUSAND  
HECTARES  
AREA PLANTED<sup>1</sup>

**20.18**  
METRIC TONS/  
HECTARE  
AVERAGE YIELD<sup>2</sup>

Sources: 1 Philippine Statistics Authority. 2016-2020 - Crops Statistics of the Philippines  
2 Philippine Statistics Authority. 2017-2021 - Agricultural Indicators System

## TYPES OF BANANA PLANTING MATERIALS

### SUCKER

- ✓ Easy to obtain
- ✓ Cheap
- ✓ Easy to transport
- ✓ Easy to manage
- ✗ Carriers of pest and diseases
- ✗ Bulky to transport
- ✗ Low multiplication rate
- ✗ Risk of variety mix up
- ✗ Limited quantity to satisfy need

 12 months to harvest  
 5 suckers after 1<sup>st</sup> harvest  
 17 kgs in yield

### MACRO-PROPAGATED

- ✓ Minimum skills to set up
- ✓ Easily operated
- ✓ Acceptable multiplication rate
- ✓ Uniform growth
- ✓ Good for enterprise
- ✗ Risk of diseases
- ✗ Requires clean substrate
- ✗ Initial investment
- ✗ Quality control
- ✗ Transport of pots
- ✗ Moderate field maintenance

 11 months to harvest  
 4 suckers after 1<sup>st</sup> harvest  
 18 kgs in yield

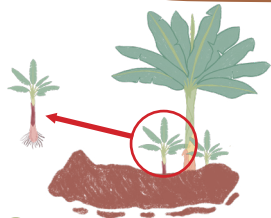
### TISSUE CULTURED

- ✓ Healthy
- ✓ High quality
- ✓ Uniform growth
- ✓ Available all year round
- ✗ Costly
- ✗ Requires aseptic conditions
- ✗ Requires skilled and competent personnel
- ✗ Sensitive to adverse factors
- ✗ Easily damaged during transport

 10 months to harvest  
 3 suckers after 1<sup>st</sup> harvest  
 20 kgs in yield



# Tissue Culture Propagation Technique



1 Collection of suckers



2 Initiation/establishment



3 Rapid multiplication



4 Rooting

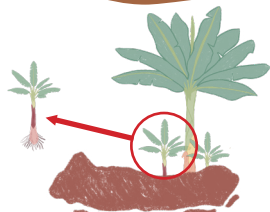


5 Acclimatization/hardening

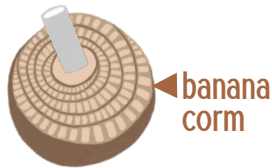


6 Field planting

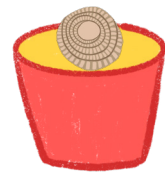
# Macro-Propagation Technique



1 Collection of suckers



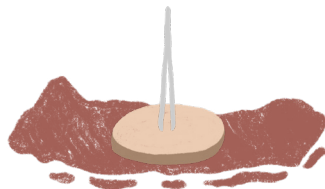
2 Decortication/decapitation



3 Fungicide treatment



4 Planting of corm



5 Primary shoot decapitation



6 Secondary multiple shoots



7 Plantlets for harvest



8 Field planting

For more information, please contact  
Engr. William V. Contillo  
DA-Cagayan Valley Research Center  
cvrchvcdp02@gmail.com

Prepared by  
IRISH MIKEE W. WIGWIGAN

# Coconut-based farming systems: A springboard towards productivity and sustainability

LARA ABEGAIL S. ESPIRITU



Coconut continues to be among the crops that shape Philippine economy, as it maintains export momentum earning the country more than a billion dollars in trade revenues every year. Despite this and the fact that the country is the second largest coconut producer in the world, the supply chain is insistently declining due to a host of factors from production to post-production.

In Majayjay, Laguna, a project titled, Outscaling of Coconut-based Farming Systems (Coconut + Tissue-Cultured Lakatan + Vegetables) was conducted by DA-CALABARZON, in its bid to address production woes and ensure sustainable production through mature and tested technology utilization. Funded by the DA-Bureau of Agricultural Research (BAR), the project aimed to convert and optimize unproductive coconut areas in the province, improve farming systems and technologies, and provide alternative sources of income to coconut farmers.

“Through this outscaling project, we implemented a diversified farming systems approach integrating high value crops, such as banana and vegetables, to coconut as base crop, as this will

enhance economic productivity per unit of land area,” said project leader and proponent Aida Luistro.

With the involvement of various farmer leaders and associations, and partners from the local government unit (LGU), the outscaling project became an effective approach by directly engaging farmers and growers in the research process, enabling them as important decision-makers from the onset to the completion of the project.

According to Luistro, “the application of Community-based Participatory Action Research (CPAR) approach in this project has been an empowering avenue especially for farmers—to be active participants and not just as beneficiaries of government interventions because research and related activities are carried out in an ethical, inclusive, and a more responsive manner, where farmers take ownership of the project itself.”

## Package of Technologies (POTs)

By introducing farm diversification, 65 coconut farmers were trained to implement the project through the POTs which include tissue cultured Lakatan banana, bitter

gourd or ampalaya, eggplant, hot pepper, tomato, and coconut as base crop. Proper distancing, planting, fertilization, maintenance, and harvesting techniques were taught to the farmers, along with proper data gathering and monitoring all throughout the production cycle.

Notably, pest and disease incidence was minimized through regular monitoring and crop inspection. The use of the University of the Philippines Los Baños (UPLB) Smarter Approaches to Reinvigorate Agriculture as an Industry (SARAI), and SARAI Pest Identification Technology (SPIDTECH) mobile app helped in the detection, identification, prevention, and control of pests and diseases. In addition, dissemination of seasonal climate outlook and weather forecasts helped farmers in adjusting the cropping calendar and their daily farming activities.

Seven barangays were identified as pilot sites: Bakia, Gagalog, Isabang, Piit, Rizal, Olla, and San Isidro. Each farmer-beneficiary was required to spare 2,500 sqm for the establishment of diversified farm models.

Despite it being implemented at

the height of the pandemic with strict restrictions from 2020 to 2022, the project proved to be a success as it led to the increase in production output to as high as 36%.

### Income at last

Cost-benefit analysis showed that the different coconut-based cropping systems had return on investment (ROI) of more than 100%, indicating that crop integration of cash crops such as bananas and vegetables to coconut is a highly profitable venture. In fact, the biggest ROI recorded was in the coconut + Lakatan + bitter gourd + chili pepper cropping system, yielding 170.66%. The income of the farmer-participants ranged from Php 222,360.00 to Php 302,360.00, a threefold increase from their pre-project implementation income of around Php 60,000.00.

This positive development was attributed to the farmers' high level of adoption and application of shared technologies, coupled with the support mechanisms and linkaging with other players. The project facilitated the access of cluster farmers associations—Samahan ng Magsasaka sa Silangan Dalitian (SAMASID) and Olla-San Isidro Farmers Association (OLSAN FA)—to other support services provided by government. The farmer-participants' consolidation efforts and registry to the DA's Registry System for Basic Sector in Agriculture and to the Philippine Coconut Authority's National Coconut Farmers Registry System enabled them access insurance and credit services, and other financial support given by the government.

### Sustaining and scaling up

Clearly, with coconut, being a perennial crop, the best

intervention is intercropping or diversification. The project proved, scientifically and economically, the solution to better economics for coconut production is, indeed, farming systems. It is not a new concept, but a correct paradigm that shouts urgency and policy support.

In the case of coconut, the national objective remains: optimize productivity and provide balancing sources of income to buffer Filipino coconut farmers of inefficiencies in the current farming practices.

*“As a woman-leader, Luistro proved that she can lead to drive tangible transformation in the lives of the farmers within her community.”*

Napoleon Francia, SAMASID president and a CPAR project partner, attested to the benefits of the paradigm shift in coconut farming. *“Malaking pasasalamat namin sa DA-RFO 4A at DA-BAR. Dahil sa proyektong ito, lumaki ang produksyon ng aming niyugan. Malaking tulong din po na kami ay natulungan para makapag organisa ng samahan.”*

### A heart for leadership

It was at a time when the world was grappling with the threats and uncertainties of COVID-19 pandemic that Luistro recognized the urgency to conduct the

project to address the pressing issues on food security and livelihood.

“It was a timely undertaking, as we know that during the pandemic, ang pinakamalaking concerns aside from the health crisis ay ang food insecurity and lack of livelihood ng ating mga farmers,” she emphasized. “We believe that this project would be a great help to our farmers during this trying time,” she added.

With a wealth of knowledge and on-farm research under her belt, Luistro was confident that she can effectively implement the project, amid restrictions during the pandemic. She began with winning the hearts of the local farmers, as this is a sure formula for success.

“Marami na rin akong exposure sa on-farm research kaya these experiences helped me to be confident in the implementation of projects,” she explained. “Farmers know if you are sincere when you are helping them... nararamdaman nila iyon...that's one way of gaining their trust.”

True enough, as the project developed, her leadership brand—the kind that follows the heart—reinforced positive change in many farming communities in Majayjay. As a woman-leader, Luistro proved that she can lead to drive tangible transformation in the lives of the farmers within her community.

To date, the project remains as a major game-changer in the lives of coconut farmers in Majayjay, Laguna, as it nurtured not only the sense of ownership within the community of coconut growers, but also the knowledge instilled in them which can go beyond the next generation of coconut farmers. ♦



# Pili Milk:

A novel plant-based milk product

MARIA ELENA M. GARCES



## A new product is born

In 2021, the Philippine Statistics Authority reported that Bicol Region is the country's top pili (*Canarium ovatum* Engl.) producer with about 90% or 1,796.38 hectares of pili production area and 84% or 4,932.60 metric tons of the total volume of production nationwide. But still, pili industry in the province has remained a “cottage industry” or small-scale business only.

And so, through the initiatives of Sorsogon Provincial Government under the leadership of Gov. Francis Joseph F. Escudero, in collaboration with Sorsogon State University, together with other government and non-government agencies, and people's organizations, conceptualized the Sorsogon Pili Roadmap, which aimed to boost the pili industry in the province and gain a national recognition as Pili Capital of the Philippines.

The DA-Sorsogon Dairy Production and Technology Center (SDPTC) supported this vision and explored the potentials of pili as a healthy food product that is rich in calories, and provides both micro- and macro-nutrients.

It was in 2020, during one of the stakeholders technical working group (TWG) meetings, which were regularly attended by Engr. Agnes Espinola as TWG member for Pili Production and Development Committee and representative of the DA-Bicol Region-SDPTC, where it was suggested that the pili milk product has research potential.

“The effect of the COVID-19 pandemic on the pili industry was much felt by middle of 2020 after travel restrictions were imposed. Processors and traders could not sell their pili pasalubong items which are mostly confectioneries. This was one of the factors

considered in pursuing the research. Another factor was the rising trend of plant-based milk products consumed by health advocates,” said Espinola.

With funding assistance from the DA-Bureau of Agricultural Research (BAR), Engr. Espinola and her women team conducted trials on pili milk product development at the Product Development and Technology Commercialization Center, also a BAR-funded facility at SDPTC, adopting the Wet Process Method using pili kernels on Laysa and Lanuza varieties.

The wet process method in the formulation of pili milk involves soaking, milling, filtration, homogenization, pasteurization, and packaging. Different optimization ratio of the materials was conducted to develop a standard process flow and formulation for pili milk, resulting to 1:10 ratio of pili kernel to water,

that produced an acceptable and comparable nutritional and sensory quality of the product, with recovery yield averaging 88%. The shelf life of the product is prolonged for two months when frozen.

The product's market assessment survey showed that pili milk ranked as top 2 from the 4 samples evaluated, with initial cost and return analysis at 36%, and at a reasonable price of PhP 55 per 200 ml bottle.

### **The women behind a winning product**

The research team, led by Engr. Espinola with Engr. Henrilyn Yamson, and Rosella Formento, are all women researcher-entrepreneurs; two are Agricultural and Biosystems Engineers and one Food Technologist. They have splitted their roles: Engr. Espinola was the main author who conceptualized the project as a whole; Dr. Yamson was in-charge of online surveys (secondary data), statistical analysis, and packaging and labeling of the product produced, while Formento as the food technologist conducted product exploration and development and study write-up.

The women team shared the same vision—to boost the pili industry in the region and at the same time introduce a healthier alternative option to existing milk products in the market, not to mention the additional income for pili farmers and processor-adoptors who would benefit from the technology.

“For every researcher, any bright idea can be likened to a hidden treasure that must silently, carefully, and patiently be explored. The intrinsic technical know-how of our SDPTC researchers of producing plant based milk from pili, making

use of the available small-scale processing equipment necessary in the product exploration such as colloid miller and high speed blender at the Center, inspired us to push through the product development of pili milk, aiming to develop a saleable product out of pili kernel aside from confectioneries we produce,” said Espinola emotionally, as she narrates how it was in the early days of the product development.

Being women researchers, they have their share of challenges encountered while working on the project, particularly on some major activities. But as a team, professionalism made them face the challenges and focused on the set goals.

Engr. Espinola recalled the times when the team had to pick and gather pili fruits to as high as they could reach, shelled enough volume of pili kernels for processing, operated the kernel grinding machine, and conducted series of trials to come up with the perceived product based on consumers' preferences.

Being superwomen in their own right, however, did not prevent them to seek assistance during difficult times; such as in gathering pili fruit from higher parts of the trees, shelling the pili kernels in larger volume, and trouble-shooting the pili kernel grinding machine whenever it breaks down.

Today, these women can now proudly say that they have championed the challenges. The pili milk product was awarded as Best Product (3rd Place) under Food Category during the 1st National Agriculture and Fisheries Technology Exhibitions in August 2023 held at Central Luzon State University, Nueva Ecija. The product was formally launched in SM Sorsogon City

in February 2024. The launching unfolded the market potential of pili milk as a milk alternative and gained support from Sorsogon City Government, Sorsogon State University, and Department of Trade and Industry.

The SDPTC is continuously processing pili milk for product promotion or upon order. Consultation meetings with partner-processor/adopter, the Barcelona Development Cooperative in Barcelona, Sorsogon, were initiated for immediate transfer of technology, which has 1,289 total number of members, 1,048 are women and 241 are men. Knowledge on pili milk processing was provided to the coop as initial assistance.

The increased demand for pili production and processing will greatly benefit the partner-pili farmers and processors with the additional income from the pili milk processing. The product will also benefit the consumers with nutritious, affordable, less cholesterol, and a satisfying taste that is expected from pili milk. ♦



*“Today, these women can now proudly say that they have championed the challenges. The pili milk product was awarded as Best Product (3rd Place) under Food Category...”*

# Revitalizing the century-old peanut industry through processing



ANGELO N. PADURA

Corn, whether white or yellow, has always been popularly associated with Cagayan Valley. But to many farmers, another commodity staple to many farm-lands and markets in the region, particularly around Alcala, Cagayan, seems to have been forgotten—the peanut.

“Long ago, colonizers brought to us this crop. Since our location was easily reached by them, our people here got to embrace peanut farming,” shared Jose Guzman, a retired professor and researcher from Cagayan State University-Andrews.

Despite being considered as one of the major field legumes grown by local farmers, peanut production has been low and erratic as compared to other crops. This results from several

constraints such as the crop’s low yield and lack of mechanization technologies for production, postharvest, and processing. Along with this, the catastrophic effects of flooding have been devastating peanut plantations around the region.

“*Since maraming mani sa Alcala, ginawa namin itong one town-one product (OTOP),*” Emma G. Battung, retired cooperative manager at Alcala Women’s Rural Improvement Club Multipurpose Cooperative (AWRIC MPC) in Alcala, Cagayan.

After managing AWRIC MPC which mainly processing peanuts, she continued her strong commitment not just in processing agricultural products, even more so in empowering women by providing them an

avenue both for learning and livelihood through the SQA Food Products Grandelis.

“*Noong nag-retire ako, gusto ko magproseso ng mani kasi malaki ang market nito, hindi lamang dito sa Alcala, pati na rin sa iba’t ibang probinsya. Tinuruan ako ng CSU bilang isang incubatee—tinuruan nila ako sa lahat ng anggulo ng pagnenegosyo, paggawa ng business plan, bookkeeping at accounting, marketing, pagre-register ng aking dalawang peanut products, pati na rin ang pagpapagamit sa amin ng peanut sheller,*” Battung remarked.

In partnership with the DA-Bureau of Agricultural Research (BAR) and the Department of Science and Technology-Philippine Council for Agriculture,

“After being involved as a CSU-CVLTBI’s incubatee, Battung was capacitated on the use of three developed machineries for peanut food processing- peanut thresher, desheller, and bulk storage. This, according to her, changed the game for peanut food processors like her.”

Aquatic and Natural Resources Research and Development (PCAARRD), the Cagayan State University (CSU)-Andrews, through its Cagayan Valley Legumes Technology Business Incubator (CVLTBI), implemented a research for development project aimed at providing professional technopreneurship services to foster the growth of technology generators and takers in establishing viable and competitive startup legume-based enterprises and networks.

“Ang peanut ay laborious, requires a lot of labor, isa ito sa mga constraints kung bakit nawawalan ng interest ang farmers kaya karamihan sa kanila ay nag-shift sa corn because of the support and machineries in corn production and even processing. Kaya gusto naming talagang matulungan ang mga farmers upang gumamit ng mga

innovations para maangat natin ‘yong competitiveness nila dito sa region pati na rin sa ibang peanut producing regions in the country such as Ilocos,” Guzman explained.

After being involved as a CSU-CVLTBI’s incubatee, Battung was capacitated on the use of three cutting-edge peanut machineries for peanut food processing— Peanut Thresher/Stripper, Sheller, and Intelligent Aerated Peanut Bulk Storage. This, according to her, changed the game for peanut food processors like her. “Sobrang bumilis ang aming pagproseso ng mani dahil sa mga makinarya na na-develop ng CSU,” she said.

Aside from these, Battung, along with other incubatees, was assisted in: application of utility model for their

product; food quality assurance; and product branding, packaging, and labelling.

With the demand of peanut processors like Battung, peanut-producing communities in Cagayan Valley are now benefitting from the increased saleability and profitability of their produce.

“Iyon pong aming mga raw mats ay direkta naming binibili sa mga farmers. Binibili namin ng mas mataas ang mani sa mga farmers para maging mas maganda ‘yong presyo kumpara sa mga bumibili sa bodega,” Battung said.

“Ang ating mga teknolohiya na na-develop sa pamamagitan ng research over time ay patuloy pa po nating ipo-promote. Maganda ang impact ng ating project at ‘yong mga machineries ay well accepted ng ating mga marginal farmers. I am expecting na sana this impact will go beyond Cagayan Valley,” Guzman expressed. ♦

For more information:  
**JOSE GUZMAN**  
CSU-Andrews  
joguz1129@gmail.com



# INCREASING YIELD AND INCOME OF RICE FARMERS

The Philippines is the world's eight largest rice producer.

Its main crops are **rice**, corn, sugarcane, pineapple, banana, coconut, and mango.

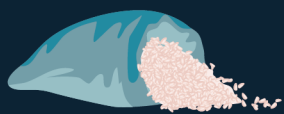
## Where is the project located?

It is located at **Pilar D. Galima** and **Osmeña**, Solano, Nueva Vizcaya. The project is joined by LGUs and 20 suitable farmer cooperators.



Nueva Vizcaya Map

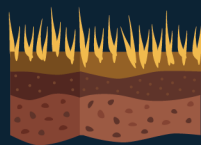
## THE PROBLEM



Low rice yield



Unutilized agricultural waste



Soil degradation

## THE GOAL

- ✓ Increase rice yield by 0.75 to 1 mt/ha
- ✓ Increase farm productivity
- ✓ Improve transfer and adoption of technology
- ✓ Strengthen support mechanisms and linkages

For more information, please contact Janine A. Quintal-Tumaliuan of DA-Cagayan valley th



# Technology Intervention

## 1 Integration of High Value Crops in Rice Production

Establish vegetable gardens along dikes and in backyards to produce food for the household and provide an additional source of income.

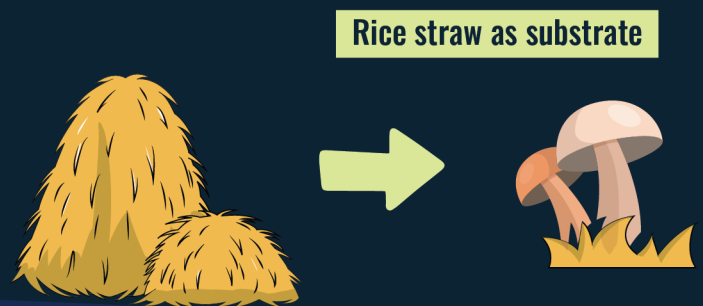


use OPV vegetable seeds

## 2 Waste Utilization for Mushroom Production

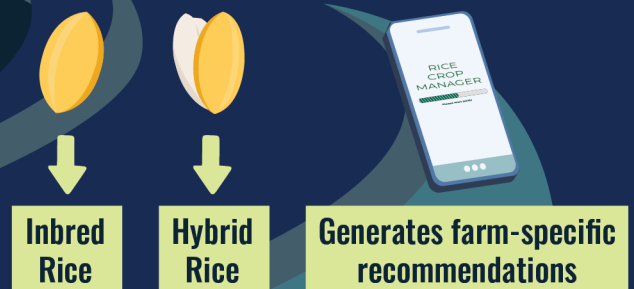
Rice straw, which is abundant in the barangays, is used as a substrate for mushrooms after each harvest.

Spent mushroom substrate is used in vegetable production as organic compost.



## 3 Various Rice Production Technologies

Utilize the use of quality seeds and recommendations from the Rice Crop Manager and Laboratory Soil Analysis for nutrient management.



Prepared by  
ALEXIS B. DEL MAR



# Hunting the sources of *E. coli* in vegetables in Metro Manila

RENA S. HERMOSO

Have you heard about *E. coli* or *Escherichia coli*?

Chances are you have been cautioned against it. *Escherichia coli* is a fecal coliform bacterium commonly found in the guts of humans and warm-blooded animals. While most strains are not harmful, there are some that can cause diarrhea, urinary tract infections, respiratory illnesses, and bloodstream infections.

Those subtypes that cause diarrhea are commonly found in contaminated water and food. To reduce exposure and prevent infection, experts suggest that

the public practice proper hand hygiene, safe food handling practices, and avoid high-risk food or environment.

Earlier research detected the presence of *E. coli*, among other disease-causing bacteria, in crops, especially in vegetables. The relatively high prevalence of these microorganisms on fresh produce poses risks to food safety.

To help address this food safety concern, the Biological Research and Services Laboratory of the University of the Philippines Diliman-Natural Sciences

Research Institute surveyed the presence of thermotolerant *E. coli* in 419 vegetable samples from three urban farms and six major wet markets in Metro Manila during the peak of the COVID-19 pandemic from February 2021 to March 2022.

Funded by the DA-Bureau of Agricultural Research (BAR), the research team found that *E. coli* was present in 13.60% of all samples obtained from urban gardens using molecular and culture techniques. Higher prevalence of contamination was observed in the urban garden samples compared

*“Those subtypes that cause diarrhea are commonly found in contaminated water and food. To reduce exposure and prevent infection, experts suggest that the public practice proper hand hygiene, safe food handling practices, and avoid high-risk food or environment.”*

to the wet market ones. Bird species was identified as the most predominant source of contamination, with other sources including human, cattle, and dog.

*E. coli* contamination was similar in both wet and dry seasons, suggesting that contamination may occur anytime. The relationship between the fecal coliform contamination and various factors like season, climate, and irrigation water quality remains unclear.

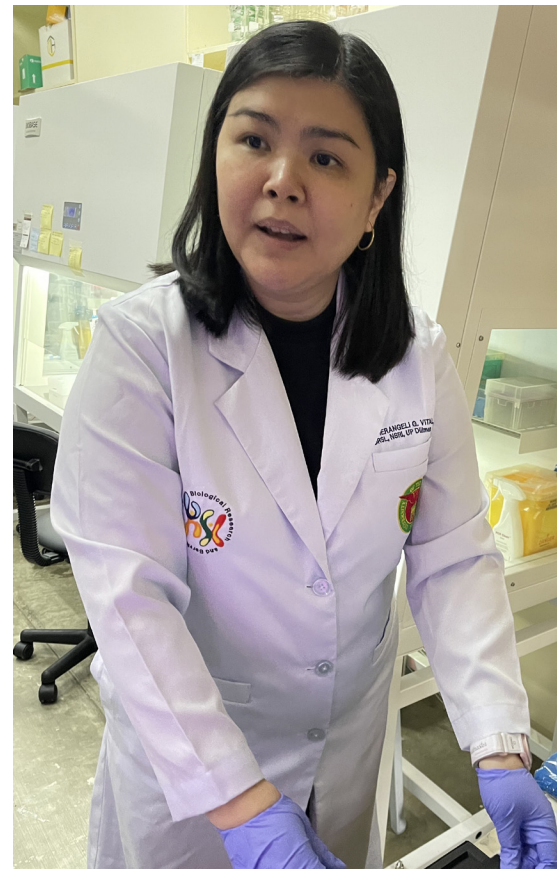
According to project leader Dr. Pierangeli G. Vital, this suggests that other factors may affect vegetable contamination, and further investigation is needed to ensure food safety and prevent spread of foodborne diseases.

The project team endorsed the results to the DA-Bureau

of Agriculture and Fisheries Standards. It was used as one of the bases in the development of the Philippine National Standard on General Standards for Microbial Hazard Limits in Primary and Postharvest Food and Feed-Product Standard.

The researchers also recommended to afford urban garden farmers with further training to avoid fecal contamination and ensure food safety. Further studies must also be made to identify possible specific markers that can be used for microbial source tracking. ♦

For more information:  
**PIERANGELI G. VITAL, PhD, DPAM**  
Natural Sciences Research  
Institute  
University of the Philippines  
Diliman  
pgvital@up.edu.ph





# Potato farmers in Benguet and Mountain Province benefit from potato seed planting material

IRISH MIKEE W. WIGWIGAN

In the Philippines, potatoes are considered a vegetable, commonly added into various dishes such as adobo, nilaga, kaldereta, bulalo, corned beef, and scrambled eggs. Also, they can be prepared in different ways, including baking, mashing, and processing into chips and fries.

As the demand for potatoes continues to rise due to population growth, urbanization, and the fast-food industry, there is a need to increase potato production without compromising quality.

However, due to the weather-dependent nature of potato cultivation, the process is not as straightforward as it may seem. It is a recognized fact that quality seed tubers are best produced

in higher elevations with cooler temperatures, hindering the multiplication of viruses transmitted by insects.

The Philippines, mostly tropical, faces a challenge since only a few provinces in the country, such as Benguet and Mt. Province, are considered the best areas for seed production, with potential expansion in the high elevation and cool areas of Ifugao, Kalinga, Iloilo, Davao, and Bukidnon. The concern now revolves around whether these provinces can meet the nationwide demand. Because of this, studies are being conducted to identify measures that will enhance and increase potato production.

A research for development (R4D) project led by Cynthia

G. Kiswa of the Benguet State University-Northern Philippines Root Crops Research and Training Center (BSU-NPRCRTC) was conducted. The project titled, Commercialization of Quality Seed Potato through the Standard Seed Production System, aims to enhance the propagation of quality planting materials and increase the yield and profit of potato farmers.

## **Fruitful advances**

Through the project, the team was able to come up with results based on key components including social acceptability, technical feasibility, financial viability, environmental soundness, and even political acceptability.

“Addressing the consistent

challenge of quality planting material shortages in potato production is an ongoing endeavor. Potato farmers across the country consistently raise this concern in forums related to the vegetable industry. Over the past two years, our project has made significant strides, creating an impact to 183 farmer households by producing 2,016,473 pieces of quality planting materials through collaborative efforts with seed potato growers and farmer cooperator partners who embraced our technology,” said Kiswa.

Accordingly, promoting top-notch seed potato quality is crucial for successful commercialization. A study on the Igorota variety compared the use of farmer-saved seeds from generation one seed tubers with apical rooted cuttings (ARCs). Thirty farmers participated in the study, cultivating areas ranging from 1,300 to 2,300 sq km, planting in February and harvesting in May.

Results showed a significant increase in tuber yield (20-58%) using improved seed tubers compared to farmers’ saved seeds. The higher yield with improved seeds is attributed to their disease-free nature, contrasting with old seeds in an informal seed system. This not only enhances competitiveness in the market but also boosts income for seed potato producers.

The study’s findings underscore the economic benefits and improved yields associated with adopting quality seed potatoes through standardized production methods. These certified planting materials not only benefit fresh potato farmers but also encourage more individuals to join the seed potato entrepreneurship, thereby contributing to the overall

success of the potato industry.

### **Growers triumphs**

Nuncia and Leonardo Antonio, a couple from Bakun, are among the two approved seed potato growers in Benguet. Their farm is strategically positioned away from other potato farms by Mt. Walls, making it ideal for seed potato production. Their dedication has earned them certification as seed tuber producers for Benguet province.

The couple obtains tissue-cultured plants from BSU-NPRCRTC and multiplies them through ARCs in their greenhouse and field. Being self-sufficient in quality seed supply enables them to distribute these certified seeds to their farmers.

Susan Bokilis, based in La Trinidad, sells rooted apical cuttings. During peak seasons, she hires part-time students and maintains two regular farm workers. She highlights that seed potato production is a user-friendly business for women, and


most of her clients are relatives in Kibungan.

Meanwhile, Nelio Compelio from Buguias does his seed potato production in a greenhouse on his rooftop in La Trinidad and on his farm. He advocates that making one’s own planting materials is more cost-effective and yields better quality compared to purchasing imported seed tubers. Together with his son, he creates clean planting materials and provides them to fellow farmers. They generate more planting materials than required for their own farms and sell ARCs to other farmers. He mentions growing clients and occasional challenges in meeting the increasing demand for his produce. ♦

For more information:

**TERESITA D. MASANGCAY**

Benguet State University-  
Northern Philippines Root Crops  
Research and Training Center  
titamasangcay@gmail.com  
0920-685-8430



*“ Susan Bokilis, based in La Trinidad, sells rooted apical cuttings. During peak seasons, she hires part-time students and maintains two regular farm workers. She highlights that seed potato production is a user-friendly business for women, and most of her clients are relatives in Kibungan. ”*



# From waste to wealth: Utilizing waste onion leaves for various food applications

LEA B. CALMADA

Onion leaves (spring onion) are known to be a good source of vitamins A, C, and K. These leaves provide various health benefits such as boosting the immune system, fortifying bones and joints, and reducing skin inflammation, among other things, according to studies.

However, despite its many benefits, onion leaves are usually left behind and are considered agricultural wastes. There is limited research on the proper use of onion leaves for various food applications. Hence, to sustain said benefits, there are efforts to increase awareness on how to properly utilize onion

leaves so that it will not be considered agricultural wastes.

To provide solutions for utilizing waste onion leaves for various food applications, the University of the Philippines Los Baños, spearheaded by Dr. Myra Borines, conducted a study titled, *Increasing Farmers' Income through the Utilization of Waste Onion Leaves for Various Applications*. The project intended to increase the income of farmers through the utilization of agricultural waste onion leaves for various applications through research and processing.

Initially, the project team

explored and identified common pesticides present in onion leaves that were used by onion farmers in Mindoro Occidental and Nueva Ecija. The data collection was done through a series of interviews with members of Samahan ng Maggugulay in Sitio-Tiaong Cluster and Pag-asa Cluster, Samahan ng Magtatanim ng Sibuyas at Gulay-Tabing Ilog Cluster, Genaro Multi-Purpose Cooperative, Kalasag Farmers Producers Cooperative in San Agustin, San Jose City, and Onion Farmers of Brgy. Peza, Bongabon, Nueva Ecija.

As a result, the study revealed five methods of pesticide removal

*“ Showing a promising return on investment, the researchers are positive on the potential of waste onion leaves as a raw material for food and other high-value products. With a significantly high ROI amounting to 1058%, Onion Leaves Extract places as the highest ranking among the POTs developed. ”*

using edible materials. Among these are washing with tap water, soaking in 1% vinegar solution, boiling, washing with 0.2% liquid detergent solution, and, soaking in baking soda and lemon juice.

After the thorough identification process of pesticide removal using edible materials, the study delved deeper into determining and evaluating various dehydration techniques and drying parameters to better preserve bioactive compounds and other valuable components in waste onion leaves. This enabled the researchers to develop processing and preservation techniques that proved to be useful for the onion leaves. For this, five packages of technologies (POTs) were introduced, namely, drying, powdering, pickling, vacuum frying, and juice extraction.

Characterization of waste onion leaves as potential raw material for food and other high-value products was first done by Borines' study. The study revealed that waste onion leaves contain

aroma and flavor components which make it a potential raw material for food and other high-value products. Consequently, a total of five products were produced/developed: dried onion leaves, powdered onion leaves, pickled onion leaves, onion leaves

extract, and vacuum-fried onion leaves.

Showing a promising return on investment, the researchers are positive on the potential of waste onion leaves as a raw material for food and other high-value products. With a significantly high ROI amounting to 1,058%, onion leaves extract places as the highest ranking among the POTs developed. This is followed by vacuum-fried onion leaves (740%); pickled onion leaves (126%); powdered onion leaves (88%); and, dried onion leaves (63%).

Dr. Borines, project leader, looks forward to commercializing the developed products to further help in improving productivity and income of farmers and the rural population. ♦

For more information:  
**MYRA G. BORINES, PhD**  
University of the Philippines Los Baños  
mgborines@up.edu.ph





◆ FROM THE REGION ◆

# PASSION AND DEVOTION: THE CREATION OF A MODEL FARMER AND A GOOD LEADER

KEVIN G. BIOL

From corporate to agriculture—Celerina Binueza, a 64-year-old farmer from Brgy. Paguite Abuyog, Leyte. Binueza grew up in a simple countryside life, raised by his father, a carpenter, and mother, a farmer. While working with her mother in the farm and seeing the latter's commitment and passion in farming, this inspired her so much which ignited her heart in farming.

A commerce graduate, she pursued her career in the City of Manila and worked in a bank for

four years. It was after meeting her husband who was a seafarer by profession that they decided to return back to her hometown and build a family. And there, it brought her back to her childhood dream and passion—farming.

After her husband suffered a stroke, she started to focus on farming and worked on the parcels of land of her parents. From white corn, she began practicing integrated farming such as planting vegetables

and rootcrops, specifically okra, eggplant, stringbeans, sweetpotato, and cassava. At present, she ventured into fruit trees such as coconut, jackfruit, and cacao.

In her recent production, she estimated around 1,000 kg of harvested sweetpotato with a market price of PhP 25 pesos/kg. For her 60 coconut trees, an estimated earning of PhP 4,000 to 7,000 per harvest after processing into copra. She also engaged herself into livestock and



poultry production. She was also able to grow yellow corn which was introduced to her by Cargill Philippines for feed production purposes. Due to high demand and high production of yellow corn, she was able to secure her own tractor which made the farm activities done more easily and efficiently. Her passion in farming excites her to discover more and learn more things about agriculture.

### Improved harvest brought by SCALE-UP

Binueza was chosen to be one of the lead farmers in the implementation of the Sustainable Community-Based Action R4DE for Livelihood, Enhancement, Upliftment, and Prosperity (SCALE-UP) Program. A local agricultural technician in the province recommended her to attend the seminars conducted by the DA Regional Field Office Eastern Visayas (DA-Eastern Visayas).

She chose yellow corn for the establishment of the Participatory Technology Demonstration (PTD) under the SCALE-UP program. During the PTD, she observed that the harvest of her yellow corn had doubled up when practicing the SCALE-UP approach despite spending much less on fertilizers as compared to what she usually practices.

From her usual three-ton harvest, she was able to reach six tons of yellow corn by simply following the recommended fertilizer application from her soil health card produced by the program.

“I spent so much less because I did not spray (insecticide) that much anymore. I have learned from the program about the natural enemies and beneficial insects in corn. In terms of fertilizer, the soil health cards provided me information on

the kind of fertilizers, timing of application, and the quantity of fertilizers to apply,” she said.

She claims that from then on, she has not gone back to her old practice and instead, continues to follow what she has learned from the SCALE-UP program. Together with her co-lead farmer, Alma Baltazar, she imparts the learned technical know-hows of the program.

### A leader of the community

Aside from being a passionate farmer, she is also an active member and an officer of different farmer organizations. Her commitment and passion in farming led her to be an inspiration to her co-farmers and be trusted in their organizations. She ensures that she herself will stand as a model farmer to all other members by showing the improvement she made in her farm.

“For me, this is one of the things

that make farming more fulfilling. Since then, this has become one of my passions, to help the community of farmers in our barangay,” she said.

For her contribution to agriculture as an empowered woman farmer, Binueza received recognition during DA-Eastern Visayas’ celebration of the International Day for Rural Women in 2023.

“This is one of the biggest blessings that I received and I am very much thankful to the SCALE-UP, that through this program, a huge improvement was seen in my production. Thank you, DA and DA-BAR, for always helping us farmers improve our farming operations. The learnings that I got from this program will surely be shared with my co-farmers so that all of them, too, can become successful farmers,” she stressed as she cited with utmost gratitude. ♦

*“Her commitment and passion in farming led her to be an inspiration to her co-farmers and be trusted in their organizations. She ensures that she herself will stand as a model farmer to all other members by showing the improvement she made in her farm.”*



◆ FROM THE SUC ◆

# TAGKAWAYAN BLOOMS: WHERE WOMEN TURN HERBS INTO HOPE

DORIS NASE-GATUS  
SOUTHERN LUZON STATE UNIVERSITY-JUDGE GUILLERMO ELEAZAR

In the heart of Tagkawayan, Quezon, nestled amidst emerald fields and verdant hills, a quiet revolution was brewing. Fueled by the ingenuity and dedication of a university research project, rural women were transforming their lives by harnessing the power of nature's bounty—local herbs. This is not just a story of scientific exploration, but a testament to the transformative power of knowledge, collaboration, and

the unwavering spirit of women entrepreneurs.

The journey began with a university's commitment to exploring the potential of herbal processing. They envisioned a future where this knowledge could empower rural households, offering a source of livelihood and improved well-being. This led to the first research project, meticulously processing selected

herbs into various forms: creams, ointments, soaps, teas, capsules, decoctions, and even food ingredients.

Driven by the success of this endeavor, a follow-up project was launched, specifically targeting active participation of rural households. Their ambitious goals were fourfold.

Cultivating and improving herbal

products, the project not only focused on growing herbs but also refining existing formulations for optimal effectiveness and safety. The project delved into the science behind the herbs, conducting thorough chemical analysis to ensure their safe use.

Recognizing the importance of presentation, the team invested in eye-catching packaging and informative labeling to elevate the products' appeal to consumers and boost marketability. Downy bottles, tar acrylic jars, and pump containers transformed the products from rustic concoctions into professional-looking merchandise. Initial sales were conducted at introductory prices, even offering some products free of charge. During the pandemic, almost a hundred bottles of dishwashing liquid were donated to frontline workers, a testament to the project's commitment to community well-being.

Meanwhile, to empower micro-entrepreneurs, training sessions were conducted. These equipped women with the skills and knowledge needed to

establish and manage their own herbal micro-enterprises. Also, knowledge dissemination was acknowledged as an important tool through conduct of seminars to equip potential partners-producers, processors, and micro-entrepreneurs with the necessary skills and understanding.

While some participants faced limitations, opting to utilize their newfound knowledge for personal and household applications rather than venturing into full-fledged micro-enterprises, three women emerged as leaders. They embraced the challenge of processing and selling dishwashing liquid, fabric softener, cream/ointment, citronella oil, and even VCO. Additionally, selling herbal planting materials became another avenue for income generation, ensuring a sustainable supply of raw materials for future production.

Further, the team recognized the importance of gathering consumer feedback as a crucial element of sustainability. Understanding user experiences

was vital for further product development and market responsiveness.

Dishwashing liquid, identified as a high-demand product, became a cornerstone of their nascent business. Eateries, restaurants, and canteens joined households in their customer base, appreciating the effectiveness and safety of the herbal-based product. Scented fabric softeners catered to the desire for fresh-smelling laundry, while creams and ointments offered natural alternatives for soothing skin irritations.

This project is not merely a showcase of successful products; it is a celebration of empowered women transforming their lives and their community. From hesitant participants to confident entrepreneurs, their journey serves as an inspiration. They have proven that with knowledge, collaboration, and unwavering determination, even the most humble beginnings can blossom into thriving businesses, rooted in the rich natural heritage of their land. ♦

*“ This project is not merely a showcase of successful products; it is a celebration of empowered women transforming their lives and their community. From hesitant participants to confident entrepreneurs, their journey serves as an inspiration. They have proven that with knowledge, collaboration, and unwavering determination, even the most humble beginnings can blossom into thriving businesses, rooted in the rich natural heritage of their land. ”*

# DA-BAR: Evolving R4D management in agriculture-fisheries

SALVACION M. RITUAL

Agriculture in the next decades will continue to face multiple, interconnected challenges globally. Food security, as determined by the rate of global food production, can be affected by several factors such as decreasing land and water resources; increasing cost of agricultural inputs; pests and diseases; and, the rising concerns about the impact of climate change on agricultural production.

Beyond addressing the major concerns related to food security and nutrition, agriculture must also continue to be the key sector in reducing poverty and overall economic growth and development of the country.

Agricultural research for development (R4D) has been a key component in addressing many of these challenges and transforming it into a progressive and productive sector. Technological innovations have been proven to contribute to incremental production of food and related commodities. Hence, investment in agricultural R4D will help ensure continuous development of technologies and best practices towards attaining food security and prosperity in the country.

DA-BAR, as the lead research coordinating agency of the department, stands at the forefront in managing the R4D system for agriculture and

fisheries. The bureau works with various implementing research institutions, both local and international, to develop technologies and innovations for adoption and utilization of farmers and relevant stakeholders.

Over the years, DA-BAR has undergone paradigm shifts which have had great implications on how R4D is designed, implemented, and evaluated, as well as how the results are disseminated, utilized and scaled to generate impacts. It has continued to make strides in enhancing R4D management aimed at transforming the agriculture sector from resource-based into technology-based industry. This in turn helps improve the sector into a profitable enterprise especially for small farmers and fishers.

As DA-BAR continues to navigate through these complex times, significant R4D strategies and mechanisms are explored in order to improve and adapt amid the challenges in the sector. Among these are:

## **A. Innovative Technology Development**

To better address the current challenges being faced by the sector, the bureau supports innovative technologies that could transform or advance the sector into a more profitable, efficient,

and sustainable industry. This also covers support to technology generation, verification, and adaptation directed toward generating, fine-tuning, and validating developed technologies to determine its feasibility and come-up with location-specific interventions or package of technologies.

## **B. Scaling of Agricultural Technologies**

Technology scaling is a fast becoming approach in achieving impacts of R4D programs and projects beyond the initial target areas or beneficiaries. To realize the full potential of innovations, DA-BAR is intensifying its efforts to scale promising technologies to significant farmers and other stakeholders throughout the value chain. By adopting certain technologies, farmers could increase their productivity and profitability.

However, small farmers often face multiple barriers to technology adoption such as financial, unwillingness to change traditional practice, and lack of vital information regarding the technology. With these, DA-BAR recognizes that new technologies should be introduced alongside mechanisms that would help farmers overcome barriers to their adoption, such as capacity building and provision of related facilities.

Among the bureau's programs on scaling of technologies are:

**Support to Commercialization of Technologies**, which enables market-oriented technologies to be strategically positioned and transferred to areas where farming/fishing communities, as well as other stakeholders need them most.

**Agri-Fisheries Technology Business Incubation**, which focuses on strengthening and capacitating the R4D-based incubators in order to provide the necessary support, guidance, and mentorship to incubatees, who seek to establish agri-fishery technology-based enterprise.

**Sustainable Community-based Action Research for Development and Extension for Livelihood Enhancement, Upliftment, and Prosperity (SCALE-UP) program**, which seeks to establish innovative and sustainable agricultural strategies and practices, targeting a significant increase in the yield and income of farmers.

### **C. Establishing Linkages to Expand R4D Network**

**International Partnerships and Collaborative Approach to Capacity Building, Technical Assistance and Networking**  
Strategic partnerships are increasingly crucial in R4D to respond to the opportunities and challenges of globalizing the agriculture sector. DA-BAR works

with several international research organizations to foster and implement research collaborations that benefit strategic development of the agriculture and fisheries sector in areas of common interests. Likewise, DA-BAR pursues partnership with donor agencies that provide opportunities for the bureau to leverage resources and expertise.

*“DA-BAR, as the lead research coordinating agency of the department, stands at the forefront in managing the R4D system for agriculture and fisheries.”*

In the past, partnerships with selected international institutions resulted in the bureau and its local partners access to human resource development, technical assistance, and technologies in key areas.

### **Partnerships with Private Sector in R4D**

Meanwhile, partnerships with the local private sector in R4D implementation are increasingly viewed as an opportunity for

government sectors such as DA-BAR to more efficiently deliver its mandate, advance on the path to achieving the R4D goals, and ensure inclusive collaboration among R4D stakeholders. The private partners are expected to add value by taking on certain roles that the government cannot, or is less well equipped to perform.

With this, the bureau takes a proactive approach to making the most of the benefits of closer partnerships. In this regard, it has considered engaging small and medium enterprises, cooperatives, and private organizations in the implementation of selected projects and activities.

DA-BAR has been instrumental in the R4D efforts to help small farmers and fishers increase productivity and income by providing relevant technologies, best practices, innovations and its effective network among the partner institutions. This kind of coordination the DA-BAR has provided will remain essential to exist for the coming years to achieve the sustainable transformation of the R4DE system.

As DA-BAR continues to be the prime mover in agri-fisheries R4D, it is imperative for the bureau to strengthen its commitment to evolve, enhance, and innovate services for the benefits of its clientele. ♦



# Soya Nuggets



Quirino State University (QSU) has been promoting soybean processing leading to various product lines.



Through funding support from the DA-Bureau of Agricultural Research, the research team developed bakery products like butterscotch, cookies pandesal, loaf, polvoron, and others.

Other than the products mentioned, QSU developed soya nuggets made from squash and soybean flour as binder-another healthy alternative food option.

## SOYA NUGGETS PRODUCTION, SELLING PRICE, AND SALES ASSUMPTIONS:

Daily Production (Packs)	Monthly Production (Packs)	Annual Production (Packs)	Price per Pack (PhP)	Annual Total Income/Sales (PhP)
30	600	7,200	75	540,000.00

Note: Number of days of operation per month = 20 days  
Number of months of operation per year = 12 months

# Cost and Returns Analysis of Soya Nuggets Business (One Year Operation), 2023

Item	Amount (PhP)
Sales of Soya Nuggets	540,000.00
Total Gross Income	540,000.00

## Variable Cost:

Soya nuggets ingredients	24,000.00
Packaging materials	43,200.00
Direct Labor	132,000.00
Water	22,500.00
Electricity	13,260.00
Fuel and oil	9,600.00
Interest on variable costs	36,684.00
Total Variable Costs	281,244.00

## Fixed Cost:

Land charge	7,000.00
License/permits	5,000.00
Insurance	416.80
Realty tax	13,000.00
Repairs & maintenance	20,840.00
Depreciation	27,640.00
Other administrative labor	79,200.00
Total Fixed Costs	153,097.00

Total Cost:	434,340.80
Gross Margin	258,756.00
Net Income	105,659.20
Net Income/Pack	0.1957
Adjusted Net Income	105,659.20
Return to Capital	105,659.20
Rate of Return to Capital (%)	38.53
Assumes 15% interest rate per year	

## Break-even Analysis

Break-even price (PhP/pack):	60.3251
Break-even yield (packs/year):	0.8043
Break-even yield (packs/day)	0.0018



Prepared by  
RICARDO G. BERNARDO



RESEARCH FOR DEVELOPMENT  
**BAR DIGEST**

DA-BUREAU OF AGRICULTURAL RESEARCH  
RDMIC Bldg., Elliptical Road corner Visayas Avenue  
Diliman, Quezon City, Philippines 1104



.....

.....

.....

.....