

# RESEARCH FOR DEVELOPMENT BARDIGEST

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



*From rice to riches:*  
Upscaling and commercialization  
of brown rice-based food products

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# ABOUT THE COVER



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To propel commercialization of brown rice, DA-Cagayan Valley Research Center developed distinct and nutritive food products taking brown rice as its main ingredient.

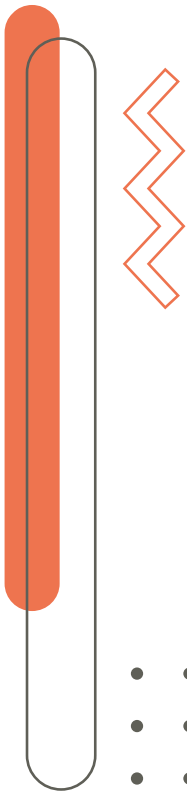
Lucban Small Water Irrigation System Association were capacitated on the processing and mass production technology of brown rice puffed balls and cookies — two rice snacks proven to be a profitable source of income to farmers and processors.

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 Agricultural Magazine of the Year  
2007 Binhi Awards  
 Best News Magazine  
2003 Gawad Oscar Florendo



# FCAs

## Strategic partners for **sustainable R4D** and **inclusive value chain**

Junel B. Soriano, PhD

Over the years, from farming systems research, on to community-based participatory action research to technology commercialization and technology business incubation, farmers' associations, cooperatives and other community organizations have been constantly visible. Similarly, in the various agricultural programs of the Department of Agriculture (DA), the value of farmers cooperatives and associations (FCAs) in providing farmers stronger involvement in the value chain and increasing their market power has always been underscored.



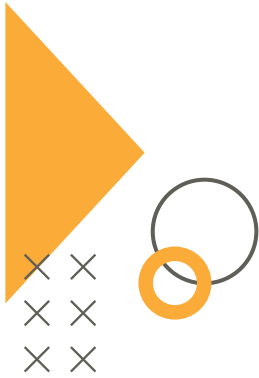
FCAs play a key role in facilitating technology adoption, linking farmers to markets, and providing a collective platform for negotiation and linkage for the flow of resources needed for development, among others.

To which, the DA-Bureau of Agricultural Research (BAR) recognizes the central role of farmers' organizations in research for development (R4D) – not simply project beneficiaries but they are strategic partners. They do not only deliver services as part of the project but also serve as key actors in planning, implementing, and disseminating technologies, and supporting knowledge exchange.

DA-BAR opines that when smallholders and other resource-poor producers work collectively it becomes easier to access the technology, farm inputs and basic services from other government agencies. The involvement of FCAs in developmental projects supported by the bureau is a good model for government endeavors that call for partnerships with farmers and fisherfolk.

In DA-BAR's R4D initiatives, it is fitting that the bureau leans toward these FCAs as it is only through organized groups that the small farmers/fishers can be effectively and sustainably assisted. When farmers/fishers band together, their limited resources and participation in decision-making process can become strong enough to deliver improvements in their communities. More so, the FCAs serve as catalyst toward entrepreneurship, transforming subsistence farming into profitable business thus, bringing agricultural developments particularly in the rural areas.

In this issue of the BAR R4D digest, we give accolade to FCAs as vital partners of DA-BAR in the implementation of its R4D endeavors. Showcased in this second quarter issue are some projects with partner-FCAs supported by the bureau that have equipped them to bring about economic improvements in their respective communities. Ensuring that through FCAs, R4D efforts at the ground level will contribute to agricultural development and create impact in the countryside. ■



# Black rice and all things in between

Diwa J. Velasquez

For most Filipino households, rice is the primary source of calories and protein that could provide enough energy throughout the day, more specifically when rice is served hot with their favorite dish at the most perfect time of the day. Whether you are a high or low-income earner, rice is the best way to go.

A lot of Filipinos are familiar with rice that is in shade of white or brown. But what about black rice? We often hear our colleagues, friends, and even family members say, “Huh, *ano ‘yon?’*,” “Black rice, *‘di ba mahal ‘yon?’*,” or even “*Hindi naman masarap ‘yon!’*” Unknown to some, black rice is being enjoyed by celebrities and fitness enthusiasts because of its health benefits and nutritional value, hence, recommended by medical experts.

Studies show that black rice contains iron and has the highest protein content compared to any other rice. It is also rich in antioxidants that can protect cells against oxidative stress that can be associated with heart conditions and certain forms of cancer. Just like any other rice that we all know, black rice can offer so much for our heart, mind, and body. Not bad, right?

However, for the Philippines to sustain rice production, proper crop intensification must be applied. Farmers must be equipped with

agricultural practices such as pest management, water management, farming system diversification, agricultural science, and market efficiency. In line with this, the project titled, Outscaling of Rice-based Farming System (Black Rice + Itik Pinas + Vegetables) in Braulio E. Dujali, Davao del Norte was developed by DA-Davao Region.

To revitalize the agriculture and fisheries sector from the effects brought by COVID-19, the region aimed to enhance farming communities through upscaling to increase industry competitiveness and sustainability.

This type of farming system was initially introduced by DA-SOCCSKSARGEN through the Community-based Participatory Action Research project that aimed to improve farm productivity and rural income of rice farmers through promotion, adoption, and commercialization of location-specific farming system approach.

Aside from increasing productivity, the rice-based farming system also reduces labor and inputs characterized by using artificial fertilizers and chemicals. In this project, selected partners were able to practice rice production in their own fields which helps in mitigating chemical wastes. Thus, it also helps in eliminating

contamination of soil, water, and air brought by chemicals which are harmful to humans and animals.

In this regard, the outscaling project include interventions such as duck, vegetable, and black rice production.

## The Itik Pinas integration

The Itik Pinas (IP), according to Department of Science and Technology-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development and the DA-Bureau of Animal Industry-National Swine and Poultry Research and Development Center, has a higher average of productivity that reaches 70% in a year, compared with 55% of the traditional ducks.





we hear names of people, when in fact, it is a name of a place!

The Braulio E. Dujali also known as Dujali is a fourth class municipality in the province of Davao del Norte. It is famous with its agricultural sceneries—more rice fields, fish ponds, and even banana plantations can be seen.

The DA-Davao Region in collaboration with the Municipal Agriculturist's Office of Dujali selected Braulio E. Dujali Organic Producers and Rural Workers Association (BEDOPaRWA) as their primary farmer-cooperative association to develop and maintain a 25-hectare of black rice areas under the principle of integrated rice-farming system.

*“Napili namin ang Dujali dahil sa sagana nito sa palay,”* said project leader Grace P. Gutierrez.

It was also mentioned that the land will be devoted to planting high-value crops such as eggplant, tomato, squash, okra, and pole sitao. The project intended to choose at least one vegetable for each cropping to ensure productivity and marketing.

*“Sa project na ito ay sana maging misyon ko rin na i-share ito sa iba. Excited ako na ang panahon ko binibigay ko dito at patuloy na nag-i-improve ang farm,”* said BEDOPaRWA farmer-cooperator Eduardo Bernadas. His primary income was white rice farming and backyard piggery before the technology adoption.

Bernadas engaged in IP egg production, vegetables, and black rice production—and was fortunate to get 60 heads of purebred IP. Currently, he has an approximate of 150 breeders that can produce at least 10 trays of fresh eggs daily.

*“Nung traditional farming pa, may mga conditions pa kapag nagharvest. Malaki ang interest kaya nung nagkaron ng pagkakataon na iba ang livelihood, nag-iba rin talaga ang pamumuhay namin. Noon, kada cropping season, 6 months—ang kita lang namin noon ay umaabot lang ng PhP 10-15,000. Ngayon, PhP 50,000 to PhP 100,000 na,”* he added.

With the goal to tag Dujali as the “Balut Capital of Davao del Norte,” the local government unit of Dujali also extended its support by providing agricultural supplies and planting materials among others.

*“Within Davao del Norte, may mga munisipyo na ginagawa ang balut as their livelihood. ‘Yun ang vision namin, gagawing direct suppliers ang mga magsasaka namin. Even with black rice, sana magkaroon din kami ng tie-up with traders para ma-engganyo ang farmers na mag-produce ng black rice,”* said mayor Atty. Leah Marie “Tata” M. Romano.

### Continuity of the outscaled project

Currently, the region aimed to disseminate the farming technologies in order to reach a vast majority of stakeholders. The BEDOPaRWA agreed to start the repayment scheme for the second liners of their members waiting to adopt the said technology. Moreover, the association commits to share their knowledge with their co-farmers in the municipality who are interested in IP by providing free 25 females and 5 male ducklings per farmer. ■

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The integration of IP in a rice-based farming system equates to an increase in egg production of at least 50 eggs that incurs an additional PhP 300 income per duck per year. In addition, the IP's eggs are at an average of 65 grams per piece which is consistent with the *balut* industry requirement.

IP can also adapt to local environment conditions and can be of high quality even with simple housing and low-cost feeds.

The rice-duck farming is said to be superior over traditional rice farming in terms of economic benefits and environmental effects.

### The real Braulio E. Dujali

For tourists and travelers going to Davao City, it is a surprise when

# LIGA: Leading productivity and gaining profit

## ▶▶▶ from purple yam

Alexis B. del Mar

Lupon ng Itanglew sa Ganap na Asenso, more commonly known as LIGA, an indigenous peoples (IP) group with 25 active members, spearheads the accelerated production and commercialization of purple yam in Sitio Itanglew in San Marcelino, Zambales.

In the Philippines, ubi is considered one of the highlights of a variety of desserts that every Juan loves. Its unique taste and texture allow Filipinos to be creative in curating delicacies showcased both locally and internationally. Ubi is also known for its high tolerance to stress and

drought, hence, the reason for its popularity among farmers in Central Luzon.

However, indigenous farmers in Central Luzon who plant and manage ubi on small patches of land with only local knowledge suffer from low productivity.



Climate change, urbanization, soil health/ecological degradation, and unpredictable rainfall are some of the major problems they are facing.

DA-Central Luzon Integrated Agricultural Research Center for Upland Development (CLIARC-UD) introduced a community development program that aims to create a community-based accelerated ubi production that will significantly increase the yield and income of IP farmers' groups. The project will provide training and support to farmers to help them establish and maintain their own ubi production systems, as well as provide market access to their produce.

Marlon Tiglao, LIGA chairperson, shared that he had been planting purple yam ever since he was young. According to him, the project initiated by DA-CLIARC-UD on purple yam is beneficial in terms of providing livelihood opportunities to their community. As farmer-cooperators, they underwent training facilitated by experts and adopted improved technologies on purple yam production.

Tiglao acknowledged the fact that selling purple yam was not the cream of the crop at first. He shared that what they were harvesting before was not as much and was often challenged by stingy and close-

fisted customers, hence was not profitable enough.

With the establishment of a nursery, technology demonstration areas, market linkages, and the development of ubi powder technology, they were able to harvest more than what they produced before. They are now able to maximize their planting materials which they had not been able to do when they were only using the community's local knowledge.

A team was also established by Dr. Emily Soriano to develop ubi powder that will be used to produce other ubi-flavored delicacies, such as jam, syrup,



▲ **Malaki po ang pasasalamat**  
 ▲ **namin dahil sa project po na ito**  
 ▲ **ng [DA] ay ‘yong mga miyembro**  
**ng kapatirang katutubo ay**  
**magpapatuloy pa sa pagtanim.**

Marlon Tiglao, LIGA chairperson

polvoron, utilizing the technology being developed by the project.

“Actually, there is change already. Before, whenever we harvest purple yam and brought them to the markets, they were always being bought at a cheap price,” Tiglao said.

To increase profits, LIGA established an ongoing partnership with MAYANI, a farm-to-table e-commerce platform for agricultural products that markets the produce of farmers. With the partnership, MAYANI will be responsible for the procurement and hauling of the ubi produce.

“Our farmers are having a hard time transporting their produce to markets,” as discussed by Tiglao.

MAYANI has been helping LIGA expand and promote their purple yam business by allowing their crops to be sold inside and outside marketplaces. They are also interested in buying ubi products produced by the IP farmers. Tiglao also shared that logistics and transportation of their crops were also challenging due to their rural location so the partnership was a win-win situation for the farmers.

In February 2022, MAYANI procured 7,000 kilograms of ubi

at PhP50/kg from LIGA farmers in San Marcelino, Zambales, amounting to a total sale of PhP 350,000.

In the next five to ten years, the LIGA hopes for the project to prosper even without the assistance of the funding agency.

Tiglao, on behalf of the other members of LIGA, expressed his sincere gratitude to the implementing agencies involved in the project.

“*Malaki po ang pasasalamat namin dahil sa project po na ito ng [DA] ay ‘yong mga miyembro ng kapatirang katutubo ay magpapatuloy pa sa pagtanim,*” he happily shared.

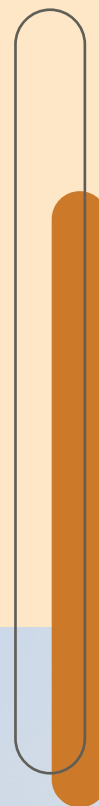
In alignment with the Department of Agriculture’s goal to empower farmers and the private sector to raise agricultural productivity and profitability, the DA-BAR, and the DA-Central Luzon strive to provide further assistance to the ubi IP farming groups through promotion and adoption of improved technologies in the region. Meanwhile LIGA plans to continue and expand their ubi production in hopes of providing a stable livelihood for their people. ■

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# Empowering fisherfolk organization through improved oyster culture technologies

Maria Elena M. Garces

Oysters are cultured extensively in the Philippines, covering 17 provinces with Negros Occidental, Pangasinan, and Cavite as major producers. Collection of spat is critical to the success of oyster culture.

In Pangasinan, several methods of collecting oyster spats were employed. Oyster farmers used oyster shells as spat collectors until they were introduced to using cut tricycle tires.

“We discovered that spats can attach to discarded oyster shells. What we do is we make a small hole on the shell and tie a short *tansi* or nylon string in it where

spats attached themselves and then allow them to grow for six to seven months before oysters are harvested,” shared Julie Ventura, 57, Group A team leader of the Samahang Magsasaka at Mangingisda ng Baley-adaan, Alaminos City.

When they learned to use cut or sliced tricycle tires to collect spats, more farmers shifted to using this method as it also collects more spats than the previous method. However, the local government unit of Alaminos City discourages the use of rubber as spat collector as it poses health risk to consumers.

Traditional methods were done in shallow estuarine areas where both spat collection and growing are done in bamboo stakes or *tulos*. These methods have several disadvantages, such as exposure of oysters to pollution from freshwater run-off and domestic wastes, presence of fouling organisms, natural predators, and siltation. Oysters harvested from the traditional methods are usually smaller and less meaty.

In April 2022, DA-National Fisheries Research and Development Institute (NFRDI) introduced the bamboo raft



culture method, which uses bamboo materials and plastic drums, developed by the DA-Bureau of Fisheries and Aquatic Resources-National Fisheries Development Center (DA-BFAR-NFDC) in Dagupan City.

“The raft method of oyster culture is considered superior as compared to other methods of oyster production. Aside from increased culture areas, the oysters produced are of better quality because these are suspended in the water column, less exposed to silt and sand, and can grow faster because of the availability of food in the water column. The bamboo raft also makes the culture of oysters possible in waters regardless of the bottom conditions and mortality from predators such as crabs and fouling organisms such as the black mussel is also lessened as the oysters are suspended in the water. The technology is now being adopted by some oyster farmers in Dagupan City,” explained project staff Niko Macaraeg.

This technology has several advantages over the traditional fixed method of oyster culture. It uses bamboo as rafts with plastic drums as floaters and is a mobile structure which can be transferred to another site when necessary.

Aimed to strengthen the oyster production through the bamboo raft technology, the DA-NFRDI implemented the DA-BAR-funded project in five oyster-producing municipalities of Pangasinan, in collaboration with the LGUs of Anda, Bani, Bolinao, Alaminos City, and Sual (collectively known as ABBAS) and partnered with fisherfolk associations in the areas.

The LGU-Alaminos City recommended to DA-NFRDI

the Samahang Magsasaka at Mangingisda ng Baley-adaan to be the partner fisherfolk association. They are registered with the Department of Labor and Employment and have 280 active members, 130 are farmers and 150 are fisherfolk.

“The association has been around for quite some time but were separated into exclusively farmers or fisherfolk,” shared Gelbert Rabadon, the focal person for the project from LGU-Alaminos.

In 2022, the association re-organized themselves to integrate farmers and fisherfolk into one since they belong in one barangay and under one umbrella, which is agriculture, thus the name Samahang Magsasaka at Mangingisda sa Baley-adaan, Alaminos City. The re-organization also coincided with the implementation of the oyster project of DA-NFRDI.

Thirty-one members underwent hands-on training on the construction of bamboo rafts and oyster spat collectors, and culture of oysters. They constructed a spat collector using a one-meter plastic strap in Cayanga River, Dagupan City. Spats were collected for two to four weeks and were then transported back to Alaminos where it was installed to the bamboo rafts at about 650 straps per raft. Water depth for the raft method is at least 1.5 meters at lowest low tide.

Black mussels compete with oysters in terms of food and space. This can cause stunted growth or even mortality of oysters. Hence, the importance of the oyster hardening process as noted by Group B team leader Franklin Alano, 46. According to him, there is a certain duration when the plastic straps containing the spats can be exposed to the sun to easily kill the black

mussels but not the oyster spats. This process can be easily done in the raft floating method by just pulling the plastic straps and laying it on the floating bamboo raft, unlike with the *tulos* method which is fixed at the bottom.

“Another goal of the project is the enhancement of the stocks in the Alaminos area. It cannot be avoided when oysters fall from the rafts which then could create a community of oyster breeders in the area. If that happens, oyster farmers will no longer need to go to Dagupan to collect spats,” mused Macaraeg.

Partner fisherfolk association in Baley-adaan, Alaminos City conducted an initial harvest after three-month culture and totally harvested their first crop of oysters at the fifth month culture. They were able to produce 6.3 metric tons or 210.5 sacks with an average weight of 30kg/sack amounting to PhP 97,150 from the initial five rafts; 196 sacks of which were bad-sized oyster and sold at PhP 450/sack while 14.5 sacks were good-sized oysters and sold at PhP 1,100/sack.

The association now has 21 rafts to culture oysters and hopes that soon each member will have one raft each.

“The project strengthened the capacity of the group on oyster culture, the project’s deliverables were achieved, has generated good income for our families, and most importantly, the group developed cooperation and are receptive of one another,” said Michael Bautista, 40, first president of the re-organized Samahang Magsasaka at Mangingisda ng Baley-adaan, Alaminos City.

Bautista also promised to continue what they learned from the project and to always remind

The project strengthened the capacity of the group on oyster culture, the project's deliverables were achieved, has generated good income for our families, and most importantly, the group developed cooperation and are receptive of one another.

the group to safeguard and expand the technologies shared with them to attain their dreams for their families.

*“Ang ibinigay nila sa atin ay dapat pangalagaan. Laging isipin na ito ay makatutulong sa atin, sa aming mga anak. Kaya pipilitin po naming gawin lahat ng paraan para hindi mawala ang technology na ibinigay ninyo sa amin. Mamahalin at papalaguin namin ito. Maraming salamat po sa mga tumulong,”* he said.

Ventura, who has four children, claimed that he will continue farming oyster using the bamboo raft method until, at least, all his children are degree holders, when he happily received his share in the sales of the association's first cropping.

*“Nabuo ang kapatiran, sama-sama, tulungan, upang magawa ng maayos at maging successful ang project,”* assured Alano. ■

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# From rice to riches: Upscaling and commercialization of brown rice-based food products

Alexis B. del Mar and Diwa J. Velasquez

Known to many, brown rice is considered more expensive than the conventional rice that all of us are familiar with. Rich in fiber and essential nutrients, brown rice has a shorter shelf life and gets rancid if stored beyond 4 to 6 weeks due to the high-fat content of the bran. Also, its cooking time takes longer than traditional varieties.

Given its benefits, brown rice is still limited in the market. Studies show that the market chain is not well understood as there is a lack of information about brown rice reaching small share households. With this, DA-Cagayan Valley Research Center (CVRC) developed brown rice-based food products through a project funded by DA-BAR.

Implemented in 2020, the project aimed to commercialize brown rice food products in collaboration with the selected farmer association, the Lucban Small Water Irrigation System Association also known as Lucban SWISA.

## Get to know the Lucban SWISA

As part of the objective of the project, the DA-CVRC also capacitated the skills of its selected partners through a series

of training about processing technology and mass production of brown rice food products.

The Lucban SWISA women's group in Brgy. Lucban, Benito Soliven, Isabela, received a brown rice milling machine from DA-CVRC, as part of a Community-based Participatory Action Research project aimed at boosting the productivity and income of rice farmers. Following the provision of the machine and initial food processing training, the women's group has officially taken over the production of brown rice food products developed by DA-CVRC.

The DA-CVRC aims to expand its business support services to connect Lucban SWISA with various agencies and reach a wider range of stakeholders. To facilitate the efficient marketing of their products, the research center has provided the organization with equipment like dehydrator and commercial bakery oven. As a result, the association was able to produce brown rice puffed balls and cookies, which have proven to be a profitable source of income.



## The two brown rice snacks

As mentioned, the association developed two distinct and nutritious snack options with a variety of flavors to choose from. First, the brown rice puffed balls which stands out from regular rice pops because it was crafted from high-quality brown rice and comes in delicious flavors like honey, peanut butter, nougat, *yema*, and chocolate. Second, the brown rice cookies, an on-the-go snack that also comes in a variety of flavors including chocolate, butter, *malunggay*, and sesame.

Based on the profitability and financial viability analysis, the price of brown rice puffed balls is PHP 60 per pack, while brown rice cookies is PHP 70 per pack. The projected return on investment of



the puffed balls and cookies are at 80.39% and 93.88%, respectively.

The DA-CVRC has also coordinated with DA-Cagayan Valley Agribusiness and Marketing Assistance Division for product promotion through trade fairs and exhibit displays. Currently, the products are sold at One Town, One Product Display Center in Benito Soliven, Isabela, DA-One Stop Shop Agribusiness Center in Tuguegarao City, and DA-CVRC Kadiwa stores in Ilagan, Isabela.

“These products have been an opportunity for both farmer-producers and consumers in the value-addition of brown rice through processing and manufacturing of its byproducts,” said project leader Gemma G. Bagunu.

She also emphasized that the food products will eventually augment income and promote a healthy lifestyle.

#### Future plans

It is with no doubt that the existing brown rice food products are healthy. However, as time changes, the preferences of the consumer also change.

“The products developed are still subject to improvement. The women’s group may consider exploring other food varieties,” said Bagunu.

According to DA-CVRC, food byproducts of brown rice will also undergo microbial and nutritional analyses through the Department of Science and Technology to ensure food safety.

Moreover, partnerships with other government agencies will be strengthened to further widen the market of brown rice products.

Through the development of brown rice-based food products, not only does it provide a healthier option for consumers, but it also promotes the value-addition of brown rice through processing and manufacturing of its byproducts. These products also boost the income of farmer-producers, ultimately promoting a healthier and more sustainable lifestyle. ■

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# FAFOGGA

## forging their way forward

Rena S. Hermoso

In early January 2023, the Philippines made headlines around the globe for the exorbitant price of onions which was at PhP 600 to as high as PhP 800 per kilogram. The local supply for this seasonal vegetable dwindles at the start of the rainy season and is augmented by importation.

This worst case scenario is the very thing that the local onion growers dread as they suffer the brunt. This also brought to light the longstanding problems that the onion industry is facing, like the lack of postharvest facilities and the hoarding of onions produced during the harvest season.



### Producing off-season onion

One of the solutions to address the unstable local supply of onion is to produce off-season onion. This would also augment the onion growers income, as off-season produce command better prices. In 2017, the DA-Cagayan Valley, through its Research Division and Nueva Vizcaya Experiment Station (NVES), introduced the off-season onion production based on research through a Community-based Participatory Action Research funded by DA-BAR. The success of this project led to its outscaling in 2020 through another DA-BAR-funded project.



Off-season onion production starts with the preparation of seedbed in July, followed by sowing in August, planting in September, and harvesting in December. It utilizes Super Pinoy variety, raised seedbeds, rain shelter, and nutrient management based on soil analysis.

Selected members of the Federation of Aritao Farmers Onion, Garlic and Ginger Growers Associations, Inc. (FAFOGGA) shared that they have long been trying to plant off-season onions on their own, but they were not able to achieve the same satisfactory results as the technology introduced by DA-NVES. FAFOGGA is among partner cooperatives of the DA-Cagayan Valley on their projects on off-season onion production.

In his 38 years of planting onions, FAFOGGA member Jose A. Pascua shared that he only started to earn a handsome income through off-season production. This year, he was able to harvest around 400 kilograms sold for PhP 100/kg from his 200 square meters lot, excluding the income from the scallions.

He also shared how they adopted the interventions introduced and became innovative when challenges arise. For example, when supply for the raw materials of rain shelter runs short, they turn to raising the seedbeds higher.

*“Kung minsan hindi naman kasya ‘yong supply na gamit, ine-experiment na lang namin. Ginagawa naming mas mataas ang bed [para] kahit maulan ‘yong tubig hindi gaanong nabababad [ang mga sibuyas],”* explained Pascua.

### From barangay-based associations to a cooperative

FAFOGGA was established in 2014 when the Office of the Municipal Agriculturist in Aritao, Nueva Vizcaya organized the farmers in nine onion-growing barangays (Banganan, Bone North, Bone South, Calitlitan, Common, Cutar, Darapidap, Nagcuartelan, and Poblacion) into small associations to expedite the process of distributing seeds. After some time, these associations, together with two existing farmers groups, were gathered into FAFOGGA. In August of the same year, they were registered under the Securities and Exchange Commission with then 921 members.

In the years that followed, FAFOGGA actively participated in various government-assisted projects, activities, and training to improve their farm productivity and livelihoods. Through these various engagements, the number of members grew to 1,487.

In March 2023, FAFOGGA reorganized itself into a cooperative registered under the Cooperative Development Authority. As of writing, they are still polishing their bylaws and recruiting members, but plans are underway.

### Getting that cold storage

In the early days of FAFOGGA, members have been aspiring for a cold storage. They know how valuable it is for their produce, as well as for the benefit of the consumers.

*“Natural lang na mangarap kami na may pag-imbakan kami. Minsan hindi [naman] namin agad nabebenta dahil minsan ang presyo ay mababa.*



*Lalo kapag maraming produce, sinasamantala naman ng mga mamimili na halos hingi na 'yong presyo,"* said FAFOGGA manager Ulysis V. de Lara.

In 2014, DA-Philippine Rural Development Project offered them a cold storage facility provided that they will be able to provide a counterpart for the funding. But at that time, the association was still starting and they were not yet soliciting membership and other related fees. Income generation activities were then out of the equation. FAFOGGA had to let go of that opportunity.

Seven years later, another opportunity presented itself and this time they were determined to grab it. The DA-High Value Crops Development Program (HVCDP) offered them a cold storage facility provided that FAFOGGA will be able to buy a lot where it will be established. Working with the funds they received as assistance, they were able to purchase the land where the cold storage facility now stands. They are now working on settling the remaining balance from the previous lot owner through seeking further assistance from other government agencies and offices.

In December 2022, the DA-Cagayan Valley turned over the Php 20M-worth onion cold storage facility to FAFOGGA. Funded by the DA-HVCDP, the facility is located in Brgy. Nagcuartelan. They also received 92 pieces of pallets and 110 plastic crates.

The cold storage facility is expected to prolong the shelf life of onions up to seven months.

This will enable the onion growers to leverage on their excess supply during the regular season, benefitting both them and the consumers in the long run.

### **Forging the way forward**

While a lot is yet to be done, both DA-Cagayan Valley and FAFOGGA are hopeful about the onion industry. DA-Cagayan Valley continuously provides assistance to onion growers by introducing new interventions to improve their productivity and distributing seeds to ensure that they will be able to contribute to the local supply.

The success of the off-season onion production has encouraged both members and neighboring farmers to venture into it. DA-Cagayan Valley, through NVES, is working on further outscaling this technology.

One of the challenges that remains insurmountable, at the moment, is the lack of diverse sources of good quality seeds. Farmers and experts alike expressed their concerns on the monopoly of seed companies over the source of good quality seed varieties, such as Red Pinoy and Red Dragon. Possible workarounds include early reservation and buying of seeds, as well as exploring other planting schedules. Progressive members of FAFOGGA, with the guidance of experts from DA-NVES, are eager to explore the latter. ■

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# Capacitating mango growers

## through participatory technology demonstration

Lea B. Calmada

In 2020, 24 members of the Malasiqui Mango Growers Association in Pangasinan with experienced a severe mango cecid fly infestation. They were used to spraying chemical pesticides to address this kind of occurrence. The infestation of mango cecid fly highly affects the quantity and quality of mango produce, resulting in the lowering of its market price. If not controlled, the damage could reach up to 97%.

“Good thing, during that time, the DA-Ilocos region introduced to us the IPM technology, which includes pruning. However, since I’m only renting the land where I grow mangoes, the owner advised me against pruning as he believed that cutting branches reduces income,” said Engr. Raul D. Datauin, president of the Malasiqui Mango Growers Association in Pangasinan.

This technology intervention was introduced through the DA-BAR-funded project, Participatory Technology Demonstration (PTD) cum Research on the Management of Mango Cecid Fly in Ilocos Region. Through this approach, the technologies were verified in the learning fields by the mango growers.

Project leader Aries V. Magat helped the association to explain to the owner the benefits of pruning, as it could actually result in good and increased production of mango. According to Magat, pruning is done to allow sunlight to penetrate in the crown and free

air circulation, thereby reducing incidence of insect pests and diseases. Only dead branches and infected branches are removed, and paint is applied on the open cut to avoid entry of fungus.

Through the 16-week training using Farmer Field School (FFS) as an approach, the association also learned other cultural management practices. Cleanliness and sanitation were observed to avoid an alternate host of the pests. The areas for the experimental study were cleaned including the surroundings, all tall weeds were also removed. Moreover, the association was taught to fertilize trees using organic and inorganic fertilizers, the rate of application is based on the age of the trees.

Using PTD as a collaborative and collective inquiry to find possible solutions on the management of mango cecid fly, the trees were induced to flower and power spraying was uniformly done to all the branches and leaves. Treatments were assigned randomly in each replication with three trees per treatment. Color coding of tags was used for easy identification of studies.

Lastly, the association also learned the proper pest and disease management. The trees were sprayed with pesticides and different organic solutions starting two weeks after flower induction following the mango spray guide of each treatment. Importance of bagging using the


waxy paper was also practiced to protect the fruits to ensure quality of fruits.

After the PTD, the association was able to identify the insect pests versus natural enemies or friendly insects. Aside from mango cecid fly, mango leaf hoppers were commonly observed with some tip borer and seed borer in the chemically treated trees. While natural enemies were more abundant in treatments 3, 4, and 5 which are non-chemical pesticides.

The association learned that the average yield of treatment and net income using non-chemical pesticides in treatments 3 and 5 were comparable with the use of chemical pesticides. All these were directly observed by the association through the PTD.

Through the project, Engr. Datuin shared that there was an increase in the production by 50% to 70%. It also gave them the opportunity to share its good results and convince the other mango growers in nearby localities to adopt the technologies.

Equipped with the Agroecosystem Analysis, a very effective decision making tool when National IPM Program introduced by Dr. Jesus Binamira of the DA in 1993, the mango growers became better decision-makers in managing pests and diseases in their respective farms.

Overall, the “PTD study was effective in enhancing the capability and technical know-how of smallholder mango growers on mango pest management. After all, there is no single intervention to combat cecid fly and other pests, but still the IPM way,” Magat said. 

# FCAs

## in a nutshell

Emily A. Soriano, PhD  
DA-CLIARC for Upland Development

Farmers cooperatives and associations or FCAs refer to a group of individuals, registered with the Cooperative Development Authority, Securities and Exchange Commission, or Department of Labor and Employment. They are independent groups of farmers or fisherfolk who voluntarily unite to meet their common needs and aspirations in agriculture, credit, agro-processing, storage, marketing among other things.

FCAs occupy a key position in the implementation of DA programs and projects. They serve as conduits for distribution of seeds, animals, farm inputs, credit, machineries, facilities, and technologies. They function as managers of processing and storage facilities. They also engage in production, marketing, processing, and credit provision.

DA-accredited FCAs have a huge advantage as they have a higher chance of obtaining various government assistance such as subsidies for farm inputs, enterprise supports (eg. soft loans or grants), technical and technological support on product development, and marketing.

Members can therefore derive great benefits from their participation in the group. Aside from the obvious financial benefits, they are also enabled toward self-empowerment. Every farmer is given the opportunity to participate in collective decision making, to vote and to express their thoughts. In working together, their bargaining power increases. They can lower costs, increase profits, innovate toward value addition for their enterprise, and provide the volume of goods that institutional buyers are looking for.

Not all FCAs are the same, however. There are big, rich, and old FCAs and there are small, poor, and new ones. The former tends to be established, well-managed, multi-enterprise institutions, while the latter are often volatile, poorly-managed, and narrowly-focused enterprises.

In implementing DA-BAR field projects, different manners of FCAs may be encountered. It depends on the commodity and its suitable area. Sometimes there may not even be an existing FCA. This last scenario is mostly the





case with my DA-BAR projects. To gain the best impact from the projects, I focused on marginal crops, and searched for suitable areas in fourth to sixth class municipalities. Understandably from this, there is little chance of having big FCAs as partners.

Success with small or new FCAs require adequate handholding, capacity-building, and partnership-building.

Handholding starts with an adequate appreciation of their situation. Participatory rural appraisal is most useful for this. The FCA must then be monitored and advised on organizational, financial, managerial, and sometimes even interpersonal issues.

can be conduits for marketing and financing, and some NGAs like the Department of Trade and Industry and Department of Science and Technology can provide technical and material support to a marketing or processing enterprise.

For a DA-BAR project impact to be sustainable, the FCA must not only endure but it also has to evolve. From a single-enterprise concern, such as production and marketing, the FCA has to engage in other segments of its commodity value chain. Product development, waste or by-product processing, product packaging and branding, and online marketing are some of the value-adding measures they can explore.



Partnership with the local government units (LGUs), state universities and colleges (SUCs), non-government organizations (NGOs), and other national government agencies (NGAs) is thus indispensable for this. LGUs can provide extra logistical support and assign personnel for regular monitoring of the FCA while SUCs can provide expert training and advice on technology and financial management. NGOs

The importance of FCAs are not simply in their presence as frontline conduits for agricultural services, but also as partners for agricultural research and development. Beyond these, the FCAs also offer the potential toward sustained increases of income for members, expanding rural employment opportunities, and shortened producer-consumer supply chains. ■

# Empowering smallholder farmers to enhance their productivity and income

Kathleen Mae B. Bulquerin

As the demand for high-quality rice grows in the Philippines, smallholder farmers face numerous challenges, hindering their ability to produce better rice and compete in the global market. To address these obstacles, the DA-Philippine Rice Research Institute (PhilRice) and partner agencies introduced RiceBIS—a corporate farming and agroenterprise business model.

This comprehensive program aims to empower small farmers by providing them with inputs, services, and capital to become part of a community of farmer-partners. Through innovative strategies and a focus on farmer empowerment, RiceBIS aims to revolutionize the agricultural landscape and uplift smallholder farmers.



RiceBIS takes a bold approach in converting small farms into larger management units, capitalizing on economies of scale to enhance land preparation, processing, and domestic marketing. By pooling resources and expertise, farmer-partners in RiceBIS communities can achieve greater efficiency, productivity, and profitability.

The program not only ensures fair income sharing but also serves as a convergence point for various government initiatives, such as the 'New Thinking' for Agriculture and Rice Competitiveness Enhancement Program. By consolidating efforts and resources, RiceBIS enables farmer-partners to access a comprehensive range of support

services and opportunities for growth.

The success of RiceBIS is evident in the remarkable results observed through rigorous monitoring and evaluation. In Nueva Ecija, one of the areas of intervention, farmer-partners within the RiceBIS community experienced a 16% increase in yield and a 15% reduction in unit cost, leading to significantly higher net incomes. These tangible improvements demonstrate the transformative impact of RiceBIS on the lives of smallholder farmers.

Building on these achievements, RiceBIS has expanded its reach to encompass nine major rice-producing provinces in the Philippines. With approximately 4,000 farmers as the program's target beneficiaries, RiceBIS aims to empower a substantial number of farmer-participants across the country. By providing capacity-building, technology transfer, and socio-economic support, RiceBIS equips farmer-participants with the necessary skills and knowledge to thrive in a rapidly changing agricultural landscape.

At the heart of RiceBIS lies the belief that farmer-participants are the key agents of agricultural transformation. By placing them at the forefront of progress, RiceBIS empowers smallholder farmers to unlock their full potential. Through collaborative partnerships with farmers' organizations, farmer-participants are given a platform to voice their ideas and contribute to decision-making processes.

Comprehensive training programs are the cornerstone of RiceBIS, equipping farmer-participants with essential skills in production,

processing, organization building, management, and agripreneurship.

The program also emphasizes the adoption of cutting-edge technologies to enhance agricultural yields while promoting sustainable and cost-effective practices. Moreover, RiceBIS supports the development of viable and profitable rice-based enterprises, enabling farmer-participants to diversify their income sources and capitalize on emerging market opportunities.

RiceBIS stands as a shining example of transformative agricultural innovation, elevating smallholder farmers to new heights of economic stability, productivity, and competitiveness. Through its holistic approach, RiceBIS revolutionizes the agricultural landscape by empowering farmer-participants.

By fostering partnerships, providing training, leveraging technology, and creating entrepreneurial avenues, RiceBIS propels smallholder farmers toward success. This transformative project not only enhances the lives of farmer-participants but also contributes to the sustainable development of their communities.

With farmer-participants at the forefront, RiceBIS exemplifies the immense potential of empowering and uplifting smallholder farmers in creating a thriving agricultural sector. ■

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# Sustaining livelihood through improved native pig production and meat processing

Angelo N. Padura

The meat processing industry has become a profitable venture over time catering to the demand of a growing population, according to the Philippine Association of Meat Processors Inc.

In rural communities like Gumaca, Quezon, native pig farming is a source of livelihood not only to pig raisers but also to meat processors. Being so, a steady supply of native pig and processing technologies that can support growers and processors are vital.

In 2020, DA-CALABARZON commercialized the technology in processing meat products utilizing native pigs. With funding support from the DA-BAR, the research team conducted a project to expand the livelihood of native pig raisers by intensifying native pig production, capacitating farmers with the meat processing technology, upgrading processing facilities for larger production, improving shelf life of the meat products, and establishing market linkages.

A total of 155 native pig growers from Munting Sambayanang Kristiyano-Magsasakang Sinusunod ang Organikong Pagsasaka (MSK-MASINOP), Bonliw Farmers Association, and First Nasugbu Natural Farmers Association were trained on native pig production following

the standards of organic farming, as well as meat processing into value-added products such as *tocino*, *tapa*, *longanisa*, sausage, and *embutido*.

## Profit from production

To ensure sustainability of raw materials for meat processing, multiplier farms were established in the three partner-municipalities. Through a roll-over scheme, farmer-cooperators were initially given native pig breeders. After being able to produce and raise a number of piglets, they have to transfer the same number of full-grown breeders which they initially received to next-in-line beneficiaries.

Jennifer B. Argel, MSK-MASINOP member and piggery owner, shared that her native pig production has significantly grown over time after adopting the technology introduced by DA-CALABARZON.

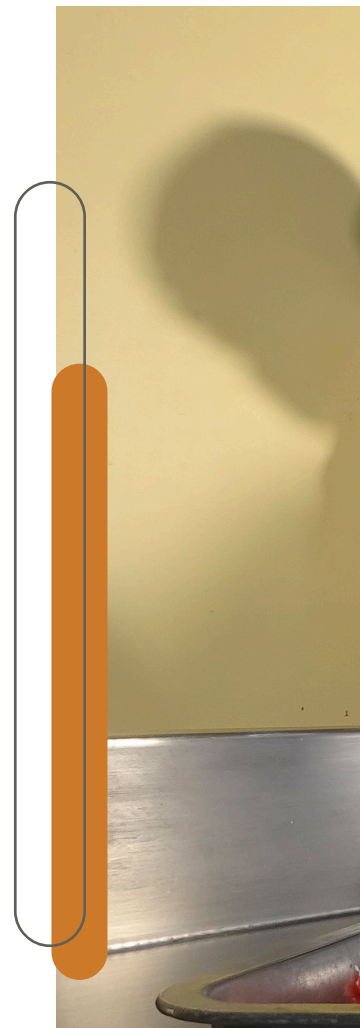
*“Mula sa dalawang inahin at isang barako, nakapag-produce na ako ng 48 na baboy. Nakatulong din iyong multiplier farm system kasi habang tumatagal, mas marami na ang nag-aalaga ng native pig sa aming lugar,”* Argel stated.

MSK-MASINOP members noted that their profit increased from raising native pigs due to low cost of production and sustained supply of native pig breeders.

*“Dahil dahon ng saging, gabi, at madre de agua ang kinakain ng aking mga alaga at bihira naman sila magkasakit, mababa lang ang aking nagagastos sa pagpapalaki ng native pig. Nakabenta na rin ako ng humigit kumulang PhP 50,000 dahilana para makapagpatayo ako ng mas malaking babuyan,”* she added.

## Profit from meat processing

While securing a stable production of native pigs, MSK-MASINOP members were trained to process native pig into saleable



products such as *tapa*, *tocino*, and *longganisa*. To penetrate a bigger market for their products, they were also assisted by DA-CALABARZON in upgrading their processing facility and improving the quality and shelf life of their meat products.

“Native pig farming has a significant potential to provide sustainable income to native pig farmers. In addition, the value-adding of culled sow and oversized pigs can provide additional livelihood opportunities to partner-associations,” DA-CALABARZON researcher and project leader Ginalyn D. Bocaya said.

MSK-MASINOP native pig raisers and processors reported

sustained income after adopting the technology introduced by DA-CALABARZON.

“Noong Enero, nakapagproseso kami ng dalawang inahing native pig. Nakagawa kami ng *tapa*, *tocino*, at *longganisa* na may kabuuang bilang na 251 packs kung saan kumita ang aming asosasyon ng halos PHP 20,000,” MSK-MASINOP member Manuel R. Odi shared.

Members of the said farmer groups signified their interest in sustaining native pig production and meat processing as it provided them with an additional source of income. By promoting the availability of locally-produced and quality meat products in each respective

municipality, the technology intervention generated jobs for locals and increased the income of native pig raisers and processors.

“Overall, the project’s emphasis on value-adding had a transformative impact on the members of the associations, enabling them to elevate their economic status and improve their livelihood. By nurturing the agripreneurial spirit within these communities, the project has opened up new avenues for growth and development,” Bocaya said. ■

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# Reviving adlay farming in marginal areas:

## Intercropping and sustainable enterprise development

Kathleen Mae B. Bulquerin



Adlay, also known as Job's tears, is a cereal crop that has been cultivated in various parts of Asia for centuries, but it is an underutilized crop in the Philippines where rice and corn are the commonly grown staples.

Intercropping with leguminous crops such as groundnut, cowpeas, and mungbean is highly recommended to increase soil fertility in the production of adlay. Leguminous crops increase the level of nitrogen, phosphorus, and potassium, correct the soil pH, and improve the structure of the soil. Intercropping adlay with leguminous crops provides a sustainable enterprise development model for farmers in marginal areas that can improve soil fertility, increase





crop yields, and diversify their income sources.

However, adlay is now gaining renewed interest due to its potential health benefits and adaptability to marginal areas. This renewed interest has led researchers to implement projects that aim to revive adlay farming by introducing intercropping with leguminous crops and promoting sustainable enterprise development.

### **Enhancement of adlay production through intercropping of leguminous crops in Quezon and Batangas**

The DA-CALABARZON led by Lucina M. Africa implemented the Enhancement of Adlay Production through Intercropping

of Leguminous Crops in Quezon and Batangas project. It aimed to increase farmers' income and expand areas for planting materials, processing, and other promotional activities, resulting in an expected increase in the adoption rate of the technology.

The project was implemented in Batangas and Quezon, where farmer-cooperators were selected to be allotted at least 1,500 square meters for the project. Soil samplings were also done in the two provinces to determine the nutrient composition of the soil for the application of fertilizers.

The Pulot variety of adlay was used as the main crop, while leguminous crops such as peanut (Biyaya 16), soybean (NSIC Sy 8), and mungbean (NSIC Mg 14) were used as intercrop. Randomized Complete Block Design with three replications and four treatments were used in the project.

### **Bayanihan to recover as one through adlay in Zamboanga Peninsula**

The DA-Zamboanga Peninsula (ZamPen) implemented a project funded through the “Bayanihan to Recover as One Act” to capacitate indigenous peoples (IP) farmers and associations in the region and enhance their adaptive capacity to adlay production technology. The project also involved rebel returnees as beneficiaries.

The six-month implementation of the project served and reached out to adlay farmers in marginalized areas and registered about 486 adlay farmers and 27 farmer-groups,

mostly IPs and rebel returnees located in Camp Salman, Zamboanga Sibugay, in support of the National Task Force to End Local Communist Armed Conflict program.

However, tribal leaders were not in favor of enhancing the *pangase*, an adlay-based wine, because it contradicts with their religious beliefs.

Despite the safety restrictions brought about by the COVID-19 pandemic, the project extended technical assistance to adlay farmers by giving emphasis on precise farming using the research findings and adlay package of technology-generated by the DA ZamPen-Research Division. Moreover, DA-BAR also provided equipment in the postharvest of adlay.

The project produced farmer-friendly adlay production guides and other information, education, and communication materials that were translated into local dialects and encouraged partner-LGUs to establish an adlay production area in their municipality to promote and encourage other farmers to plant.

Adlay has the potential to provide a more diverse and sustainable source of income for farmers in the country and bring food security closer to reality. In time, perhaps adlay will no longer be an underutilized crop, but a thriving one that can contribute to the economic growth of marginal areas in the Philippines. ■

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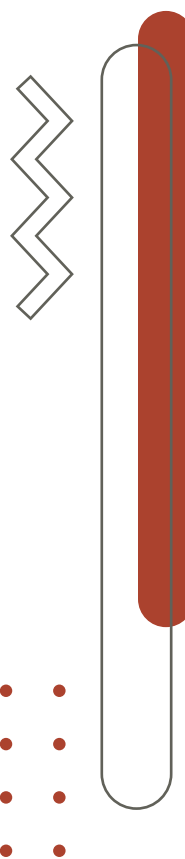
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# Farmers to bring organic vegetables, fruits *to a different level*

Angelo N. Padura



The demand for organically-grown produce is becoming more popular and acceptable into the market nowadays. These products promise more than just its nutritive value to the consumers but even more so to organic farming practitioners through an enhanced profit in their production.

In 2021, a team from DA-Cavite Agricultural Research and Experiment Station (CARES) led by researcher Eva B. Pugay implemented a project to determine the demand and market potential of processed organic fruits and vegetables, and capacitate a cooperative in fruit and vegetable processing.

Having been in the business of organic farming and production since 2008, the Yakap at Halik Multi-Purpose Cooperative (YHMPC), a Philippine National Standards-compliant and certified organic production area in General Emilio Aguinaldo, Cavite, became the cooperators of the project. The cooperative is composed of 300 members that are engaged in integrated organic farming of crops, organic fertilizer, organic livestock production, and organic fruits and vegetables production.

However, members of the cooperative were challenged by the low profitability of their organic produce particularly during lean season.

*“Kapag lean season ay sobrang mura naming binebenta ang aming prutas at gulay para maubos at hindi masayang,”* YHMPC-Cavite chapter chair Gabriel A. Arubio said.

These farmers even had to hurdle more due to restrictions of the COVID-19 pandemic and the Taal volcano eruption. This paved the way for these farmers to realize something more for them and their harvest — processing of their organic produce.

### **Strengthening farmers’ capacity**

“We chose YHMPC to serve as a model to other organic farming practitioners that organic farming can be made more profitable through processing,” DA-CARES project leader Eva B. Pugay said.

Through the funding assistance of DA-BAR, DA-CARES trained members of the cooperative with basic food safety and good manufacturing practices, packaging and labeling, marketing and entrepreneurship, as well as in processing organically-grown vegetables and fruits into chips and powder

through the use of vacuum fryer and spray dryer, respectively.

*“Napatunayan ng aming value chain analysis na malaking tulong na matuto ang aming mga magsasaka na i-proseso ang mga prutas at gulay na kanilang inaani upang ito ay mapakinabangan at mabawasan ang pagkasayang,”* Arubio said.

In preparation for the certification of the processing facility to mass produce the products, the research team also assisted the members of the cooperative to come up with their own organizational structure.

### **Determining demand and market potential**

In collaboration with the Department of Education-CALABARZON, the research team conducted a survey revealing students’ interest in buying vegetable chips and natural fruit juices as their snacks in Cavite.

Survey showed that 179 of 187 elementary students want vegetable chips and fruit juice products. Among the top two choices are squash and mixed *pinakbet* for vegetable chips, and *guyabano* and *langka* for fruit juice.

“We were surprised because elementary pupils do not normally prefer eating vegetables and fruits,” Pugay said.

Further, two institutional buyers and grocery owners in the province signified high interest in purchasing the products as soon as it becomes commercially available.

“They are willing to commit to buying our products even if our production becomes big enough,” she added.

Through the study, DA-CARES assures that there is really a market for the processed organic vegetable and fruit products. An annual net income of PhP 1,034,280 for 8,100 *langka* juice pouches and PhP 290,880 for 11,520 squash chips pouches are projected to benefit the members of the cooperative.

“Through the research, we were able to boost the confidence of organic farming practitioners here in General Emilio Aguinaldo, Cavite through the confirmation of potential demand and institutional buyers of the processed organic vegetable and fruit products,” Pugay said.

Aside from promoting a nutritive and safe snack for consumers, Pugay explained that the project shall contribute in sustaining the production of organically grown crops by augmenting the income of organic farming practitioners in Cavite.

To date, the project is to be recommended for its second phase of implementation that will mass produce and commercialize the organic fruit and vegetable products. ■

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# Indigenous community in Mindoro ventures into stingless bee production

Evelyn H. Juanillo

When we think of bees, we think about its painful sting. But did you know that there are stingless bees? They still bite, especially when their colony is threatened, but it does not hurt as much. This type of bees are also known as meliponines, and they have gained attention nationwide and worldwide for their medicinal honey.

DA-BAR, in partnership with local government units and state colleges and universities and the University of the Philippines Los Baños (UPLB) Bee Program, has supported various projects on the promotion and commercialization of stingless bees. Various communities in the Bicol region, as well as in Batangas, Laguna, and Quezon learned to propagate stingless bees for pollination and production of honey, pollen, and propolis. The quality of bee products were also improved.

The DA-Bureau of Agriculture and Fisheries Standards, after consultation with stakeholders in Luzon, Visayas, and Mindanao, established the standard for organic honey. With this, wild honey landed a niche in the local and foreign markets, giving opportunities to the indigenous peoples (IP) in Mindoro to earn additional income. Among the new products produced are organic honey, propolis, and cosmetics.

In the past three years, the following farms have adopted the beekeeping technologies developed by the UPLB Bee Program: Balay Buhay sa Uma in Bulusan, Sorsogon; Yumi Farm in Tayabas, Quezon; Sayonora Farm in Majayjay, Laguna; Paradiso Farm in Mabitac, Laguna; Guimaras Mango Farm in, Guimaras, as well as three municipalities in Lanao del Norte and Mangyan community in Loyal, Oriental Mindoro. Except for the latter, these farms have been developed for agro-tourism.

In 2020, just before the world closed down its borders, a project implemented by the UPLB Bee Program was funded by DA-BAR. This aims to commercially propagate stingless bees for honey, pollen, and propolis production by establishing a meliponary in Barangay Loyal, Victoria, set up a bee product processing facility, and standardize and package bee products for local and international markets.

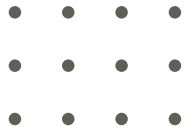
What makes this project unique from the rest is that it is implemented in collaboration with Pulot Tadyawan Association (PTA), wherein 90% of the members belong to the Mangyan communities. They initially received training on native bees

management and sustainable way of harvesting honey in the wild from the UPLB Bee Program in partnership with the ABS-CBN Bantay Kalikasan, Local Government Unit of Victoria, and the Department of Social Welfare and Development. Further intensive training and facilities are needed to improve their skills on beekeeping and production of bee products.

Despite the movement restrictions during the lockdown, PTA was able to receive stingless bee hives to serve as starter colonies.

A bee product processing facility was also established in the barangay. This will be used for storing raw propolis, harvested honey and pollen, and by-products such as soaps, lip balms, repellents. The PTA members will handle its maintenance.

Rising above the challenges that include the pandemic and several typhoons, the community was able to earn a total of PhP 59,000. Thirty kilograms of honey were sold at PhP 500 per kilo, 20kg of pollen at PhP 600/kg, 20kg of propolis at PhP 600/kg, while the by-products (soaps, lip balm, and repellent) were sold for a total of PhP 20,000. ■

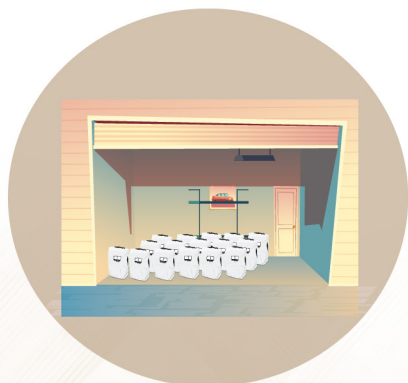


# Improving Brown Rice Quality, Shelf Life, and Engineering Technologies

## Process/Method for Improving the Quality and Extending the Shelf Life of Brown Rice



Steaming of brown rice for 10 min was the most effective in reducing lipase activity and free fatty acid production



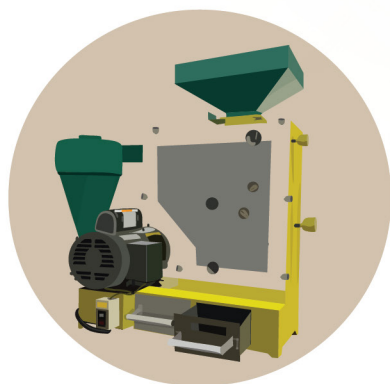
Shelf life of stabilized brown rice determined at room temperature and refrigerated storage conditions



Hermetic storage of brown rice using SACLOB validated with appropriate thickness of tarpaulin material

Improve brown rice shelf life and pilot test brown rice engineering technologies to ensure the availability and accessibility of affordable brown rice in the market, providing rice consumers with a healthy, nutritious, and shelf-stable product.

## Brown Rice Machines



### Portable Brown Rice Machine

Dehulling unit: 4in diameter rubber roll

BR recovery: 65-75%

Output capacity: 6-11kg/h

Power Source: 1hp, 220V, single phase electric motor



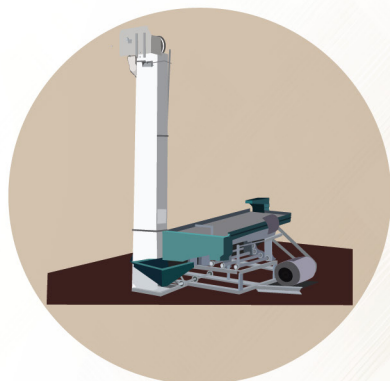
### Village-type Brown Rice Machine

Dehulling unit: 8in diameter rubber roll

BR recovery: 71-77%

Output capacity: 115-331kg/h

Power Source: 5hp (dehuller), 1hp (bucket elevator), 220V single phase electric motor



### Retrofitted Brown Rice Machine

BR recovery: 65-79%

Output capacity: 115-202kg/h

Power Source: 1hp (separator)

1hp (elevator) 220V single phase electric motor

Can be attached to the common two-pass rice mills in many localities

# Indigenous community in Mindoro ventures into stingless bee production

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## RESEARCH FOR DEVELOPMENT **BARDIGEST**

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