

13th agri fisheries national tech forum concludes

Recognizing the importance of disseminating technologies generated from research and development (R&D) and providing new perspectives on technology commercialization, the Bureau of Agricultural Research (BAR) concluded the 13th Agriculture and Fisheries Technology Forum and Product Exhibition (NTF). With the theme, "Bringing Products of R&D to the Filipino Farmers, Fisherfolk, and Agripreneurs through Technology Transfer and Commercialization," the event was held on 8-10 August 2017 at the BAR Grounds, Visayas Avenue, Quezon City.

The activity started with a thanksgiving mass officiated by Father Toto Jaranilla of Mount Carmel Parish. This was followed by a ribbon-cutting ceremony led by Department of Agriculture (DA) Undersecretaries Segfredo Serrano and Bernadette Romulo-Puyat, and Assistant Secretary Leandro Gazmin. Joining them were BAR Director Nicomedes Eleazar, BAR Asst. Director Teodoro Solsoloy, Quezon City Police District Director Guillermo Lorenzo Eleazar, and BAR-Technology Commercialization Division Head Anthony Obligado.

More than 50 exhibitors participated in the event including DA-regional field offices (RFOs), Bureau of Fisheries and Aquatic Resources-regional offices (BFAR-ROs), state universities and colleges (SUCs), and other partner institutions showcasing various R&D breakthroughs, products, services, and technologies supported by BAR under its National Technology Commercialization Program (NTCP).

BAR Director Eleazar, who delivered the opening message, reiterated the importance of NTCP, a banner program of the bureau. "*Ang NTCP ay instrumento sa pagbuo ng maraming teknolohiya na nagbigay daan at nag-resulta sa positibong resulta* from improved productivity, economic profitability, to benefitting

farmers, fisherfolk, agripreneurs, communities, and stakeholders," he said.

He cited some of the successful products supported by BAR including *adlay*, fruits wines that are now available in the mainstream market; and *rimas*

which reached Hong Kong. He also acknowledged the importance of the private sector that adopted the technologies and helped in sustaining the technology.

Other highlights of the event were the launching of the BAR R&D Portal and soybean coffeetable book, "SOYAmazing Stories from the Field: Results from Soybean R&D Program". The portal is an information system containing essential data on the different R&D projects funded by BAR from 2005 to present. Meanwhile, the coffeetable book featured 31 stories of farmers, farmer organizations, and entrepreneurs whose successes were credited, in one way or another, to the various soybean technologies generated by R&D institutions under the DA National Soybean Program. In relation to the intensified promotion of soybean, BAR also conducted the second-leg of the "Soybean Cooking Contest" in the afternoon of the first day.

Seven Intellectual Property (IP) certificates were also awarded during the opening day, one for patent and 6 for trademarks. These were: 1) Galactomannans from Makapuno



Leading the ribbon-cutting ceremony are: (L-R) BAR Asst. Director Teodoro Solsoloy, DA Assistant Secretary Leandro Gazmin, BAR Director Nicomedes Eleazar, DA Undersecretaries Segfredo Serrano and Bernadette Romulo-Puyat, Quezon City Police District Director Guillermo Lorenzo Eleazar, and BAR-Technology Commercialization Division Head Anthony Obligado. PHOTO: RDELACRUZ

Endosperm and the Process of Producing the Same (Philippine Coconut Authority-Albay Research Center); 2) JOVIMIN (DA-RFO 1), 3) NVCITPRO (Nueva Vizcaya State University), 4) DAERRYS (Central Luzon State University), 5) Azucar de Lanuza (Sitio Ipil Winemakers Association and FREEDOM, Inc.), 6) Nature's Pharmacy Nature The Healer (Mr. Arturo Tanco, Jr.), and 7) THE BARROWS (Mr. Robert Sto. Domingo). This was made possible through the assistance and services

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The big challenge is climate change -Serrano



DA Undersecretary Segfredo Serrano, in his message, cites the challenges being faced by the agri-fishery sector and the need for collaboration in order to address such challenges. PHOTO: PLESACA

Agriculture Undersecretary for Policy and Planning Segfredo R. Serrano, who served as a keynote guest during the opening ceremony of the 13th Agriculture and Fisheries Technology Forum and Product said that, competition in exporting agricultural products is not the only challenge of our time, but also climate change and how we are addressing it.

“Ang mga produkto at teknolohiya natin ay kinakailangang

kaya ‘yung physical stress at ‘yung biophysical challenges ng climate change. Papaano natin gagawin iyan kung halimbawa ay wala naman tayong ganoong kalaking budget. Ang parati kong sinasabi ay ganito, ang lupa nga sa Pilipinas ay limitado, matindi pa ang land conversion. Kaya ‘yung ating lupain para sa pansakahan, para sa pangisdaan, paliit nang paliit,” he said.

He also emphasized the need to cooperate with the Congress, particularly in passing a comprehensive law on land use. *“Ang dami nating batas tungkol sa lupa, may AFMA, may agrarian reform, kung anu-ano. Kung kakaunti lang ang lupa natin, tapos nakikita natin ngayon, hindi lamang sa Maynila kundi sa ibang siyudad ng ating bansa, nagkukulang na tayo sa tubig,”* he said.

USec Serrano pointed out that the challenges must be taken seriously if we are to plot our food production agenda. The depletion of land resources devoted to the agriculture sector, the changing weather patterns, and the country’s integration in the Asean Economic Community are posing real threats

to food security and sufficiency, and thus the need to be more judicious in implementing plans and programs. “When there is land scarcity, water becomes a problem as well and it’s not going to get any better unless we put our heads together,” he said.

He furthered that the only limitless resource that the country has is its own human resource. Therefore, there is a need to intensify education and capacitating the Filipinos as this will bring the country back ultimately in its own track.

The Undersecretary also congratulated BAR in the holding of its yearly technology forum and product exhibition, which coincides with its 30th year anniversary. ### (Patrick Raymund A. Lesaca)



USec Serrano also visits the booths and products featured during the NTF. PHOTO: PLESACA



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It could have been a play of words but the title of the book has appropriately termed

SOYAMAZING

book launched

what soybean is, both as a crop and as a priority program of the Department of Agriculture (DA). “It is SOYAmazing!” as one soybean farmer exclaimed.

The coffeetable book titled, “SOYAmazing Stories from the Field: Results from Soybean R&D Program,” was launched on 8 August 2017 during the opening of the 13th Agriculture and Fisheries Technology Forum and Product Exhibition at the BAR Grounds, Visayas Ave., Diliman, Quezon City.

Leading the ceremony was DA Undersecretary Segfredo R. Serrano, who also served as the keynote speaker for the event. Joining him were Assistant Secretary Leandro Gazmin, BAR Director Nicomedes Eleazar, BAR Asst. Director Teodoro Solsoloy, and Quezon City Police District Director Guillermo Lorenzo Eleazar.

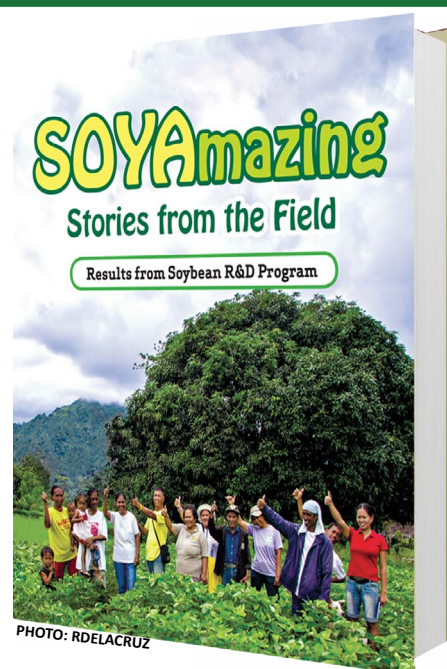
Agriculture Secretary Emmanuel Piñol, in his message in the book, reiterated that, “Soybean is a wonder crop. Its value as a protein source is legendary. It is a main ingredient for so many things

including food, animal and fish feed, and pharmaceutical and industrial products.”

The book features 31 stories from the field including farmers, farmers’ organization, religious groups, and entrepreneurs who have adopted the soybean technologies and interventions introduced to them through the DA National Soybean Program.

The program was initiated in 2011 by the DA-High Value Crops Development Program (HVCDP) and BAR with the ultimate goal of promoting soybean and expanding local production to sustain the industry and eventually provide farmers stable market and better income. With the creation of the program, the Soybean Roadmap was crafted composed of the various strategic frameworks anchored on community-based sustainable production and establishment of a viable soybean processing industry.

“The success stories clearly show that soybean is literally taking root as an important cash crop that has vast potentials to alleviate poverty in the rural areas, especially in farming



communities,” said BAR Director Eleazar.

Also present during the book launch were the soybean farmers whose stories were included in the book. One of them was Mr. Richard Virtudazo who flew all the way from Tago, Surigao del Sur to attend the launching.

Mr. Virtudazo worked for a private company in Manila before he became a full time soybean farmer. “Over the long term, I was able to get training on different farming technologies. But I adopted organic farming because I could save on inputs. Also, organic foods are safe for human consumption,” he said. ### (Rita T. dela Cruz)

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offered by the IP Rights Management Section of BAR.

The second day featured seminar series and technology demonstrations including topics on soybean, cheese from goat’s milk, bee products, mushroom, rubber, fisheries, and Hoya. Technology generators, product developers, and even walk-in participants were provided with information on various available packaging materials for specific products.

This year’s central display setting featured R&D projects being coordinated by the bureau and the supported technologies that resulted to high-impact results. These included soybean, *adlay*, fruit wines,

mushroom, heirloom rice, queen pineapple, *rimas*, *tilapia* ice cream, *kapis*, apiculture, native animals, and chevon products.

Other personalities who graced the activity were: Representative Abdullah Dimaporo of the 2nd district of Lanao del Norte; Agricultural Training Institute Director Luz Taposok; DA-Information and Communications Technology Service Director Clint Hassan; University of the East Caloocan Chancellor Zosimo Battad; University of the Philippines Los Baños Vice Chancellor for Research and Extension Rex Demafelis; Isabela State University Vice President for Research, Development, and

Extension and former BAR Director William Medrano; Tarlac Agricultural University Vice President for Research, Extension and Training Tessie Navarro; Atty. Rhaegee Tamana, chief of staff of Senator Cynthia A. Villar; Ms. Evi Wulandari, junior professional officer, FAO Representation in the Philippines; and Mrs. Lorna Daffon of PTV 4’s *Mag-Agri Tayo* Program.

NTF is conducted annually by BAR to serve as a venue to showcase projects and initiatives funded by the bureau through the National Technology Commercialization Program, wherein generated technologies are properly disseminated and promoted to various stakeholders. ### (Ma. Eloisa H. Aquino)

Eight seminars highlight 2nd day of NTF

Highlighting the second day of the 13th Agriculture and Fisheries Technology Forum and Product Exhibition of the Bureau of Agricultural Research (BAR) on 9 August 2017 were the seminar series and product demonstrations featuring eight topics. These were: 1) product

packaging, 2) diversity of Hoya, 3) regional initiative on fisheries partnership, 4) production of different types of goat cheese, 5) growing soybeans, 6) bee products, 7) mushroom value chain, and 8) rubber propagation.

The first seminar titled, **Importance of Packaging**, was delivered by Mr. Allan Bucu, vice president of RBNP Enterprise, which focused on product packaging. According to Mr. Bucu, packaging can spell the difference between success and failure in the marketplace as packaging is the last chance the producer has in influencing a consumer to buy. He said that good packaging can “talk” with the consumer and establishes familiarity and creates recognition. The types of packaging materials that can be used are glass, metal, rubber, plastic, paper, and film/foils with costing as the main consideration in the selection of the actual container along with convenience.

The next topic was on the ornamental plant, Hoya, presented by Mr. Fernando Aurigue of the Department of Science and Technology’s (DOST) Philippine Nuclear Research Institute (PNRI) as **Diversity of Hoya in the Philippines**. Not familiar to many Filipinos, Hoyas form a genus of flowering plants with many of its species indigenous to the country. Mr. Aurigue said that,



Walk-in visitors from both government and private sectors listen to the eight seminar topics during the second day of the NTF. PHOTO: RDELACRUZ

some 200-300 species in the world are known but 500 may be closer to the truth. Hoyas may be bushy, viny, or pendant in growth habit and have potentials as ornamental plants – propagated plants are saleable in the local and international markets with preference on species with larger and longer-lasting flowers, but rare species or varieties are expensive; as medicinal plants – some species have been used by indigenous people or in traditional medicine; and as food plants (for confirmation and research). They are hardy plants, said Mr. Aurigue, as Hoyas can tolerate high temperatures such as those in urban areas.

Off the beaten track was the seminar, **The Oceans and Fisheries Partnership: A regional initiative to combat illegal, unreported, and unregulated (IUU) fishing and seafood fraud using catch documentation and traceability systems in Southeast Asia**, presented by Dr. Len R. Garces of the US Agency for International Development (USAID) Oceans and Fisheries Partnership based in Bangkok, Thailand. He highlighted the threat to global fisheries from surging worldwide demand for ocean products, declining ocean health, and continued illegal, unreported and unregulated (IUU) fishing. According to him, IUU fishing harms legitimate fishing activities and livelihoods, jeopardizes food and economic security, benefits

transnational crime, distorts markets, contributes to human trafficking, and undermines ongoing efforts to implement sustainable fisheries policies. With traceability, a product can be tracked through all stages of its production, processing and distribution in the complete supply chain, i.e., from plate to bait. Dr. Garces

mentioned that traceability offers a significant opportunity for governments to strengthen fisheries management and potentially improve the labor conditions of fishers as it deters illegal trade by protecting and potentially enhancing the value of legally-caught fish thus, strengthening sustainable fisheries management.

A good source of potential income was discussed in **Production of Different Types of Cheese from Goat's Milk** by Professor Olivia C. Emata of the University of the Philippines Los Baños (UPLB)-Dairy Training and Research Institute. According to her, a number of products can be made from goat's milk. It is a good medium for *Lactobacillus* bacterial organisms in making probiotics. Different types of cheese can be made from goat's milk which include white cheese, blue cheese, feta cheese, and cream cheese, said Prof. Emata. But owing to its major differences with cow's milk, goat's milk is relatively harder to process into cheese. She mentioned that the composition of goat's milk is similar to that of cow's milk, with the major difference being that the fat globules of goat's milk are smaller and its protein composition has less A1 β - casein (one of the major allergens in milk). The big advantages of goat's milk over cow's milk are: its lower β - casein (low allergenicity) making it similar to human milk; it contains

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BSU WINS SOYBEAN COOKING CONTEST



The winners from BSU explain to the judges their winning soybean-based dish. PHOTO: RDELACRUZ

Chicken Fillet with *Etag*-Soybean in Honey Mustard Soybean Tidbits Sauce” presented to the judges with chopped carrots and broccoli on the sides, which amazed both the

source of fiber and protein, also gives some extra crunch to our dish.” Flores added that the flavor of roasted and salted soybeans complemented with the *etag* gives a Cordilleran twist to the dish. *Etag*, often referred as either *kinining* or *kinuday* is a dried meat (usually pork) that is very popular among the Cordillerans and considered part of their own culinary cuisine.

As first prize winner, BSU received a research grant worth one million pesos and a plaque. The second place went to “Soydineria Espesyal” prepared by students from the Southern Luzon State University-Judge Guillermo Eleazar, while the third place went to “Soya Pastel with Soya Milk Sauce” prepared by the Isabela State University.

Serving as the judges were: Chef Jam Melchor, owner of Yes Plate Manila; Mr. Ralph Rivera, proprietor of Soya Bar Food Chain; and Ms. Thelma Estera, Central Luzon State University professor.

The event was part of the Department of Agriculture’s continuing effort, through BAR, to promote the health benefits of soybean in the country by creating soybean recipes that are nutritious, delicious, and affordable. ### (Leoveliza C. Fontanil)



Rollled Chicken Fillet with *Etag*-Soybean in Honey Mustard Soybean Tidbits Sauce PHOTO: RDELACRUZ

Students from the Benguet State University (BSU), Ms. Pamela Jeane Remiendo and Ms. Maravilla Senado, took home the first prize in the second leg of the “Soybean Cooking Contest for Luzon” held during the opening day of the 13th Agriculture and Fisheries Technology Forum and Product Exhibition on 8 August 2017. The contest aimed to promote the health benefits of organically-produced soybean through developing original healthy soya-based food recipes.

The students prepared a unique soya-based dish called “Rolled

audience and the judges.

Ms. Rodeliza Flores of the BSU-College of Home Economics and Technology (CHET), coach of the students said, “the dish is easy to prepare, affordable, and most importantly, healthy and nutritious. The soya nut, aside from being a

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four times more oligosaccharides (sialic acid) for brain development of the newborn child; it contains higher amount (20x more) of the amino acids, taurine and cysteine, making it similar to human milk; it is rich in short-chain fatty acids making it a source of rapidly available energy; and it is good for people with fat absorption syndrome and people suffering from malnutrition.

Researcher and soybean breeder at the UPLB-Institute of Plant Breeding, Mr. Elmer Enicola, conducted the seminar, **Growing Soybeans for Specific Environments and Markets**. Mr. Enicola looks to a future where the Philippines can have a steady supply of locally-grown

soybeans throughout the year. He cited the country’s rainfall patterns as the major determinant for the availability of soybeans in the year, considering that soybeans need to be harvested during dry seasons. In his presentation, Mr. Enicola showed the annual planting and harvest patterns of soybean farmers in Central Luzon and in Mindanao, and proposed production plans that can secure the local supply of soybeans even if particular areas are affected by the rainy season. He also cited the importance of BAR’s efforts towards increasing soybean production in light of global health trends.

A seminar on the **Organic Production System and Irradiation Technology in the Production of**

Safe and Quality Bee Products was also conducted during the technology forum. Ms. Zenaida M. De Guzman, science research specialist from the DOST-PNRI, talked about a BAR-funded research that aimed to integrate commercial scale, stingless bee production with organic agriculture. Organic agriculture, according to her, is an integral part of beekeeping because conventional agricultural practices involve industrial chemicals found in insecticides, herbicides, and fungicides that can poison and threaten bee populations. With organic agriculture, consumers who buy bee products such as honey are also guaranteed of their quality and safety. She also

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BAR awards **BEST PRODUCTS, BOOTHS**



This year's NTF best product winners are (clockwise): *apali* flour-based products (DA-RFO 11), zero waste products from squash (DA-RFO 5), maize silky sip (DA-RFO 2), *adlay* sweet cone (DA-RFO 4B), and fishtail palm sugar (DA-RFO 10). **PHOTOS: RDELACRUZ**

Awarding of the “Best Products” and “Best Booths” capped off the 13th Agriculture and Fisheries Technology Forum and Product Exhibition of the Bureau of Agricultural Research (BAR) on 10 August 2017.

The award for the “Best Product” was bestowed to the product of research and development that is unique, has an appropriate packaging and labeling, possesses market potential, and is relevant in achieving food security and health and wellness. This year, the *apali* flour-based products of the Department of Agriculture-Regional Field Office (DA-RFO) 11 bagged the “Best Product” award. *Apali* is a local name for lesser yam and has been identified in Region 11 as a climate-resilient commodity that can withstand adverse climatic conditions, particularly in long dry periods. Product development initiatives for the crop have been undertaken by DA-RFO 11, producing the *apali* flour and various *apali*-flour based products such as cookies, crinkles, and munchkins.

The second place went to DA-RFO 5 with

their zero waste products from squash, a technology that showcased making use of all the different parts of the squash (skin, flesh, seeds, etc.) for the development of various food products. The third prize went to DA-RFO 2 for their maize silky sip, a healthy beverage made from boiled corn silk while the *adlay* sweet cone of DA-RFO 4B and the fishtail palm sugar of DA-RFO 10 came in fourth and fifth places, respectively.

The “Best Booth” award was given to the exhibit booth which exemplified originality and creativity in both concept and design. The use of indigenous materials, organization of displays, properly labeled products and information materials, and knowledgeable and friendly staff members also formed part of the criteria which the judges looked for

when choosing the winner for the best booth.

This year, the DA-RFO 2 won the first prize. Their booth featured a *jeepney*-like structure with an intricate design made from the seeds of the region’s champion commodities. Getting in second and third places were DA-RFO 5 and DA-RFO 10, respectively. Meanwhile, the DA-RFO 4B and DAF-ARMM were in fourth and fifth places.

The top three winners from both categories each received research grants under BAR’s National Technology Commercialization Program (NTCP) worth Php 2 million for the first prize, Php 1.5 million for the second prize, and Php 1 million for the third prize. ### (Anne Camille B. Brion)



Best booth winners are (clockwise): DA-RFOs 2, 5, 10, 4B and DAF-ARMM. **PHOTOS: NTF DOCUMENTATION COMMITTEE**

PHOTO: RDELACRUZ



BAR TO SUPPORT INTENSIFIED R&D INITIATIVES ON ONION

Onion (bulb) is a popular ingredient in almost all dishes. Due to its pungent aroma and distinct taste, onion has become a favorite seasoning making it ideal for spicing up meat, salads, and vegetable dishes. But beyond its common and obvious use in preparing foods, onion has other potential uses.

In response to the directives of Secretary Emmanuel Piñol of exploring research interventions that can optimize the uses of onion, including the processing of its leaves and shallots, the Bureau of Agricultural Research (BAR) led a

meeting with project implementers. The meeting also looked into the possibility of developing a technology that instead of seeds, onion tubers will be used as planting materials that could be harvested after two months. This allows farmers to harvest as much as three to four times per year.

The first step taken was to have the onion leaves submitted by DA-Regional Field Office 3 analyzed for pesticide residues upon the concern of the heavy use of pesticide during onion crop production. The Bureau of Plant Industry-Pesticide Analytical Laboratory Section (BPI-

PALS) conducted a chemical analysis for *Chlorpyrifos*, pesticide active ingredient. The result of the analysis obtained by Gas Liquid Chromatography showed that the sample submitted was lower than the Limit of Quantification (LOQ) to *Chlorpyrifos* (>0.01 mg/kg). Analysis showed that the sample submitted was negative to *Chlorpyrifos*, the active ingredient of the pesticide used.

BAR, as the research and coordinating agency of the Department of

Agriculture, recently funded three projects on onion. These include: 1) Development and Promotion of Cost-Effective Seed Production Technology for Onion, 2) Development of Products from Onion Leaves towards Increased Farmers' Income, and 3) Increasing Farmers' Income through the Utilization of Waste Onion. The first two projects will be led by the Central Luzon State University (CLSU) while the last project will be implemented by the University of the Philippines Los Baños (UPLB).

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discussed the use of local honey and irradiation technology in the development of wound dressing materials. Ms. De Guzman's research is being implemented by the DOST based on a partnership of DOST-PNRI and DA-BAR.

With the massive turnout of interested participants in BAR's previous seminars on mushroom production, the bureau once again invited Dr. Emily Soriano of the DA-Regional Field Office 3 to discuss ***Mushroom: Value Chain Analysis***. She described the various types of mushroom produced in the Philippines and presented data from the Food and Agriculture Organization of the United Nations showing the global

trend of countries increasing their respective production of mushroom but which, unfortunately, also shows the Philippines as not following the trend and instead is decreasing in its total mushroom production. To help address this trend, she conducted a value chain analysis of mushroom production in Central Luzon, from input provision to the end-market, pointing out the various stakeholders involved at each stage, problems encountered, and possible interventions. She also discussed the established practices of local mushroom producers that can be of good use to those considering putting up their own mushroom-based businesses.

The seminar series was

concluded by Engr. Roger Bagaforo of the DA-Regional Field Office 9 with a seminar talk on the ***Evolution of Rubber Propagation Technology***. He compared the efficiency of propagation techniques, such as brown and green budding, that are used to grow seedlings in rubber plant nurseries. He mentioned the use of root trainer cups that make it faster for a seedling to become mature enough for transplanting. These plastic containers have vertical ridges in the inner wall that hasten the growth of healthy roots and can be recycled up to 10 years making their use more environmentally-sustainable than that of conventional polyethylene bags. ### (Victoriano B. Guiam and Ephraim John J. Gestupa)

BANANA STALK, WATER LILY studied for animal feeds and fiber

Six institutions, led by the Bureau of Agricultural Research (BAR), Philippine Carabao Center (PCC), Philippine Fiber Industry Development Authority (PhilFIDA), University of the Philippines Los Baños (UPLB), University of Southern Mindanao (USM), and Pampanga State Agricultural University (PSAU), convened to assess the progress of a BAR-funded project, "Utilization of Banana Stalks and Water Lily as Feed and Fiber," on 14-15 August 2017 at PCC, Science City of Muñoz in Nueva Ecija.

The project was implemented in response to the directives of Agriculture Secretary Emmanuel Piñol to conduct studies on the utilization of dehydrated banana stalks and water lily as extender feeds for small and large ruminants to be mixed with traditional and commercial feed ingredients, and as source of fiber.

Dr. Arnel del Barrio, PCC executive director, delivered a welcome remarks acknowledging the efforts of all those who are involved in the project.

Initial reports of the project were presented by Dr. Norman de Jesus of PSAU; Dr. Geoffray Atok and Dr. Julius Jerome Ele of USM; Dr. Daniel Aquino of PCC; Dr. Amado Angeles of UPLB; and Engr. Cristina Panganiban of PhilFIDA. The efforts of PCC and UPLB focused on feeding lactating buffaloes and dairy cattle with banana stalks and water lily, respectively; while PSAU and USM are focused on goats; and PhilFIDA on banana fiber.

The project covers the studies on the volume and availability of banana stalks and water lily and their utilization as feed ingredients for small and large ruminants, and experiments on nutritive and feeding value, digestibility and performance of animals using banana by-products and water lily, as well as the situational study on the potential use of banana stalks and water lily as source of fiber.

Serving as panel of evaluators were Dr. Enrico Supangco, dean of the College of Agriculture and Food

Science, UPLB; Mr. Joell Lales, chief of the BAR-Program Development Division (PDD); and Dr. Rhea Desalesa also from BAR-PDD. Meanwhile, Ms. Marnelie Subong and Ms. Angelie Sayno of the BAR-Program Monitoring and Evaluation Division served as review coordinators and facilitators.

As a measure to meet the specifications for feed formulation, PCC and UPLB conducted the initial proximate analyses for dehydrated banana stalk and water lily. These analyses show the moisture, crude protein, crude fibre, crude ash, and nitrogen-free extract content of the samples.

The team from UPLB conducted a simple and rapid preferential study to check whether the feeds will be acceptable to the calves. Feeds given to the test animals were combined with salt and molasses. Results showed animals consumed water lily in whole form. Test animals consumed more banana stalks especially when added with molasses.

PCC initially produced 40 mixed rations silages (20 bags banana and 20 bags water lily with 5kg capacity) for growing and lactating buffaloes with 25 percent and 50 percent banana stalk and water lily content, respectively. The fermented total mixed ration (TMR) has 16 percent crude protein content. Other ingredients include copra meal, rice bran, biophos, salt, vitamin-mineral mix, urea, molasses, and rice straw. The TMRs will be used in the feeding trials for buffaloes.

PSAU and USM conducted surveys and gathered data on the distribution and abundance of banana stalk and water lily in their respective areas. *Saba*, *Latundan*, and *Lakatan* are the common banana varieties grown in the provinces of Aurora, Bataan, and Pampanga. A survey on the prevalence of water lily was also conducted in Pampanga. In Mindanao, the production of *Lakatan* is high in Davao Oriental, *Cardaba* in Davao Occidental and Davao del Sur, and



Banana stalk feed formulation



Water lily feed formulation



Banana fiber

PHOTOS: PLESACA

Cavendish in Compostella Valley. The volume of *Cardaba* is high in Cotabato.

PhilFIDA identified the provinces of Isabela, Oriental Mindoro, Camarines Sur, Iloilo, Bukidnon, Davao del Norte, North Cotabato, and Maguindanao as having existing banana plantations as potential source of fiber. The provinces of Oriental Mindoro, Davao del Norte, and North Cotabato have already been validated. Of the provinces identified, Davao del Norte showed the highest production area for banana with 36,368 hectares, hence, potential for fiber.

As agreed, the group will validate the observations and recommendations that surfaced during the discussion. ### (Patrick Raymund A. Lesaca)

NTC HOLDS FINAL DELIBERATION for the 2017 Gawad Saka Search for OAS, OAR



The National Technical Committee (NTC) convened on 22-25 August 2017 in Los Baños, Laguna for the final deliberation of the shortlisted nominees vying for the 2017 Gawad Saka Search for Outstanding Agricultural Scientist (OAS) and Researcher (OAR). The activity aimed for the NTC to integrate the results from the desk evaluation held in June and the month-long field validation conducted from July to August, and to recommend the finalist who will qualify for endorsement to the Board of Judges (BOJ).

Coordinated by the Bureau of Agricultural Research (BAR) through the Institutional Development Division, the Gawad Saka Search for OAS and OAR is an activity of the Department of Agriculture (DA) being conducted yearly to recognize the outstanding scientists and researchers who have contributed to the overall growth of the agriculture and fisheries sector.

Composed of experts in agriculture- and fisheries-related fields, this year's NTC for OAS are

Chairperson: Dr. Nicomedes Eleazar (BAR); Vice Chairperson: Dr. Teodoro Solsoloy (BAR); Members: Ms. Digna Sandoval (BAR), Dr. Roberto Rañola, Jr. (University of the Philippines Los Baños), Dr. Edralina Serrano (UPLB), and Dr. Jonar Yago (Nueva Vizcaya State University).

Meanwhile, this year's NTC for OAR are Chairperson: Dr. Nicomedes Eleazar (BAR); Vice Chairperson: Dr. Teodoro Solsoloy (BAR); Members: Ms. Digna Sandoval (BAR), Dr. Enrico Supangco (UPLB), Dr. Jose Hernandez (UPLB), Dr. Elda Esguerra (UPLB), and Dr. Mudjekeewis Santos (National Fisheries Research and Development Institute).

The desk evaluation held in June of this year sought to evaluate the nominees' works based on the quality of scientific/research works; and their productivity in terms of new knowledge and number of significant technologies developed, research projects conducted, research grants generated, and presentations in

symposia/fora, among others.

The month-long field validation conducted from July to August verified the accuracy of information of the nominees' works in the field level. In this stage, the evaluators looked into the creativity of the nominees, considered the originality of their scientific/research works and methods, and assessed the impact of new knowledge generated from research.

For the OAS, Dr. Olivia Damasco of UPLB, Dr. Marissa Romero of the Philippine Rice Research Institute, Dr. Felix Salas of the Visayas State University, and Dr. Emma Sales of the University of Southern Mindanao made it to the list of shortlisted nominees. Meanwhile, the shortlisted nominees for the OAR included: Dr. Arthur Dayrit of the DA-Regional Field Office (DA-RFO) 3; Dr. Merlina Juruen of the Provincial Agriculture Office-Davao del Norte; and Dr. Berly F. Tatoy of the DA-RFO 10. ### (Anne Camille B. Brion)

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The three projects will cover the development of cost-effective seed production technologies for onion; development of package of technologies for the processing of onion leaves into different products such as powdered onion leaves, dried onion leaves, vacuum-packed onion leaves, extraction of bio-actives for health purposes, etc.; and development of onion carbonizer, briquette, and biochar out of onion leaves.

Furthermore, UPLB's study aims to characterize and monitor the composition of waste onion leaves as potential raw material for food and other high-value products. This would be able to respond to the Secretary's instruction to look into the potential of dehydrated onion leaves as a condiment in *arroz caldo*, *mami*, and as a spice in Oriental dishes. ### (Ma. Eloisa H. Aquino)

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Seaweed Farming

Seaweed farming is presently the most productive form of livelihood among the coastal communities in the southwestern part of the Philippines. Throughout the world, seaweed is harvested as a food source as well as an export commodity for the production of agar and carrageenan products. This course focuses on the *Eucheuma* sp. and the *Kappaphycus* sp. These are essential sources of carrageenan. Seaweed export is the country's third dollar earner after tuna and shrimp. At present, the Philippines ranks third next to China and Korea in the world market in seaweed export.

Seaweed farming only requires low capital investment and short culture period, and yet the profit is high. Also, the size of individual farms are small - even less than 0.25ha to 1.0ha. Because of these favorable conditions, seaweed farming is continually expanding and attracting coastal communities to invest in it. As a complimentary source of livelihood for coastal communities, it can reduce pressure in the fishing grounds as well as reduce the illegal use of toxic chemicals such as cyanide in fishing.

Course Objectives
At the end of the course, you shall be able to:

1. identify the considerations in selecting the site suitable for seaweed farming;
2. enumerate the materials needed for seaweed farming;
3. describe what to consider in the preparation, care and
4. differentiate the culture methods.

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Module 1 - Considerations for Site Selection
Module 2 - Required Materials and Tools

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BAR, ATI's e-learning on SEAWEED FARMING produces 68 graduates

The five-module course on seaweed farming, developed by the Bureau of Agricultural Research (BAR), as part of its contribution and participation to the e-Extension Program for Agriculture and Fisheries of the Agricultural Training Institute (ATI), has produced 68 graduates out of the 76 enrollees for the first semester of 2017. This was based on a report sent by ATI to BAR on 3 August 2017.

The seaweed farming module is a practical approach on the different aspects of improved seaweed farming including site selection, preparation, transport, seedling maintenance, harvesting, postharvest handling, and packaging of the seaweeds. It is part of the 54 e-learning courses that are being offered by ATI as part of its e-Learning for Agriculture and Fisheries, a major

component of the e-Extension Program for Agriculture and Fisheries of the Department of Agriculture.

"Since the e-Extension Program started, ATI is very grateful to BAR for actively sharing its technical expertise in the development of e-Learning course on seaweed farming," said Dr. Luz A. Taposok, director of ATI.

These e-Learning courses are certificate courses on farming and fishing technologies on crops, livestock and poultry, marine and fisheries, social technologies and sustainable agriculture. Majority of these courses were developed in collaboration with research

and development institutions, state universities, among others.

The courses are offered in three ways: 1) *online*, with the use of internet; 2) *offline*, specially offered in areas without internet connectivity through the ATI's e-Extension Offices; or 3) *blended*, a combination of online and hands-on learning exercises which are done with face-to-face interaction.

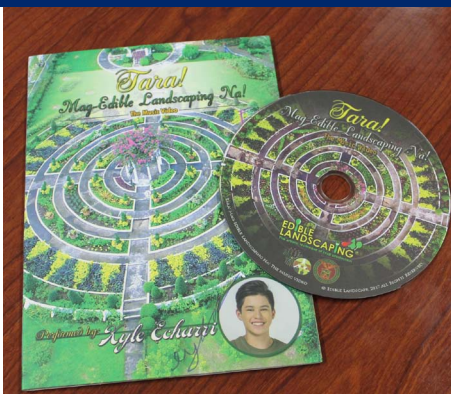
At present, the ATI is offering 30 online courses as well as free digital learning resources which are available in downloadable and web-based format.

From 2008 to 2017, the e-learning on seaweed farming has 586 enrollees and 484 graduates. #### (Rita T. dela Cruz)

EDIBLE LANDSCAPING music video launched



EL project leader, UPLB Chancellor Fernando Sanchez Jr. (3rd from left); and BAR-TCD Head Anthony Obligado (2nd from left) with UPLB-EL and BAR-TCD team during the launching of the EL music video. PHOTOS COURTESY OF MEQUINO



To capture the greater interest of the public on edible landscaping (EL) and further promote its potential, particularly in bringing this technology to those who wish to do it on their own, the University of the Philippines Los Baños (UPLB) launched the EL Music Video on 26 August 2017 in Quezon City.

Funded by the Bureau of Agricultural Research (BAR), the launching of the music video is part of the various promotional strategies that the project is employing

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Terminal review of BAR-SEARCA-UPLB project conducted



PHOTO: PLESACA

The terminal review is attended by proponents from UPLB's College of Economics and Management to present the significant findings for each component of the project.

A terminal review of the project, “Strengthening Agricultural Research and Development towards ASEAN Integration,” was conducted on 22 August 2017 at BAR. The project was funded by the Bureau of Agricultural Research (BAR), in collaboration with the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA).

In attendance were project proponents, led by Dr. Prudenciano Gordoncillo of the College of Economics and Management-University of the Philippines Los Baños (CEM-UPLB). Joining him were Dr.

Imelda Molina, Dr. Jim Mariano, and Dr. Vic Rodulfo, Jr. all from UPLB.

As presented by Dr. Gordoncillo, project leader, the research study’s aim is to find out how to strengthen the capacities of R&D institutions in the Philippines with specific emphasis on the implications of ASEAN integration. In a brief presentation, he said that the project is anchored on benchmarking agricultural research and development (ARD) activities in the country relative to ARD practices in the ASEAN region and to assess partnership among government agencies and state universities and colleges.

Also present in the review were project proponents from UPLB-CEM. Among them were Dr. Imelda Molina, who presented the “Capability Assessment” and the “State-of-the-Art” components of the project; Dr. Jim Mariano who shared what has been accomplished under “Capability Building” component; and Dr. Vic Rodulfo, Jr. who highlighted the activities undertaken during the benchmarking studies of the ASEAN region.

The proponents have endorsed several policy recommendations that will strengthen agricultural research and development. These include: a) proactive human resource development program; b) link the impact of research undertaking not only towards the development of agricultural sector, but also in strengthening regional trade in the ASEAN region; and c) promote strategic partnerships among the academe, research institutions, and the private sector; among others.

Ms. Salvacion Ritual, head of the BAR-Program Monitoring and Evaluation Division (PMED) facilitated the review and was assisted by Mr. Juan Nikolas Paller also from BAR-PMED. ### (*Patrick Raymund A. Lesaca*)

to commercialize EL and to bring it closer to the users/adapters.

EL is an innovative approach to creating attractive and functional spaces while producing safe and nutritious food including fruits, herbs, and medicinal plants instead of the usual ornamental plants which are used mainly for its aesthetic value.

Conceptualized by the EL Team, the music video titled, “*Tara! Mag Edible Landscaping Na!*” was performed by Mr. Kyle John P. Echarr, a talent first introduced during The Voice Kids competition. Music and lyrics are by Joscha Emmanuel A. Dadap, Von Jelmar P. Herbosa, and Maria Charito E. Balladares.

Dr. Fernando Sanchez, Jr., UPLB Chancellor and project leader,

in his message said that, “we know that practice and implementation of edible landscaping, goes way beyond achieving a simple and elegant way of embellishing or enhancing one’s surroundings—it is really also an excellent way to potentially address our country’s food and nutrition security needs.”

“Through the universal language that is music, we hope that this medium shall further reach, encourage, and bring together as many people as possible to the wonders and benefits of establishing their very own edible landscape at home, at school, or in public places like parks, as well as government buildings and more and more Filipinos shall join and start the edible landscaping revolution,” Dr.

Sanchez added

Also, in attendance were staff members of the BAR-Technology Commercialization Division led by its head, Mr. Anthony B. Obligado.

BAR started supporting the EL project in 2010. In the Philippines, the term edible landscaping was first used during the conference of the Society for the Advancement of the Vegetable Industry held at the UPLB Seniors’ Social Garden in 1999. It was used to describe the exhibit booth built by the late, Dr. Leonido R. Naranja, who served as the first project leader then. The exhibit booth was embellished and garnished with vegetable plants which somewhat are likened to presentations during garden shows. ### (*Ma. Eloisa H. Aquino*)



BAR-Administrative Division Head and NTCP technical staff, Ms. Evelyn Juanillo, delivers the message of BAR Director Nicomedes Eleazar for the training activity. PHOTO: BCADAYONG

SEARCA, BAR conduct financial viability training

To equip research personnel of various academic and research institutions with knowledge and skills in conducting financial viability and profitability analysis of new technologies and enterprises, the Bureau of Agricultural Research (BAR) and the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) conducted a training on “Financial Viability and Profitability Analysis of New Technologies and Enterprises under the High Value Crops Development Program (HVCDP)” at the SEARCA Headquarters, College, Los Baños, Laguna.

The three batches of trainings concluded with 52 participants from Department of Agriculture (DA) staff bureaus, regional field offices (RFOs), state universities and colleges (SUCs), local government units (LGUs), and people’s organizations (POs) who underwent and completed the training.

The training course combined classroom lectures/discussions and laboratory exercises. It also taught the participants the use of computer applications on the various analytical tools used in evaluating the profitability/financial viability of new production, postharvest, and processing technologies as well as enterprises.

Serving as the resource persons during the training were faculty from the College of Economics and Management (CEM) of the University of the Philippines Los

Baños (UPLB): Dr. Corazon Aragon, retired professor; Dr. Cesar Quicoy, associate professor; Dr. Antonio Jesus Quillooy, assistant professor; and Prof. Bates Bathan, former assistant professor.

Representing BAR Director Nicomedes P. Eleazar was Ms. Evelyn Juanillo, head of BAR’s Administrative Division. She underscored the objective of the activity. “As we have developed the first volume of the ‘Financial Viability and Profitability Analysis of Various Commodities’ in the past, we seek to be able to come up with succeeding volumes. As we go back to our respective agencies, I encourage you all to re-echo the information and knowledge to your colleagues as we look forward to submitted proposals

with economic indicators,” she said.

Furthermore, she hoped that through the training, it would create an encouraging impact to future investors presenting what the project, the specific commodity, or the product holds.

As defined in the ‘Financial Viability and Profitability Analysis of New Technologies and Enterprises Training Manual’, “Costs and returns analysis is the most common method of determining the profitability of different farm practices, technologies, business enterprises, or cropping patterns in a given accounting period; while the financial and sensitivity analysis rather than simple costs and returns analysis, is the most appropriate tool in determining the commercial profitability or financial viability of technologies for high-value crops, or investment projects/enterprises with long gestation period (i.e., those that generate a stream of costs and benefits).”

All participants performed actual exercises on cost and return analysis, break-even analysis, partial budgeting analysis, break-even budgeting, and financial and sensitivity analysis. Projects funded under the DA-HVCDP and being coordinated by the bureau under the National Technology Commercialization Program (NTCP) were subjected to analysis.

The training conducted this year served as the second leg of the activity that kicked-off in 2008. ###
(Bernalin P. Cadayong)

Financial and sensitivity analysis is the most appropriate tool in determining the commercial profitability or financial viability of technologies for high-value crops, or investment projects/enterprises with long gestation period.

Amazing Apali, the lesser yam with great potential

Story and photos by Rita T. dela Cruz

It is not as popular as potato, sweet potato, or yam but *Apali* (*Dioscorea esculenta*) is a lesser yam with great potential. *Apali*, as it is called in the South of the Philippines, is also known as *Tugi* among the Tagalog. It is a climate-resilient crop that can withstand adverse climatic conditions, particularly during long dry periods. It is high in dietary fiber, has longer shelf-life, and can be an alternative staple food source that can address food security issue in the country.

This lesser yam is native to Southeast Asia and is one of the first yam species that was cultivated. It is considered as an underutilized crop that is only remembered mostly during the long period of famine when people have nothing to eat. People would rely on *Apali* as it is always available. It can be stored for six months. It grows in rainfed or upland and marginal lands and can be grown as a backup crop during growing seasons of rice and corn.


Depending on the variety, the *Apali* plant can grow up to 50 cm long and can produce 5-20 tubers per plant. The stems are cylindrical, pubescent, with scattered prickles. Physically, *Apali* has a smaller corm than other yams, looking like a long and narrow sweet potato, but occasionally it can be a spindle or branched. Its flesh, which

is smooth and has no fibers, unlike most rootcrops, ranges from white to cream color.

Often served cooked either boiled or roasted, *Apali* is high in Vitamin C, dietary fiber, Vitamin B6, potassium, and manganese. It is low in saturated fat and sodium, and promotes good healthy balance in human body against osteoporosis and heart disease.

Apali is minimally cultivated in the country either due to lack of awareness of the crop or due to its unexplored economic potentials as fresh and processed foods.

Given the great potential of *Apali*, the Department of Agriculture-Regional Field Office (DA-RFO) 11 embarked on a three-year study titled, "Collection, Evaluation, and Identification of Apali Cultivars Suitable for Food Processing in Region XI". Funded by the Bureau of Agricultural Research (BAR), the study aimed to increase the supply of *Apali*, identify the best variety that has long shelf life and best for processing, and develop *Apali* package of technology that the farmers can easily adopt. With the increased supply of *Apali* production, DA-RFO 11 is also exploring the various product development initiatives that can be



Apali flour-based products won the "Best Products Award" in BAR's 13th National Technology Forum.

derived from the indigenous crop.

According to Ms. Jorgea C. Galindo, researcher from the DA-RFO 11 who is also the project leader, *Apali* can be found in the tropical forest in the Philippines and is considered as an indigenous rootcrop that can substitute rice and corn. It can be processed into various products including boiled, sweetened, jams, candies, and vegetable mixed or stewed with meat.

Due to its potato-like characteristics, *Apali* can also be sliced or diced, boiled, or fried like chips or fries. In fact, the DA-RFO 11 has recently come up with the *Pinoy* version of French fries using *Apali*. Dubbed as the *Apali Pinoy fries*, it was found to taste very similar with that of French fries in terms of texture and appearance. The taste was found to be acceptable among those who have tried it during trade fairs and

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Maize Silky Sip, *a healthy twist to an unusual drink*

Story by Daryl Lou A. Battad



Maize or corn silk (*Maydis stigma*) is a collection of fine, soft, fiber-like yellowish threads from the flower of the maize plant that is generally considered as a waste product.

However, this is no longer the case for the research team from the Cagayan Valley Research Center (CVRC) of the Department of Agriculture–Regional Field Office (DA-RFO) 2 in Ilagan, Isabela, as they continuously diversify the many uses of corn, this time, focusing on the silk.

The Cagayan Valley region is dubbed as the Philippines' corn capital being the country's top producer of corn. Together with other agricultural crops in the region such as rice, farmers rely heavily on corn for livelihood. With investments on research and development (R&D), CVRC, led by its Station Manager Rose Mary Aquino, explored the potentials of the maize silk in the hopes of adding more product value and at the same time increasing the income of corn farmers in the province.

"So far, ang dine-develop

namin ay coming from the grains of corn such as noodles and coffee, among others. Then we came to ask ourselves, ano ang pwede nating gawin sa waste?" Aquino shared. Such idea inspired her and her team to come up with a project to develop a product using silk.

Traditionally, maize silk is used for its diuretic properties, among others. Indigenous Western communities were known to have been using maize silk as remedy for urinary tract infections (UTI), and kidney and bladder infections.

In the medical world, diuretics are medications designed to increase the amount of water and salt expelled from the body in the form of urine. These medicines are often prescribed to help treat high blood pressure, as it reduces the amount of fluid in the blood vessels. Additionally, diuretics can aid in weight loss, too.

Other health claims of corn silk according to some studies include its ability to regulate blood sugar levels; a good source of Vitamin C; has anti-inflammatory properties; and facilitates blood clotting. In fact, a study on the phytochemical components and antioxidant activity of various extracts of corn silk demonstrated that it is rich in phytochemicals such as alkaloids, amino acids, carbohydrates, phenolic compounds, terpenoids, steroids, proteins and tannins, and has also exhibited high antioxidant properties.

Focusing on these health benefits, Ms. Aquino's team looked into utilizing the silk as a healthy juice drink, adding to the existing product line of corn called the *Mangi Maxi*. Derived from the words *Mangi*, an Ibanag term for corn, and *Maxi*, which means to maximize, *Mangi Maxi* offers a wide array of corn products such as coffee, noodles, and pastries to name a few.

With a brand name *Maize*

Silky Sip, this newest addition to the *Mangi Maxi* product line is a healthy juice drink made out of corn silk. Processed through boiling and fermentation, it is blended with lemon grass using honey as sweetener to make the taste more appealing especially to the health-conscious market.

The *Maize Silky Sip* is currently packaged in a 350-ml glass bottle and priced at Php 25. It was given third prize for "Best Product" category from the recently held 13th Agriculture and Fisheries Technology Forum and Product Exhibition organized by the Bureau of Agricultural Research (BAR) on 8-10 August 2017.

However, to further improve the packaging without compromising market competitiveness, the research team is now collaborating with the Department of Science and Technology (DOST) to analyze and establish its nutritional value and especially to determine appropriate natural preservatives that can prolong the shelf life of the product. Presently, a bottle of the *Maize Silky Sip* can last for up to five days.

Also, in collaboration with the National Nutrition Council of the Philippines, the research team is looking into the possibility of promoting the *Maize Silky Sip* safe for infant use, targeting those who suffer from pediatric UTI.

With funding support from BAR, under its National Technology Commercialization Program (NTCP), this product development project takes off from the existing projects on white and purple corn implemented by DA-RFO 2.

"For now, we are undergoing field trials to establish when is the best stage to gather the silk of the maize plant, without affecting the grains," said Ms. Aquino. Her team is

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Leyte farmers benefit from abaca multi-stranded yarning machine

Story by Leoveliza C. Fontanil

Abaca fiber is one of the most high-valued commodities and products grown in the Philippines due to its high demand both in local and foreign markets. The Philippines is among the world's top and largest producer of abaca fiber and by-products. It is the strongest among the existing natural fibers and is primarily used as a raw material for pulp and paper, fiber craft, cordage, among others. With its wide range of uses, abaca has rapidly grown into an industry providing opportunities for livelihood and as additional income to abaca farmers and processors.

The Philippines Abaca Market Forecast and Opportunities reported that the abaca market is projected to grow at a compound annual growth rate (CAGR) of around 5.7 percent until 2019. Given this, there will be a continuous demand for abaca and its by-products for the future years, thereby the need to increase production to cater to the local and international markets.

Fabricating abaca machine

The National Abaca Research

also set to establish data on the silk's storability, and to determine the best corn variety to use for the *Maize Silky Sip*.

"We are hoping that one day, this product can compete with the highly commercialized natural fruit juices available in the market. Not only does the *Maize Silky Sip* juice promote our local corn industry, but more importantly, it will help uplift the lives of our corn farmers," Ms. Aquino added.

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Center (NARC) based at the Visayas State University (VSU), Baybay City in Leyte, one of the agencies mandated to uplift the abaca industry, has developed a multi-stranded yarning machine for the production of abaca yarn. This is to replace the tedious, time-consuming, and knotting method of *tinagak*-making. Support is being provided by the High Value Crops Development Program (HVCDP) and the Bureau of Agricultural Research (BAR) through its National Technology Commercialization Program (NTCP).

According to Dr. Feliciano G. Sinon, NARC-VSU project leader, in traditional scenario, the conventional production of small twines for abaca handicraft is done by knotting individual fiber, combining the yarns, and twisting them into filaments to produce twine. This process is slow and labor intensive. Moreover, the traditional making of twine is a laborious work since the operator has to walk back and forth in setting the twisting end and in laying operation. Thus, NARC embarked on a project titled, "Development of a Twining Machine for the Production of 1-5 mm diameter Abaca Twine," that aimed to develop a twining machine for fast production of abaca twine from multi-stranded and untwisted abaca yarn, and mainly to bring abaca machine generated technology to its adaptors and possible end-users.

Considered more economical than the traditional technique, the machine can produce 1.5 kg per day of multi-stranded yarn as compared to 1.0 kg of yarn per week using the knotting method. Twining capacity of the machine can produce good quality



PHOTO COURTESY OF FSINON/NARC-VSU

Members of the SAHA group engage in abaca handicraft production with assistance from NARC-VSU.

1mm diameter twine at 200 m/hr, wherein the twine made from *tinagak* yarn using the machine was very smooth and has no protruding fiber ends.

Dr. Sinon pointed out that, the fabrication of the prototype twine machine was subjected to a series of different evaluation for its operational functionality. As a result, the machine has good acceptability ratings to end-users. Piloting activity of twining machine was tested, and many of the abaca handi-crafters in the community said that, "the twine machine is very useful for handicraft making, easy and simple to operate." They also mentioned that the community could have one unit in the future, and end the manual twine making.

The cost and return analysis of the machine amounts to Php 45,000 with the net income of about Php 129/day with a payback period of 1.71 years and a return on investment as high as 58.35 percent.

Currently, two units of the

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machine were already sold to abaca cooperatives such as Maharlika Abaca Growers Association of Magara, Roxas, Palawan and Sibugay, Zamboanga City for their handicraft production and expansion.

SAHA engages back into business

Seeing the importance of machine developed to the abaca processors and to other possible-end users, the project aimed to establish a village-level abaca yarn production and abaca by-products processing enterprises. This provides greater chances to strengthen the production capability of handicraft-abaca makers to engage in agribusiness using the developed machine. Thus, to further pursue this goal, the project, "Pilot Production and Commercialization of Abaca Yarn, Twine, and its Derived Products in Region 8 Areas," was implemented by NARC-VSU.

The San Agustin Abaca Handi-crafters Association (SAHA) in San Agustin, Baybay City, Leyte, project collaborator of NARC-VSU, reorganized in 2015, capacitating their skills through training provided by NARC-VSU Team. Members of the association received learning skills on handicraft production, business-operational management, product marketing, and product development. The team also provided them technical assistance to develop both their leadership and organizational capabilities.

After the training in 2016, SAHA's business operation started producing abaca yarns and processed

abaca into new high-valued products. Aside from products made from *bacbac* like bags and coin purse, SAHA is now offering new products including twine balls, abaca decorative vases, macramé twine handbags, *sinamay* bags, and other abaca derived products using abaca yarns and twines out of the generated machine.

To have a centralized area for SAHA's business operation, a Handicraft Processing Center was also constructed by the project in the community. SAHA members are involved in all operational processes including purchasing of raw materials, making handicraft products, and delivery, among others. At present, four establishments in nearby locality of Baybay City, Leyte market their abaca products. These are: VSU Pasalubong Center; Baybay City Pasalubong Center; Laurente's Store; and VSU-NARC Display Room.

SAHA also developed good business strategy wherein business operation and management scheme have been stabilized by the members to continue and enhance the production of their newly-developed products. Thus, the association provided the raw materials to the members and they in turn encouraged selling their products directly to the association where they are paid in cash. The percentage of the income goes to the association for additional budget for its continuous operation.

Dr. Sinon shared that the biggest benefit of the project was not only to provide abaca handi-crafters with additional knowledge on making abaca products for their income

opportunities, but also to improve teaching capabilities by sharing their acquired knowledge through training. SAHA members continuously involved themselves from trainees to trainors, and recently they were tapped as resource persons in various handicraft trainings within Visayas and Mindanao. ###

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exhibits.

The project also enabled DA-RFO 11 to produce *Apali* flour and various *Apali* flour-based products including cookies, crinkles, and munchkins. These products won the "Best Products Award" during the recently concluded 13th Agriculture and Fisheries Technology Forum and Product Exhibition organized by BAR. The award is annually given to product of research and development that is unique, has an appropriate packaging and labeling, possesses market potential, and is relevant to achieving food security and health and wellness. ###

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