

done since the existing macadamia trees are bearing continuously.

Benefits and uses

Based on the investment analysis prepared by the project proponent for a one-hectare macadamia orchard, assuming that the initial capital is Php 205,000, positive returns could be realized in the 6th year with projected gross margin of Php 591,800 from the 10th year onwards, or a return on investment of 200 percent.

Considering further that macadamia production has a relatively low input requirement, it could be promoted as a cash crop for small farmers, and a potential crop in areas with inadequate irrigation systems or rainfall due to its relative tolerance to drought. In fact, macadamia plantings were also reported in Ilocos region which is a relatively dry area.

Macadamia nuts are rich sources of energy. The nuts provide close to 718 calories/100 gram which is one of the highest calorific values for food seeds and kernels. Since macadamia is free from gluten protein, it is one of the ingredients preferred for gluten-free food formula preparations. Such preparations are healthier alternatives for patients with wheat gluten allergy or celiac disease. It is also considered a healthy food product as it keeps blood cholesterol levels in check.

Macadamias are also excellent sources of minerals such as calcium, iron, magnesium, manganese, and zinc. Furthermore, the nuts are rich in many important B-complex vitamins that are vital for metabolic functions.

One hundred grams (100g) of nuts can provide 15 percent of the average person's niacin requirement, 21

percent of pyridoxine (vitamin B-6), 100 percent of thiamin, and 12 percent of riboflavin. They also contain small amounts of vitamins A and E. These fat-soluble vitamins are potent antioxidants and help protect cell membranes and DNA damage from harmful oxygen-free radicals.

The crop is used as an ingredient for various confectionery products. Whole kernels are roasted and salted, and sold in jars/cans which are usually found in 'gourmet sections' of markets. As a dessert, it can be eaten raw, fried, or roasted and salted. The oil can be extracted and used in salads and in cooking, and also finds use as a lubricant and in the manufacture of cosmetics.

Macadamia is a genus of four species of trees indigenous to Australia that constitutes part of the plant family, *Proteaceae*. They are native to northeastern New South Wales and to central and southeastern Queensland. Australia contributes more than 30 percent of the global crop. Each year, 70 percent of the Australian crop is exported to over 40 countries. The macadamia is the only native Australian crop that has ever been developed and traded internationally as a commercial food product.

The project has verified the adaptability of the macadamia tree to Baguio City conditions, taking into consideration the macadamia trees in the experimental station that have matured. Macadamia has the potential for commercial production, either as a cash crop or as a component of agroforestry

systems. The introduction of macadamia into the existing production systems will enhance food production and biodiversity and industry development from its products and by-products.

For future R&D endeavors, the proponent is proposing to establish demonstration farms in other parts of Baguio City and in the provinces of Mountain Province (in Sagada), Benguet, and also Ilocos Norte.

The project on macadamia conservation, propagation, and commercialization in Luzon is funded and supported under the National Technology Commercialization Program of DA-BAR. ###

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BAR HIGHLIGHTS 10 YEARS of agri-fishery R&D in publication

Over the years, the Bureau of Agricultural Research (BAR) of the Department of Agriculture (DA) has supported research and development (R&D) initiatives that generated technologies and initiated interventions, benefitting the lives of the country's farmers and fisherfolk. Farms, especially in the rural areas, continue to reap the fruits of increased production and improved productivity through these technology-based interventions.

To disseminate information on these technologies to its stakeholders, particularly of what has been done in R&D during the last decade, BAR and its partners came up with "A Decade of Success: A Compendium of Agriculture and Fisheries R&D Projects Supported by the Bureau of Agricultural Research from 2005-2014." The compendium serves as a 10-year portfolio featuring BAR-supported projects implemented by its partners from the DA-Regional Field Offices (RFOs), Bureau of Fisheries and Aquatic Resources (BFAR) Regional Offices, and state universities and colleges (SUCs) towards improving the agri-fishery sector.

According to BAR Director, Dr. Nicomedes P. Eleazar, "As the material allows for quick reference and easier information retrieval, we are likewise providing ready-to-access information on technologies generated in R&D that will cater to the technology needs of the farmers, fisherfolk, research institutions, policy makers, entrepreneurs, academe, organizations, and other interest groups."

The compendium is composed of 17 volumes of

published material - of which 16 volumes highlight researches accomplished by the regions, while the remaining volume features the researches done by the bureau's partner SUCs. The books summarize a decade of R&D efforts with concise information including project summaries, technology description and application, as well as the

Ariel T. Cayanan and representatives from different DA regional offices and SUCs, formally launched the compendium during the closing ceremonies of the 28th National Research Symposium held at the Bureau of Soils and Water Management Convention Hall in Quezon City. ### (Ephraim John J. Gestupa)



The R&D compendium features agriculture and fisheries R&D projects implemented by the DA-RFOs, BFAR, and SUCs that were given support by the Bureau of Agricultural Research from 2005 to 2014. PHOTOS:BAR

intended beneficiaries.

The consolidation and packaging of information to produce the compendium was funded under BAR's Scientific Publication Grant (SPG) that aims to support initiatives on technology promotion and dissemination through print media with grants for the preparation and printing of research-based publications.

On 27 October 2016, BAR, in the presence of DA Undersecretary

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PHILIPPINES

BAR reviews accomplishments, sets plans for 2017

To review what had been achieved in 2016 and to devise strategic plans and set priorities that will help improve the Bureau for the year ahead, the Bureau of Agricultural Research (BAR) conducted its annual review and planning workshop on 17-18 January 2017.

In BAR Director Nicomedes P. Eleazar's message, he emphasized the importance of responding to the research and development (R&D) needs of the agri-fishery community, emerging issues of the sector, and current thrusts of the Department of Agriculture (DA). "With the change in administration, BAR has continued to perform and deliver by prioritizing commodities and programs, including priorities of the new administration, transitioning R&D accordingly."

In this regard, Director Eleazar mentioned the conduct of the Research and Development, and Extension Agenda and Programs (RDEAP) 2016-2022 prioritization workshop last December to align the goals of the Bureau with the current thrusts of the Department. In particular, the activity aimed to help BAR in prioritizing and evaluating R&D proposals in the next medium-

term, taking into consideration their potential contributions to the attainment of the DA's objectives of making food available and affordable, increasing the income of farmers and fisherfolk, and increasing agriculture's resilience to climate change risks.

Director Eleazar likewise recognized the major accomplishments of the Bureau in the past year. One of these was the compendium project that produced a compilation of BAR-supported regional RDE projects from 2005-2014 in book form. It provides ready-to-access information on technologies generated through R&D that will cater to the technology needs of the farmers, fisherfolk, research institutions, policy makers, state universities and colleges, entrepreneurs, students, and other stakeholders. With its institutionalization, the compendium will be updated every three years through the developed compendium database system.

Also in 2016, BAR continued to stage its major annual activities that included the holding of the 12th Agriculture and Fisheries Technology Forum and Product Exhibition in August, the 28th National Research Symposium in October, and the 3rd National CPAR Congress in

November.

Under the Community-based Participatory Action Research (CPAR), one of BAR's banner programs, eight new and five on-going projects were funded for the year. Additionally, a community organizing workshop was conducted in July which was participated in by CPAR implementers. The workshop aimed to equip the implementers on how to further strengthen the implementation of the CPAR program through eliciting active participation and cooperation among farmer and fisher cooperators, and other stakeholders.

For the National Technology Commercialization Program (NTCP), another banner program of BAR, 18 projects were supported for commercialization, most of which were on high-value crops. Also, the Technology Commercialization on Wheels (TCoW) project was launched. TCoW is an initiative that aims to bring packages of technologies to the rural communities through the use of a mobile exhibit truck.

Under the R&D Facilities Development Program, another equally-important major program of the Bureau, 37 projects were supported through the Institutional Development Grant facility.

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Strengthening local MACADAMIA PRODUCTION in Luzon through R&D

Story and photo by Patrick Raymund A. Lesaca

develop appropriate nursery management technologies; produce quality planting materials; and promote production through the establishment of a demonstration orchard and the dissemination of information materials.

According to Mr. Jorge Disuanco, president and chief executive officer of MacNut Philippines, Inc., the planting of macadamia nuts in Mindanao and all over the Philippines is expected to, not only bring up the number of trees in the islands, but also improve the economy of the people (citing balita.ph/2010/09/15/macadamia-nuts-to-bring-more-trees-income-to-mindanaoans-feature/). Macadamias are the world's most nutritious nuts and the demand for them worldwide is high. With the low production cost in Mindanao and even the whole Philippines, it can be a very viable export business for the country. Macadamia nuts are in great demand in the food industry especially in the production of chocolates, gourmet biscuits, ice cream, and other snack products.

Propagating the macadamia nuts

Macadamia growing aims to consistently produce large crops of high quality kernels. Therefore, it is essential to have good basic knowledge of what governs quality plant material production.

Macadamias are easily grown from seed, but the seedlings may take 8-12 years to bear a crop and the quality of the nuts is unpredictable. Grafting is the most common method of producing new trees. Budding is also possible, as well as propagation from softwood cutting and air-layering. Macadamia may also be propagated through cuttings.

Rooting of cuttings is generally a less expensive operation than grafting for the varieties which root readily and grow well from cuttings. However, trees grown from

rooted cuttings take some time to develop an adequate root system and will need staking when young. Some grafted varieties of macadamias begin bearing within two years, while others take seven to eight years.

At the BPI experimental station in Baguio City, there are eight fully-grown macadamia trees that are about 15 years old and are already fruiting all year round. The trees show good promise of locally-grown macadamia for commercial production.

Project progress

The project has on-going verification trials on germination, grafting techniques, and use of cuttings for propagation in the station. Researchers are experimenting on several nursery management technologies using different potting media and soil additives. About 500 cuttings that were set under intermittent mist are now in the callous stage which will eventually produce roots. A total of 150 seedlings were asexually propagated and are being maintained through regular watering, fertilizer application, and pest and disease management.

The existing trees in the station are being maintained as sources of scions for grafting of seedlings and cuttings for propagation. The harvested nuts are used for seedling production.

The researchers pointed out that, for the target of 1,500 quality planting materials of macadamia, a total of 1,007 seedlings (seedlings, grafted plants, and cuttings) have already been produced. Majority are seedlings which will still be grafted. Grafting is performed whenever there are seedlings available and scion branches are ready for use in propagation.

In addition, 437 macadamia nuts that were sown are now starting to germinate. The harvesting of macadamia nuts is continuously being

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This publication provides regular updates on DA-BAR's activities as the country's national coordinator for agriculture and fisheries R&D. It also highlights features and news articles concerning NaRDSAF-member institutions.

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Mr. Danilo Guinto (left), president of CVIFA; and Mrs. Lorelie Valdez (right), owner of RLG Fruit Wines are among those who benefitted from the fruit winemaking project.



Guinto as its president, CVIFA is comprised of mango farmers and women of Libag Sur. The group was formed due to their common interest of engaging in winemaking as they do not want to suffer losses in their mango farming again. The group is grateful that the ISU invited them to attend a winemaking training and be part of the project. They were given hope that all need not be lost in mango farming.

The group, in their first attempt, was able to produce 2,000 bottles of various kinds of fruit wines such as mango, native guava, wild watermelon, pineapple, bignay, banana, guyabano, avocado, and mulberry. The group was also able to forge a partnership with LGU-Tuguegarao City for financial and in-kind assistance. CVIFA is still new in running the business, but

because of their linkage with other stakeholders, they were able to place their products in several *pasalubong* centers in Tuguegarao City.

Another project cooperater is Ms. Lorelie Valdez, owner of RLG Fruit Wines. She ventured to winemaking due to her husband's medical condition. It is known that wine has therapeutic properties as it contains polyphenols and other bioactive compounds that are antioxidant and antimicrobial. According to a number of scientific studies, moderate wine drinking protects against cardiovascular diseases, dietary cancers, ischemic stroke, peripheral vascular disease, diabetes, hypertension, peptic ulcers, kidney stones, and macular degeneration, among others.

The hobby became a business opportunity because of the persuasion

of family and friends who have tasted her homemade wine. Since she started the business in 2010, RLG Fruit Wines now has a captive market in Isabela. Its wines are distributed to a number of supermarkets and other market outlets in Isabela and neighboring provinces.

Ms. Valdez is thankful to ISU for making her part of the project as it introduced her to winemaking instruments such as pulper, juicer, filler and filter machines which make her processing less laborious, and likewise further improve the quality of her wine.

Being in a place blessed with a variety and abundance of fruit species, it is not surprising that different kinds of fruit wines are finding their niches in the market. With institutions such as ISU that contribute to the development of the local fruit wine industry, it is only a matter of time before the rest of the world will have a taste of Filipino fruit wines. ###

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“This two-year project aims to refine and standardize the package of technologies for local wine processing, and empower the people's organizations through enhancement of their capacity in winemaking.”

Dr. Laidan of DOST Region 12 orients BAR on Halal

To orient its staff on the observation of Halal in food preparation, the Bureau of Agricultural Research (BAR) conducted a seminar at BAR on 23 January 2017 on the distinctive characteristics of this religious practice.

An Arabic word, Halal pertains to all things that are permissible in Islam. Haram, on the other hand, are all those ingredients, food, and beverages that are totally prohibited in Islam.

Serving as resource speaker was Dr. Hadja Sittie Shayma Zenaida P. Hadji Raof Laidan, regional director of the Department of Science and Technology (DOST)-South Central Mindanao. An active advocate of Halal Science, Dr. Laidan is one of the prime movers of Halal development in the country.

BAR Director Nicomedes P. Eleazar led selected BAR staff in participating in the said activity. In his message, he thanked Dr. Laidan's favorable response to the Bureau's invitation. “We look forward to future collaborative projects, particularly on the development of Halal products under one of the Bureau's programs, the National Technology Commercialization Program, to assist our R&D partners in the development of products for domestic consumption and, eventually, enable our food entrepreneurs to export these commodities. Starting this year, we are also planning to implement Halal research and development activities in relation to the Technology Business Incubator program of the



Dr. Hadja Sittie Shayma Zenaida P. Hadji Raof Laidan, regional director of DOST-South Central Mindanao, introduces the concept of Halal to BAR. PHOTO: EIGESTUPA

Bureau,” Dr. Eleazar said.

In turn, Dr. Laidan affirmed that she sees the importance of the activity as an effort to “promote awareness on Halal; impart basic principles and guidelines of Islamic Shariah law; and share how Islam's code of life relates to and affects the food and non-food industry.”

In her presentation, Dr. Laidan provided an overview on the practice of Halal, as well as the issues, concerns, challenges, and opportunities that the Philippine Halal industry has to address. One of the current concerns is the insufficient supply of raw materials in the county, thus, the need to increase domestic production of the ingredients and other inputs for Halal products. She added that the country also has an insufficient workforce, in particular, devout Muslims to manage and man a Halal firm.

Dr. Laidan suggested that, as a jumpstart activity for the Bureau, there should be: capacity-building trainings for technology generators to

be able to fully commercialize Halal products; documentation of Halal production management systems; and development of a devout Muslim manpower staff to handle Halal projects. Furthermore, she informed the group

of the availability of technical services at the Halal Laboratory housed at DOST Region 12 in Cotabato City. With state-of-the-art equipment and facilities, as well as advanced technology, the said facility now serves as a clearing house of Halal products in the country. To date, it has catered to local and even international clients.

As to the role of the Department of Agriculture (DA) in the implementation of Republic Act 10817, or the Philippine Halal Export Development and Promotion Law, the Department is one of the agencies mandated to “formulate and implement a national research, development and extension program to develop, propagate, or commercialize products and technologies and to improve and expand the number of Halal products, processes and services.” The Department will start the crafting of a Halal Roadmap to serve as a guide for the development of the Halal food industry that caters to, not only Muslims, but other consumers of Halal products as well. This document shall also provide timelines for the delivery of goods and services by the DA's Halal Food Industry Development Program (HFIDP).

BAR, as the lead coordinating agency for R&D activities of the DA, serves as a member of the DA-HFIDP Executive Committee and the DA-HFIDP Technical Working Group. ### (Ma. Eloisa H. Aquino)



As a token of appreciation, BAR Director Nicomedes Eleazar hands over BAR publications to Dr. Laidan. PHOTO: EIGESTUPA

BAR recognized as one of ATI's partners in agri extension



BAR received a plaque of appreciation from ATI during the Institute's 30th anniversary celebration. PHOTO:ACBRION

The Agricultural Training Institute (ATI) celebrated three decades of delivering leadership in extension services in agriculture and fisheries. With the theme, "Extending Excellent Extension Services beyond Boundaries", ATI held its 30th anniversary program on 26 January 2017 at the Rural Development and Education Center at the ATI Central Office. In attendance were guests from the Department of Agriculture (DA) agencies and other government offices including state universities and colleges, ATI alumni, stakeholders from the private sector including farmers and fisherfolk representatives, as well as ATI staff of the central office and regional centers.

Various partners in agricultural extension were recognized. The Bureau of Agricultural Research (BAR) was particularly cited for its contributions

to the success of the DA's Rice Crop Manager (RCM) project and the e-Extension Program for Agriculture and Fisheries, and for its role in capability-building for RDE practitioners.

BAR supported the RCM proposal developed by the DA with the International Rice Research Institute in 2015 involving the development of a comprehensive decision support tool that provides farmers with personalized advice, through computers and mobile phones, on crop protection from major pests and on crop management in the

growing season, thus increasing the potential for higher yields and income.

Over the years, BAR and ATI have cooperated in each other's initiatives. Recently, BAR partnered with ATI in developing online courses in the e-Learning component of the e-Extension Program. It has also been instrumental in funding an ATI-led project for the training of agricultural development and extension officers of the community or "AgRiDOCs". Conversely, ATI has provided training services and other inputs in the regional implementation of BAR's Community-based Participatory Action Research (CPAR) program.

Since ATI's founding on January 1987 under Executive Order No. 116 under then President Corazon Aquino, the Institute has aimed to further its training and

education programs, scholarship grants, support for insurance, climate resiliency-related activities, and others. It has targeted agricultural extension workers, farmers, fishers, rural-based organizations, rural women, youth, senior citizens, persons with disabilities, agriculture enthusiasts, and private groups.

The "ATI@30" celebration was a weeklong affair held on 23-27 January 2017 at the ATI compound. Activities included exhibits manned by 13 ATI regional training centers, the Learning and Discovery Center, and the ATIng Gulayan ng DA; the launching of six new publications which deal with ATI's experiences and accomplishments in working with the DA's stakeholders, on agritourism, and on strategic planning; and the issuance of ISO certificates to seven ATI training centers and loyalty awards to current and former ATI staff. ###
(Victoriano B. Guiam)

BAR reviews...from page 2

Meanwhile, through the Human Resource Development Program, five Degree Scholarship Program grantees, 85 Non-degree Scholarship Program grantees, and 12 new undergraduate scholars were given support for the year.

Accomplishments under each of the commodity R&D programs being handled by BAR, including other salient activities, were discussed in detail by the responsible division and unit heads. Administrative and budget utilization matters, as well as the DA's Special Area for Agricultural Development Program, were likewise presented in plenary sessions for everyone's guidance. ###
(Anne Camille B. Brion)



initiatives for advancing the wine industry in the country, particularly the fruit wine industry.

Wine, an alcoholic beverage made from fermented juice of grapes or any plant (i.e., fruits), is the oldest known fermented product of man. Evidence shows that, since ancient times, the practice of winemaking already existed. And through scientific breakthroughs, various winemaking techniques and technologies were developed and fine-tuned.

These winemaking techniques and technologies are what the Isabela State University (ISU) wants to adopt, refine, and standardize while taking into consideration the fruit substrate to be used and the existing production conditions that will allow commercial-scale production in Region 2 (Cagayan Valley).

With funding support from the Bureau of Agricultural Research (BAR), ISU-Cabagan, led by Dr. Raul B. Palaje, operationalized the project titled, "One Town, One Product Enterprise (OTOPE): Sustainable Fruit Wine Production and Commercialization in Cagayan Valley." This two-year project aims to refine and standardize the package of technologies for local wine processing, and empower the people's organizations (POs) through enhancement of their capacity in winemaking. The project is also the ISU's answer to the call by BAR to the wine stakeholders to strategize and come up with a cohesive plan on how to help the local winemakers upscale their products in terms of quality and competitiveness.

The team of Dr. Palaje assessed the status and needs of the local fruit wine industry in the region. As expected, there are already existing fruit-based wineries in the locality, with most of these wineries being either single proprietorship or village/organization-managed. They also noted that with research and development (R&D) support, these local wineries can be helped to further elevate their products through provision of technical assistance, skills development, improved marketing strategies and linkaging, and support to packaging, labeling, and equipment.

The OTOPE concept

OTOPE is similar to the OTOPE (One Town, One Product) concept of DTI which supports micro, small, and medium enterprises (MSMEs) through identifying, developing, and promoting a specific product or service for each locality. Instead of distinct products or services, the OTOPE of ISU focuses on fruit crops. According to Dr. Palaje, the key to move OTOPE forward is for local wineries in Region 2 to adopt a standard processing technology and packaging for all the wine products of the region. For this reason, trainings and wine technologies (e.g., winemaking equipment) support are two of the main interventions provided by the project.

Dr. Palaje is also gunning for the project to jumpstart the strengthening of the fruit wine industry in the region by encouraging every province to banner a specific fruit commodity that is abundant in their locality, and pour in investments to make for competitive wine and other fruit-based products enterprises.

As a start, consultations were done with the local government units (LGUs) of Isabela, Cagayan, Batanes, Nueva Vizcaya, and Quirino to assess and evaluate the existing local wineries in these provinces. Because of this, the ISU was able to identify and tap the participation in the project of three single proprietorship (SP) businesses and four women's organizations already engaged in wine production. These are: 1) Vulauan Ta Barangay (VTB) in Tumauni, Isabela, 2) Eastern Rural Improvement Club in Cagayan, Isabela, 3) Bickys Wine in Quezon, Isabela (SP), 4) RLG Fruit Wines in Alicia, Isabela (SP), 5) JBM Food Products in Cabatuan, Isabela (SP), 6) Integrated San Lorenzo Entrepreneurs in Lallo, Cagayan, and 7) Libag Sur Women's Group in Tuguegarao City. Other school institutions are also being assisted by ISU for their winemaking endeavors, namely: Batanes State College and Quirino State University.

This project also puts into the limelight the significant role of women in winemaking. It is not a coincidence that the identified groups are mostly women-led associations as women are the ones keener to engage in this kind of activities. Thus, the project provides intensive on-site training and coaching to these groups, not only for organizational development, but also for the empowerment of the women members.

In the long run, the project envisions organizing these local winemakers into a single federation.

Sweet living through winemaking

Aside from the seven local wineries, another group that is a cooperator and technology adopter of the project is the newly-formed Cagayan Valley Integrated Farmers Association (CVIFA). With Mr.

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Fruit winemaking in Cagayan Valley gets much needed boost

Story and photos by Diana Rose A. De Leon

Nagsimula kami magka-interes sa winemaking dahil sa hindi magandang karanasan ng mga mango farmers dito sa aming lugar. Two years ago, ang mga mangga ay binibili lang nang Php 5 per kilo. Halos 1/3 ng harvest namin ay napupunta lang sa waste kasi tinutusok ng kulisap ang mga bunga. Dahil dito ay bumaba talaga ang income ng mga mango farmers,” shared Mr. Danilo Guinto, a farmer from Libag Sur, Tuguegarao City, Cagayan.

The case of Mr. Guinto and the mango farmers of Tuguegarao City is not an isolated one. In the Philippines, fruit postharvest losses are, on the

average, put at 28 percent; a loss that eats away, not only at the income of the farmers, but at the country's bid to achieve agricultural growth and food security.

Using R&D for upscaling winemaking

Engaging in food processing is highly encouraged for farmers such as Mr. Guinto who primarily live off inherently perishable commodities such as fruits. As damage and spoilage are always expected to occur that can make fruit commodities undesirable for consumers' consumption, only

through processing can these fruits be prevented from turning into complete waste. Prolonging of the shelf-life of fruits, also through food processing, is likewise recommended as not all fresh fruits can be absorbed by the market and consumed in their fresh form.

Winemaking is one of the value-adding food processing activities that can be done with fruits to reduce postharvest losses. This is why the government, through the Department of Agriculture, Department of Trade and Industry (DTI), Department of Science and Technology, and other concerned agencies, is supportive of the

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Accomplishments of BAR-Bioversity project on banana presented in terminal review



Dr. Agustin B. Molina, Jr. (2nd from left) of Bioversity International-Asia and the Pacific Office presents what have been accomplished by the BAR-Bioversity project on banana. Present during the terminal review are Dr. Lorna Herradura of BPI-DNCRDPSC (left), BAR Assistant Director Teodoro Solsoloy (3rd from left), and Ms. Vida Sinohin (right) from Bioversity International. PHOTO:PRLESACA

Dr. Agustin B. Molina, Jr., honorary research fellow and acting regional coordinator of Bioversity International-Asia and the Pacific Office, presented the accomplishments of the Department of Agriculture-Bureau of Agricultural Research (DA-BAR)-funded and supported project titled, “Mitigating Banana Fusarium Wilt Tropical Race through a Farmer-Participatory Approach of Developing Disease Management Strategies,” during an in-house project terminal review conducted by BAR on 24 January 2017.

In his presentation, Dr. Molina, as the lead project proponent, talked about the Fusarium wilt disease of banana caused by *Fusarium oxysporum* f. *Sp. cubense* (Foc) Tropical Race 4 (TR4), also known as the Panama Disease, which is a catastrophic type of disease that has affected the sustainability and production of Philippine Cavendish banana of both large-scale and smallhold farms particularly in Southern Mindanao.

According to Dr. Molina it was first spotted in 2000 when it appeared in Cavendish plantations in the highlands of Mindanao. By

2013, it had already affected thousands of hectares of small independent growers. He added that the banana industry is still under threat and remains challenged by biotic and abiotic production constraints, including social and market issues. Thus, mitigating the threat of Foc TR4 in the Philippines is imperative to reduce the pressure.

With the DA-BAR and Bioversity International coordinated project, the introduction of the somaclonal Giant Cavendish tissue-culture variants, GCTCV 218 and GCTCV 219 in the country was made possible through a material transfer agreement carried out between Bioversity International and the Taiwan Banana Research Institute (TBRI). These are being adopted by large-scale multinational companies and smallholder farms in Mindanao.

Based on the Bioversity report, a total of twenty farmer-collaborators were selected and pilot farms were established by the project.

With the DA-BAR and Bioversity International coordinated project, the introduction of the GCTCV 218 and GCTCV 219 in the country was made possible...

More than 30,000 seedlings of GCTCV 219 were produced, distributed, and planted. Commercial planting of GCTCV 218 in severely affected farms took place in March 2016.

As pointed out by Molina, these somaclonal variants have been found to be resistant to Foc TR4. The outscaling of these resistant cultivars does not aim to replace existing varieties where the deadly disease is not yet a problem. He recommended their use as an option in the areas where existing varieties can no longer be

economically grown because of Fusarium wilt. He likewise suggested conducting an adoption-impact assessment to improve the efficiency of adoption, and highlight the impact of the technology and mitigation of the threat.

BAR Assistant Director Teodoro S. Solsoloy and staff led the project terminal review. Dr. Lorna E. Herradura, center chief of the Bureau of Plant Industry (BPI)-Davao National Crop Research, Development and Production Support Center, one of the project collaborators, also attended the review.

Other collaborators involved in the project are Lapanday Food Corporation, DOLE Asia (Philippines), Tagum Development Corporation (TADECO), BPI-Davao City, DA-Region 11, and the University of the Philippines Los Baños. ### (Patrick Raymund A. Lesaca)

Coffee industry,

the global market.

Key to BPI's goals is its support to the value addition to coffee being done by local farmers. This was accomplished by funding the purchase of various coffee processing equipment such as dehullers, depulpers, roasters, and dryers, as well as the establishment of community-based processing facilities. BPI has also partnered with BAR on initiatives for generating and verifying new knowledge on establishing and managing coffee farms.

Following Mr. Ayos' discussion was coffee expert and business owner, Mr. Robert S. Francisco who talked on the health benefits of coffee. Francisco shared how coffee has been the fascination of experts in the medical field since it is consumed like water by most of the human population. Scientists and doctors have looked into what coffee can do about this generation's rising diseases, considering how much a person is capable of consuming over a lifetime. While it is unlikely that coffee can be used for treating diabetes, Alzheimer's, Parkinson's disease, or cardiovascular disease, Francisco explained that coffee can still, in some way, help reduce the effects of such diseases or lessen the possibility of a person acquiring the said diseases.

For example, the antioxidants in coffee can reduce the risk of a person from having cardiovascular disease or Type 2 diabetes. Coffee also keeps the brain healthy by keeping dopamine levels active and stable. Studies have also shown that coffee has a favorable effect against dementia and Alzheimer's disease.

After discussing the results of various researches and studies conducted on the health benefits of coffee, Francisco reminded the participants that coffee has not yet been scientifically proven to heal any disease and its supposed health

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For the month of January, the Bureau of Agricultural Research (BAR) conducted a seminar series that was fitting of the slightly cooler climate at this time of the year. On 27 January 2017, experts discussed all about coffee: its place in the global market, the local industry, as well as its health benefits.

Coffee is not only a major player across national economies, but it has also become a constant and common fixture in human life, becoming part of human routine in the process. There is no telling just how much the human race was able to accomplish, all thanks to a cup of warm coffee. So to kickoff another year of seminars, the Bureau's Applied Communication Division invited Mr. Romeo P. Ayos of the Bureau of Plant Industry (BPI) to talk about the status of the Philippine coffee industry as the initial seminar offering.

According to Mr. Ayos, back in the 1880s, the Philippines was the fourth largest exporter of coffee beans. Through the help of Spanish friars, Batangas and Cavite became established coffee hubs producing top quality beans. Unfortunately, in 1889, the country's coffee plantations were plagued by coffee rust which was followed by insect infestations. The country's coffee production decreased

to only 1/6 of its original harvest.

Other countries like Brazil eventually became major players in the coffee global market which led to a surplus of coffee supply circulating around the world. By the time the Philippines was ready to get back on its feet, farmers had already shifted to other crops.

Mr. Ayos remains optimistic about the Philippine coffee now that the government is taking measures for restoring what was once a thriving industry. The Department of Agriculture, through BPI, has launched support programs aimed at transforming the Philippine coffee industry to "an industry that is cost-competitive, aligned with global quality standards, reliable, and environment-friendly; and provides sustainable benefits to farmers, processors, traders, and exporters."

To improve the coffee farmer's productivity, BPI has put up coffee nurseries with readily-available planting materials for its project beneficiaries at the least cost. Coffee processors are also being assisted in putting up exhibits on coffee products in trade fairs and other big marketing events in order to re-introduce Philippine coffee to

Through the funding support of BAR and the assistance of the DA-RFO 9 in terms of training and seed support, the association was able to produce and process soymilk, soycoffee, and soya meat balls.

demonstration trials; 2) seed and commercial production; 3) product development, processing, utilization and promotion; and 4) enterprise/market development.

In the promotion of soybean production and processing in the region, the KASAMMAKA was tapped as one of the organizations with farmer-cooperators engaged to produce, process, and market soybean products. Through the Zamboanga Peninsula Integrated Agricultural Research Center (ZAMPIARC) of DA-RFO 9, the association was provided with 200 kilos of organic soybean seeds which were planted in their four-hectare farming area. The projected average production of soybean achieved in Tigbao, Zamboanga Del Sur is 550 kilograms per hectare.

Prior to their engagement in the project, KASAMMAKA members attended training programs on soybean production and processing sponsored by ZAMPIARC. Since then, the association has become actively involved in farming organically-grown soybeans.

Through the funding support of BAR and the assistance of the region in terms of training and seed support, the association was able to

produce and process soymilk, soycoffee, and soya meat balls. With their farming experience and entrepreneurial ability, the group is now selling soycoffee at P200.00 per kilo, and soymilk at P50.00 per liter, while the soya meat balls (fishball size) are being sold at P2.00 per piece.

To reciprocate the government's assistance, which is part of the agreement between the DA-RFO 9 and BAR, the association returned the 200 kilos of seeds given to them. This will then be re-distributed to the next identified farmer-cooperators in the province.

The group, which is now tagged as small-scale farmer entrepreneurs, plans to improve their products in terms of labeling and packaging, and aims to penetrate larger markets in the province.

KASAMMAKA is one of the frontrunners of the government's campaign for sustainable agriculture in Zamboanga del Sur. Ms. Porferia Carpina, one of the founders of the

organization and spokesperson of the group, admitted that the interventions of the DA-RFO 9 and BAR provided them with the livelihood flexibility in producing and marketing soybean products. To them, engaging in the soybean farming business has given them a sense of pride and fulfillment.

Organically-growing of soybean is one of the advocacies being pushed by the DA which aims to promote responsible production and consumption towards achieving food self-sufficiency. Soybean is a legume known for its high protein content, oil characteristics, medicinal properties, and industrial uses. BAR has included soybean development and production under the Bureau's client-driven R&D programs. The Bureau also handles the R&D component of the program and is in close coordination with the DA-High Value Crops Development Program in the production, processing, and promotion of soybean as a champion crop. ### (Patrick Raymund A. Lesaca)

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Some of the KASAMMAKA members together with their families.



Soymilk processing



Group of women farmers in Zamboanga del Sur BENEFITS FROM SOYBEAN R&D

Story and photos by Patrick Raymund A. Lesaca

A women-led farmers' association residing in Barangay Bigong, Tigbao, Zamboanga del Sur is now reaping the fruits of their labor from soybean R&D interventions introduced to them by the Department of Agriculture-Regional Field Office 9 (DA-RFO 9) and the Bureau of Agricultural Research (BAR).

Established in 1998, the *Kahugpungan sa Mga Mag Uuma/Mamumuong Kababayan-An* (KASAMMAKA) Inc., or the "Organization of Women Farmers and Workers," was formed and created to meet the basic needs of women, empower them, and establish livelihoods through organic farming, among others. These advocacies were initially carried out and promoted by

roughly 200 original members following its creation. To date, the same principles are still being pursued by about 2,000 KASAMMAKA members.

Throughout their farming history, these women farmers are producing organically-grown rice, corn, vegetables, fruits, and other root crops; and are into raising livestock and poultry animals in their area. To the people of Barangay Bigong, everyday living is a challenge to reckon with. Their harvests dictate the quality of living and the amount of personal gains.

Unknown to them, their efforts as individuals, as an association, and as organic farming advocates were not left unnoticed by the DA-RFO 9 and BAR with the

implementation of the project titled, "Building a Sustainable Soybean Industry in the Philippines." BAR funded and supported the endeavor which has a component involving the development of commercial organic soybean in the region whose objectives are: to promote organic soybean as an important legume in Region 9; to demonstrate organic soybean production technology; to make available organic seeds of recommended soybean varieties; and to improve the skills and capabilities of farmers in organic soya product, processing, and utilization. In addition, it has four implementation mechanics, namely: 1) technology

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benefits featured in BAR seminars

benefits are still subject to further research. Health benefits are also dependent on how much a person is consuming on a regular basis.

Among the participants of the seminars was Ms. Lanie Latuga, an Alternative Learning Systems teacher for the indigenous people in the Sierra Madre. She made sure to visit BAR hoping to explore ways of introducing new sources of income and agricultural practices to the IPs in Sierra Madre. She said, "*Bukod doon sa health benefits, ang coffee ay mabenta talaga sa market. Ang mga katutubo ay walang napagkukuhanan ng income, umaasa lang sila sa hunting at sa paghahakot ng kahoy papunta sa kabilang bayan. So kung may ma-i-introduce tayo na bagong source of income, hindi na sila maghihirap.*"

Mr. Walther Hontiveros, on the other hand, had just finished writing a thesis on coffee production in Quezon Province. He attended the seminar as he was looking to see how much the coffee industry has grown over the years as well as to be informed of the new frontiers in coffee research. "I also want to meet

like-minded people who are interested in coffee. I want to learn about the new support mechanisms and policies the government has initiated. I was happy to hear from our speakers." When asked about what he appreciated most in the seminars conducted by BAR, he mentioned being glad about hearing from the field experts about the in and outs of the commodity's industry and being given tips and advice on how to get into its market.

Along with the new year, comes a new approach to BAR's monthly in-house seminars. For each seminar, two speakers will be invited to talk about different aspects involving the month's featured technology or commodity. Where the month of January focused on coffee, the month of February will showcase mushroom culture and processing.

(Ephraim John J. Gestupa)

BAR's monthly in-house seminars are free and open to the public. For more information, you may visit BAR's website: www.bar.gov.ph; BAR's Official Facebook page; or contact: (02) 461-2800/2900 local 1153/1137.



Mr. Romeo Ayos (left) from BPI discusses about the Philippine coffee industry. Meanwhile, Mr. Robert Francisco from a private company (right) talks about the health benefits of drinking coffee. PHOTOS: EIGESTUPA

BENEFITS OF DRINKING COFFEE

From the presentation of Mr. Robert Francisco

- Promotes alertness and stamina
- Improves attention span
- Contains antioxidants that may help in preventing heart ailments
- Reduces the risk of Type 2 diabetes (green coffee extract)
- May reverse the effects of cognitive aging

Reminders from Mr. Francisco:
Always consult your physician. Coffee has not yet been scientifically proven to heal any disease and its supposed health benefits are still subject to further research, and are also dependent on how much a person is consuming on a regular basis.



Cookies from arrowroot rhizome wastes PHOTO:ACBRION

Brownies from arrowroot rhizome wastes PHOTO COURTESY OF MCAPINA/MSU

MSC studies potentials of arrowroot rhizome wastes for food

Can wastes ultimately find their way to our tables? This is what the Marinduque State College (MSC) explored in one of their studies under the project, “Enhancing Productivity and Viability of Arrowroot Industry in Marinduque,” which was supported by the Bureau of Agricultural Research under the Department of Agriculture's High Value Crops Development Program.

According to Mr. Michael V. Capina, project leader, arrowroot is a local rootcrop that grows in the province of Marinduque. It forms one of the profitable industries in the province due to the high quality of the sought after by-product, which is the starch, that can be extracted from its rhizomes. With its superior properties – in food preparation and its easy digestibility – pastries such as the popular arrowroot cookies of Marinduque, biscuits, and other bakery products are being made out of it. Arrowroot starch is also being used for non-food purposes with its applications in the cosmetic and pharmaceutical

industries.

Mr. Capina and his team, however, observed that only 45 percent of the rhizomes are being utilized for starch. “During the usual extraction process, recovery for starch ranges from 13 to 20 percent only, with 27 to 35 percent remaining as rhizome residues, and 45 to as much as 60 percent as water,” he explained. Hence, their study focused specifically on utilizing the rhizome waste materials from the extraction process of arrowroot starch to produce arrowroot flour.

In their study, waste rhizomes (*sapal*) were washed and dried afterwards. After drying, the waste rhizomes were ground 2-3 times to produce the flour. This flour was then used to make brownies and cookies. “Results of proximate analysis showed that the flour derived from waste rhizomes is comparable to the arrowroot starch extracted with the usual process, in fact, with even higher crude fiber content than the starch,” Mr. Capina said.

The products, however,

are still being subjected to further improvement alongside testing and analysis. Apart from human consumption, the flour is also being studied for its potentials as an animal feed material. “We are exploring the expanded utilization of arrowroot by-products to help reduce environmental pollution resulting from direct discharge of unused by-products,” Mr. Capina concluded.

Also under the study, Mr. Capina and his team have tried developing novelty items from wastes of different arrowroot plant parts such as handmade paper from leaves; picture frame, fan, and pen holder from stalks; paper bag from rhizome skins; and cardboard and tissue holder from waste rhizomes (*sapal*). ### (Anne Camille B. Brion)

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BAR to integrate GENDER ELEMENTS in project proposals

Acknowledging the importance of Gender and Development (GAD) as a factor for change, the Bureau of Agricultural Research (BAR) held a workshop on 13 January 2017 at BAR for its technical staff to integrate GAD perspectives in the use of the Bureau's Competitive Research Grants Manual, specifically, the incorporation of gender elements in the preparation and screening of project proposals particularly those submitted for support under the Community-based Participatory Action Research (CPAR) and National Technology Commercialization (NTCP).

The technical staff who attended the workshop are responsible for evaluating the project proposals submitted to BAR. The participants were briefed on the important guidelines for ensuring that projects are gender mainstreamed. The Bureau's GAD Focal Point System invited GAD Technical Adviser, Ms. Loren Umali, to present to the technical staff the guide questions that shall be used in assessing proposals and how they respond to Gender and Development concepts. Among the technical staff who attended were Mr. Patrick Cabrera from the Program Development Division, Mr. Jay Invinsor Bermas and Marnelie Subong from the Program Monitoring and Evaluation Division, Ms. Glacelle Alyne Malinao and Bernalin Cadayong from the Technology Commercialization Division, along with BAR's GAD Technical Working Group member, Dr. Rhea Desalesa.

During the activity, it was agreed that project proposals for submission for either CPAR or NTCP support must have seamlessly integrated gender elements. Such elements must manifest throughout project preparation, implementation, and monitoring which Ms. Umali characterized as being people-centric.

According to Ms. Umali, the proposals need to contain

information that considers both genders, whether it is about their roles in the community or on how each gender will receive the benefits from the project. Beginning with a proposal's rationale, Ms. Umali deemed it necessary that both genders should have some representation or part in the study.

Situations are interpreted differently between men and women and, therefore, the results of a project will also lead to varied impacts to either gender. Nonetheless, project benefits and resources have to be equally accessible to both men and women. Ms. Umali also pointed out that project activities such as workshops and field days must provide women with as much opportunities as there are for men.

During the forum that followed Ms. Umali's discussion, Mr. Cabrera expressed his support for making CPAR projects more gender sensitive in the evaluation of proposals. He resolved to make sure that project evaluators are made aware of their responsibility of persuading proponents to consistently incorporate GAD concepts all throughout the proposal writing process. Mr. Bermas, on the other hand, observed that aside from project proposals, a CPAR project's Participatory Rural Appraisal report should also provide a way for

evaluators to see whether or not a project is gender sensitive. Given that a CPAR project starts with the assessment of target communities, a PRA report should also contain socio-economic data that characterizes the role of women in a community.

Ms. Umali advised the technical staff that GAD-related information generated in the PRA reports be carried through to the project proposal as it is ultimately the latter that will serve as the basis for the Philippine Commission on Women in evaluating the Bureau's adherence to the rules and policies on GAD. Ms. Umali also stressed the importance of the logical framework of a research proposal. It is through a proposal's Logical Framework that all the elements of a project come together to give readers and evaluators the big picture of what it is exactly that the proponents want to achieve. Crucial to the Logical Framework of a research proposal is the identification of gender-sensitive indicators that shall be used for measuring the quality and extent of a project's accomplishments. Thus, Ms. Umali encouraged the technical staff to assess a project's indicators on whether or not these support and verify inclusive outcomes. ### (Ephraim John J. Gestupa)



PHOTO:EJGESTUPA

BAR's GAD Technical Adviser, Ms. Loren Umali (right), briefs the technical staff about the important guidelines to ensure that projects supported by BAR are gender mainstreamed.