SEMINAR ON CLIMATE CHANGE

Farmers vs. climate change say yes to natural farming

PHOTO: RDELACRUZ

If farmers wish to win the battle against the debilitating effects of climate change, they should seriously consider the practice of organic agriculture and diversified farming. Thus was the general idea presented by Dr. Victoria Espaldon of the University of the Philippines Los Baños (UPLB) in a seminar she gave during the 7th National Agriculture and Fisheries Technology Forum and Product Exhibition organized by the Bureau of Agricultural Research (BAR) and which was held at SM Mega Trade Hall 2, SM Megamall, from 11-14 August 2011.

"It is imperative that the agriculture sector adapt to climate change," said Dr. Espaldon, professor and dean of the School of Environmental Science and Management at UPLB.

In her presentation, she emphasized the significant impact that organic farming and crop diversification could bring to the farming communities. "The best climate change strategies", she said, "include sustainable agriculture and good agricultural practices."

Specifically, she recommended using climate-ready crops, integration of livestock and non-farm income generating activities, adjustment of the seasonal calendar, climate-resilient postharvest storage and postharvest processing practices, and inclusion of climate risks in agricultural planning.

On why organic agriculture helps mitigate global warming, Dr. Espaldon said that it promotes better water infiltration, retention, and delivery to plants, which help sustain crop yield during drought periods. She likewise presented the case of some farms in Puerto Princesa, Davao, and Bukidnon where the current agricultural practices defy the prevailing system of farm management.

Espaldon explained why organic farmers should not be too concerned about eradicating weeds from their farms:

"Organic agriculture disregards 'clean culture' because many weeds are not really enemies. In fact, they serve as green manure by helping to conserve soil moisture and prevent erosion. The presence of weeds could also be an effective source of pest control at no cost to the farmer," she explained.

Moreover, she encouraged the application of natural fertilizers made with indigenous microorganisms (IMO) to see improvements in the health of both crop and soil. She said that this approach to organic farming can be successfully practiced in either commercial or backyard farms.

"IMOs can be easily prepared using farm or kitchen waste such as rice and banana peelings and mixing them with moldy leaves and molasses. After a few days, the IMO produced can be mixed with water and drenched into the soil or compost," she explained.

"The regular application of manure and compost (vermiculture-derived) would also inoculate the soil with beneficial organisms," she added.

Dr. Espaldon further explained that through organic farming, fighting off new diseases and pests with changed growing conditions with the appropriate practices could be effective adaptation measures. She likewise emphasized that crop diversity and re-integration of livestock into crop farms would increase the economic value of forage crops that add organic matter during the phases of rotation. ***(Miko Jazmine J. Mojica)***

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7th A/F Tech Forum concludes; draws more than 9,000 visitors

The Bureau of Agricultural Research made its way to a successful conduct of the 7th Agriculture and Fisheries Technology Forum and Product Exhibition on 11-14 August 2011 at the SM Megatrade Hall 2, SM Megamall, Mandaluyong City, drawing a remarkable 9,000+ visitors. This annual activity also coincided with BAR's Anniversary Celebration with the bureau now marking its 24th year of existence as the coordinating and funding agency of the Department of Agriculture (DA) on research and development (R&D) initiatives and activities. With the theme, *"Galing ng Makabagong Teknolohiya Para sa Pag-unlad ng Magsasaka at Mangingisdang Pinoy,"* the event is the high point of BAR's efforts to identify, disseminate, and promote mature technologies in agriculture and fisheries. This is also in keeping with its drive to establish and strengthen linkages and networks with private sector, non-government organizations, local government units and other government agencies.

The activity kicked off with the ribbon cutting and opening of product exhibits on 11 August 2011 led by Agriculture Secretary Proceso J. Alcala and assisted by BAR Director Nicomedes P. Eleazar and Assistant Director Teodoro S. Solsoloy.

Director Eleazar welcomed the participants and guests. He impressed on his audience the increase in R&D earmarked budget for the year, likewise encouraging research partners to submit proposals for possible funding support.

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Agriculture Secretary Proceso J. Alcala (2nd from right) leads the ribbon-cutting ceremony officiating the opening of the 7th A/F Tech Forum Exhibit. With him are (L-R): TCA President Max P. Guillermo, BAR Director Nicomedes P. Eleazar, Region 5 RTD for Research Edgar G. Madrid, and Asst. Dir. Teodoro S. Solsoloy (right). PHOTO: ACONSTANTINO

IN THIS ISSUE...

BAR awards 5 best products from R&D

One of the innovations introduced in the 7th Agriculture and Fisheries Technology Forum and Product Exhibition (tech forum) was the selection and identification of the "best product" among the participating exhibitors. The awarding was held during the closing ceremonies of the tech forum on 14 August 2011 at the Megatrade Hall 2 of SM Megamall in Mandaluyong City.

The criteria for judging, as formulated by the panel of judges, zeroed-in on the commercialization potential of the product, its marketability and uniqueness, and must capture the theme: *'Galing ng Makabagong Teknolohiya Para sa Pag Unlad ng Magsasaka at Mangngingisdang Pinoy.'*

The panel of judges was composed of technical advisers from the Bureau of Agricultural Research (BAR), namely: Ms. Josefina Lantican, Ms. Virginia

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7th A/F Tech Forum...from page 1

Serving as keynote speaker, Sec. Alcala noted the remarkable record-breaking increases in rice (14.4 percent) and corn (37 percent) harvests during the first six months of the year which he credited to the repair and rehabilitation of irrigation systems and facilities resulting to an expansion of the total harvestable area, and the effective delivery of production and marketing support.

Sec. Alcala commended the said technology forum, *"Napapanahon ang pagtitipong ito bilang isang kasangkapan upang mapagtagumpayan ang hamon na magkaroon ng sapat, abot-kaya at ligtas na pagkain ang bawa't pamilyang Pilipino, at sumagana ang buhay sa kanayunan."*

He instructed BAR, together with the Agricultural Training Institute (ATI), to be more aggressive in the field of RD&E and respond according to the needs of our small farmers and fisherfolk. "We will be more aggressive in seeking private sector investments in our RD&E endeavors," he added.

As part of the innovations in the event for this year, simultaneous technical presentations and technology demonstrations were conducted. A cultural presentation featuring the exemplary talents of DA's very own Regional Executive Directors (REDs), Regional Technical Directors (RTDs), research managers, staff, as well as partners from the state universities and colleges (SUCs) were showcased on the third day.

The product exhibition provided a venue that brought together manufacturers, distributors, dealers and buyers and served as a platform for identifying business opportunities for companies and business people and open up new doors for entrepreneurship.

Crowd in attendance during the opening program. PHOTO: ACONSTANTINO

About 90 exhibitors filled the hall. These were comprised of DA-attached bureaus and agencies, Regional Field Units (RFUs), Bureau of Fisheries and Aquatic Resources (BFAR), Regional Integrated Agricultural Research Centers (RIARCs), Regional Fisheries Research and Development Centers (RFRDCs), SUCs, and other R&D partner institutions, and private entrepreneurs.

Exhibits featured and showcased products, services, and technologies with commercial potentials developed on high-value crops, livestock, fisheries, natural products for health and wellness, biofuels, organic agriculture, and climate change. A special central display featured some of the BAR-supported projects and technologies which included: edible landscaping; herbs and spices; organic vegetables; and by-products of *adlai*, sweet sorghum, abaca, and *pandan* leaves.

Culminating the opening ceremonies was the launching of three BAR-funded books: 1) Philippine Rainfed Agriculture Research and Development and Extension Program (PhiRARDEP) Framework and Action Agenda, 2) Climate Change Research and Development and Extension (RDE) Agenda and Program for Agriculture and Fisheries, and 3) The 1st Sweet Sorghum Business Summit and Plantation Showcase.

Special awards were given to the best booth presentations and best unique products. The event was organized by BAR, through its National Technology Commercialization Program (NTCP). NTCP, one of BAR's banner programs, serves as a vital tool for the development of rural enterprises and the improvement of agriculture- and fisheries-related industries anchored on appropriate activities emphasizing technology promotion, transfer, utilization, and commercialization. ***(Ma. Eloisa H. Aquino)***

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BAR awards..from page 1

Agcopra, and Mr. Roberto Villa, and also included Mr. Anthony Obligado, OIC-head of BAR's Technology Commercialization Division (TCD).

From the 96 exhibitors, five products were selected and named the "2011 Best Products". These were: *Ilocos pickled shallot and pickled garlic* from Region 1, *goat's milk* from Region 3 , *adlai products* from Region 4A, *pili oil* from Region 5, and *apiculture and bee products* from UP Los Baños.

Considered as "White Gold" and a very profitable cash crop, Region 1's garlic is also known for its succinct aroma and pungency the world over. These characteristics made the region's bottled **pickled garlic**, an entry product in the event, win as one the best products. It was produced by the Ilocos Integrated Agricultural Research Center (ILIARC) of the Department of Agriculture's RFU-1. To date, the bottled pickled garlic has already gained momentum in terms of product quality and marketability.

Also in the best product category, **goat's milk** of Region 3 was chosen due to its nutritional value. Goat's milk is easily digestible, less allergenic and contains less lactose which is good for lactose-intolerant persons. Milk production and its commercialization is a close collaboration between the DA-RFU 3 and Mr. Jeffrey Lim of JSJ Farm located in Brgy. Caturay, Gerona, Tarlac.

Region 4A's ***adlai*** (*Coix lacryma-jobi*) was also given recognition during the event. *Adlai* is also called Job's Tears because of its tear-shaped grains. It belongs to the grass family, Poaceae. *Adlai* is a promising crop due to its potentials as a food and feed source. It can be cooked the same way as rice, or made into *maja blanca*, *sinukmani*, and other rice-based *kakanin*. The grain can be ground into flour and used to make breads and pastas. This characteristics help the Department of Agriculture's (DA) in its goal of attaining food self sufficiency. *Adlai* is now being developed as an alternative staple food crop.

(Clockwise) Pili oil, pickled shallot, goat's milk, adlai, and apicul;ture products PHOTOS: ACONSTANTINO/LPADILLA

The Bicol region takes pride in its ***pili* oil** which is known for its distinct characteristics and various applications. Indeed, *pili* oil production is an emerging technology that could uplift not only the agriculture sector of the region but also serve as a source of livelihood for its communities. Locally-made *pili* pulp oil is now becoming a popular and an inexpensive alternative to olive oil. The process extracts oil from freshly harvested pili using minimal heat and simple cooking and filtration tools. The oil is currently distributed by Bicol's Best Leslie Pili Products.

The Apiculture Booth, which was part of the special setting of the forum, showcased **bee products** like honey, oil, syrup and other bee-based products such as cosmetics, balm, and soap, among others. It also won the best product award. The bee project undertaking is a venture between DA-BAR and the UPLB Bee Program. ***(Patrick RA Lesaca)***

Seagrass...from page 9

items. She added that the seagrasscraft makers are continuously experimenting and generating new products. File system box and folder kit are the new seagrass craft products.

At present, it is noted that the enterprise development in flood-prone areas project in Camarines Sur brings about additional employment opportunities among the residents due to the increase of 20-35 percent in bulk orders on seagrasscraft. The economic activity in the community is visibly ensured by increasing number of households engaged in seagrasscraft production.

For future directions of seagrass craft industry, they are leaning on identifying research areas for optimum production and continuous product development of seagrass-based agribusiness enterprise. They also envision of upscaling into municipal-level the craft-village handicraft production enterprise. They plan to cluster the direct and indirect keyplayers in seagrasscraft industry in the locality to insure stable source of raw materials and skilled workforce to meet the increasing demand of the commodity, and strengthening and maintaining linkage mechanism between the target organizations and supporting entities to sustain the local handicraft industry.

Undeniably a unique and profitable enterprise, the seagrasscraft industry has been officially identified and promoted as banner commodity of the town of San Fernando under the One-Town-One-Product (OTOP) Program of the Department of Trade and Industry. ***(Diana Rose A. de Leon)***

rich protein and minerals that can be found in it. After all, it is not called 'black gold' for nothing.

"Mungbean sprouts are rich in Vitamin C and iron. Iron in mungbean sprouts is twelve-fold high as compared to mung bean soup while a four-fold increase in iron can be achieved when it is cooked with tomato," said Aquino in her presentation.

Like groundnut, mungbean is a drought-tolerant, all-season crop that matures from 55 days to 74 days after emergence (DAE) depending on the variety planted. The climate change-ready varieties for mung bean are Pagasa 7, NSIC Mg 12 or *Pagasa 19*, and NSIC Mg 15 or *Kinang*.

According to Aquino, mungbean's high carbohydrate content particularly found in Pagasa 19 makes it a good raw material for bread or noodle production.

"The *Pagasa 7* mungbean is sold at farm gate price of P35 per kilogram. In terms of rat and frog infestation, *Pagasa* 19 is at an advantage because the plant grows taller. On the other hand, *Kinang* is a good choice if you want your plant to mature early," she explained.

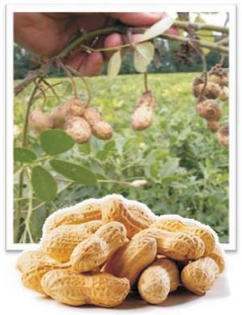
Soybean: The wonder crop

Soybean, while currently classified as legume in the country and in other parts of the world, the Food and Agriculture Organization (FAO) and the United States Department of Agriculture (USDA) classify this crop as an oilseed. Whether touted as the "king of beans" or "wonder crop", the powerhouse of health benefits that is present in soybeans is worth paying attention to.

Aquino discussed soybean as a source of high quality protein and has numerous health benefits that can be gained from soy isoflavones including the ability to lower the risk of several types of cancer, reduce menopausal symptoms such as hot flushes in women, and reduce the risk of osteoporosis and heart disease.

"The tocopherol or Vitamin E found in soy is a very good anti-oxidant. Soybean sprouts also contain 12 times more iron than found in mungbean," she added.

While the US remains the biggest producer of soybeans in the world, the Philippines is beginning to dip into the global opportunities for soybean. Through the Philippine Soybean Roadmap 2011-2014 crafted by the Department of Agriculture (DA), BAR is tasked to



PEANUT
(Arachis hypogaea)

SOYBEAN
(Glycine max)

MUNGBEAN
(Vigna radiata)

coordinate all R&D activities needed to be undertaken for the roadmap to take off. BAR, in coordination with regional research centers such as CVIARC, is looking into the potential to supply the huge soy demand in the Japanese market. Currently, the approved varieties for soybean are *PSB Sy 2* or *Tiwala 6* which matures in 86 to 103 DAE.

Soil health and organic agriculture

The soil also deserves justice- if only they could have their own lawyers. Thus was the lament of Aquino about the severe problem on land degradation due to wrong farming practices. Thankfully, even with increasing cropping intensity, soil health can be maintained with the inclusion of grain legumes in the production system.

"Peanut, mung bean, and soybean are nitrogen-fixing crops because of *Rhizobium*, the bacteria that can be found abundantly in the root nodules of legumes," said Aquino. The nitrogen compounds that can be found in legumes are essential for the growth of plants. When the plant dies, the nitrogen that is fixed is released to other plants and also helps to fertilize the soil. Aquino said that legumes maintain soil fertility by serving as 'green manure' and soil conditioner, and acts as a good substrate for organic fertilizer production.

According to Aquino, due to this nitrogen-fixing ability, the organic way of legumes production is highly possible and commendable.

"Legumes are very responsive to residual nutrient utilization and require less fertilizer input. In Cagayan Valley, the farmers who adopted a peanut-white corn intercrop did not apply chemical fertilizers or pesticides. Farmers who organically planted mungbean and soybean after upland rice also found that on-time planting helped minimize pest damage," said Aquino.

Development of a legume industry

A 2006 study from Central Luzon State University (CLSU) by Abon et al. assessed the legumes industry and the current policy environment to help boost the industry. An inventory of government policies and programs were undertaken that included the enabling institutions and their outcomes. The researchers highly recommended an appropriate policy environment that will establish a national program for sustained legumes production with provisions for adequate R&D support on its production, processing, and utilization. Improvements on government credit-marketing support services that will promote productivity, link, and expand markets were also deemed necessary. Furthermore, the development of a stronger linkage between producers and processors of legumes and the enabling mechanisms for the establishment of rural-based legumes enterprises with the government providing market and price incentives were recommended.

With the bright promise of legumes and the existence of government support particularly from the DA including BAR, dedicated researchers and scientists, farmers' interest, and increasing public awareness in nutritious and organic food, the aim of producing quality source of food and sustainable livelihood is an exciting prospect that, hopefully, this generation would not miss out this time. ###

For more information on legumes, you may contact Ms. Rose Mary Aquino or CVIARC at tel. no. (078) 622-0961 to 62, email: rosegaquino@yahoo.com, cviarc_ies@yahoo.com.

BAR launches books on climate change, rainfed agriculture, and sweet sorghum

BAR-supported books launched during the opening of the Tech Forum at Megamall.

In a bid to promote the current priorities and R&D programs of the Philippine agriculture and fisheries sector, the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) launched three books on climate change, rainfed agriculture, and sweet sorghum on 11 August 2011 during the opening of the 7th Agriculture and Fisheries Technology Forum and Product Exhibition which was held at the SM Megatrade Hall 2, SM Megamall, Mandaluyong City.

The first two books, "*Climate Change Research, Development and Extension Agenda and Program for Agriculture and Fisheries*" and "*Philippine Rainfed Agriculture Research, Development and Extension Program (PhiRARDEP) Framework and Action Agenda*" are reference documents that serve as guides to all stakeholders, particularly researchers, scientists and policymakers in aligning their RDE efforts with the prescribed priorities and frameworks on climate change and rainfed agriculture.

"These two books, which are first-of-its-kind, are results of a series of consultations, meetings, and workshops with the agriculture and fisheries RDE sector and stakeholders to address the anticipated impacts of climate change and to unlock the vast potentials of rainfed agriculture in achieving food security and reducing poverty," said Dr. Nicomedes P. Eleazar, director of BAR.

The book on climate change provides an overview/background discussion on climate change as a phenomenon and its impacts specific to the agriculture and fisheries sector as well as a detailed discussion of BAR's Climate Change RDE Agenda and Program, including its rationale, framework, objectives, and components. "We gave priority on the short- and long-term adaptation strategies that are significant to address the potential damage, to take advantage of opportunities, and to cope with the consequences of climate change. More importantly, the book contains action plans which were jointly proposed by our participating stakeholders including RDE priorities, a timeline for the implementation of activities, and the possible implementing agencies. This publication will be crucial for project proponents because it provides important guidelines on specific areas that need to be researched in order to address climate change," Dr. Eleazar explained.

BAR Director Nicomedes P. Eleazar (right) and UPLB Chancellor Luis Rey I. Velasco (left) turn over the books to DA Secretary Proceso J. Alcala (center). PHOTO: RBERNARDO

The book on rainfed agriculture presents a holistic perspective on undertaking an effective RDE system for rainfed agriculture in the country providing an action plan to implement the framework and to ensure that the objectives of the program are delivered as intended. It also contains helpful inputs in the development of a strategic implementation plan which is a valuable contribution towards establishing the program. This undertaking is a concerted effort of DA-BAR in partnership with the DA's High Value Crop Development Program (DA-HVCDP) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

Also launched was the "Proceedings of the 1st Sweet Sorghum Business Summit and Plantation Showcase" - the output of the business summit and plantation showcase held on 2 June 2011 in Bacolod City. This collaborative effort between DA-BAR and the University of the Philippines Los Baños (UPLB) provided a good venue for different stakeholders in the renewable energy sector to engage in discussions on the potentials of sweet sorghum in the biofuel industry and identify business opportunities.

Included in the book are various presentations including a discussion on the Philippine Bioethanol Program and the prospects of sweet sorghum in the Philippines. Topics on the agronomic side of sweet sorghum were also presented in the book such as the agronomic performance of sweet sorghum, sweet sorghum seed purchase arrangement, and sweet sorghum seed supply business arrangement, along with the development of an evaporation system for sweet sorghum syrup production. "The book will be helpful for individuals who are interested in sweet sorghum production particularly for bioethanol and other high-value products," stressed Dr. Eleazar. ***(Rita T. dela Cruz)***

7th Agri & Fisheries Tech Forum concludes with "best" awards

The 7th Agriculture and Fisheries Technology Forum and Product Exhibition officially closed with the giving of the "best awards"— best cultural presentation, best booth, and best innovative products. The closing and awarding ceremonies were held on 14 August 2011 at SM Megatrade Hall 3, SM Megamall, Mandaluyong City.

Bureau of Agricultural Research (BAR) Director Nicomedes P. Eleazar, in his welcome remarks, mentioned how the bureau has come of age in terms of conducting this yearly event which, a mere seven years ago, was held at the office of BAR and now it is being conducted in a much bigger and more accessible venue, the SM Megamall. He articulated that this year's Agriculture & Fisheries Tech Forum and Product Exhibition is a concrete manifestation of BAR's commitment to be of service to the Filipino farmers and fisherfolk. "We are now leveling the technologies knowing that the true measure of research and development is its ability to reach the market and our end-users," he stressed. He also acknowledged the involvement and participation of Agriculture Secretary Proceso J. Alcala during the Forum's opening ceremonies. He also extended his gratitude to the R&D community, collaborators in the state universities and colleges (SUCs), partners from the private sectors, as well as colleagues from the various government agencies, for making the event a success.

Director Eleazar and Assistant Director Solsoloy, assisted by Mr. Anthony Obligado, the head of the Technology Commercialization Division (TCD), awarded a Certificate of Participation to each of the 96 exhibitors for their invaluable participation and contribution to the success of the event.

The best cultural presentation was awarded to the Luzon cluster while Mindanao and Visayas and clusters went home with the second and third prices, respectively.

The "Best Booth Award" went to DA-Regional Field Unit 8 while the 2nd and 3rd place went to DA-RFU 4A and 5, and DA-RFU 10 and 11, respectively.

The best innovative product awards were given to Region 1 (Ilocos pickled shallot and pickled garlic), Region 3 (goat's milk), Region 4A (*adlai* products), Region 5 (pili oil), and UPLB (apiculture and bee products).

Asst. Director Teodoro S. Solsoloy, in his closing remarks, said that the success of the 7th Agriculture and Fisheries Technology Forum and Product Exhibition was a product of effective collaboration by and among the key players involved like the DA Family, SUCs, research and scientific communities and the private sector. He added that the success of the event was also due to the determined efforts of the men and women of BAR.

Dr. Solsoloy extended his heartfelt gratitude to everybody for coming and joining the event including the "walk-ins' or common mall shoppers and wished everybody a safe journey home. ***(Patrick RA Lesaca)***

Trophies for the Best Cultural Presentation PHOTO: ACONSTANTINO

Asst. EVIARC Manager Elvira C. Torres (center) receives the grand prize for Best Booth. PHOTO: RDELACRUZ

Booth of DA-RFU 8 wins "Best Booth" PHOTO: ACONSTANTINO

Luzon Cluster (Reg. 1,2,3,4a, 4b, CAR) bags the "Best Cultural Presentation" PHOTO: RBERNARDO

When your food takes good care of you and the soil, too!

Miko Jazmine J. Mojica

Organic legumes production in Cagayan Valley. According to Ms. Rose Mary Aquino, on-time planting helps minimize pest attack and damage. PHOTO: DA-CVIARC

While cereals such as rice and corn are the staple food in Asia, legumes are increasing in importance as sources of nutrition for both humans and the soil. With the growing demand for food, especially rice and corn, farmers are prone to resort to monocropping, a farming practice which not only favors pest infestation and soil degradation but also reduces the opportunity to generate better incomes.

When the rice-rice or corn-corn cropping pattern becomes the norm, humans, particularly those in the distant areas or those with much reduced purchasing power, may miss out on other essential and inexpensive sources of protein, vitamins, and minerals with a largely rice or corn diet. Hence, crop diversification is an attractive option that wise farmers could take advantage of given its several benefits.

Ms. Rose Mary Aquino, a senior researcher at the Cagayan Valley Integrated Agricultural Research Center (CVIARC), is one staunch advocate of crop diversification. Specifically, she actively promotes grain legumes, such as groundnut (peanut), mungbean, and soybean, as a means to alleviate poverty in the face of climate change and malnutrition in marginalized rice- and corn-based farming communities.

During the 7th National Agriculture and Fisheries Technology Forum and Product Exhibition organized by the Bureau of Agricultural Research (BAR) at the SM Mega Trade Hall 2, SM Mega Mall, Mandaluyong City on 11-14 August 2011, Aquino presented the enhancement of grain legumes productivity in predominantly rice and corn producing areas in Region 2.

Breaking the monocrop

Based on the studies made by CVIARC researchers from 2006-2010, Aquino presented the four possible cropping patterns for a cereals-legumes cropping system. For example, it is possible to adopt a rice-mungbean, corn-soybean, corn-peanut, or corn-mungbean-peanut intercrop depending on the average monthly rainfall and temperature.

"Grain legumes production supports the agriculture sector's climate-change mitigation measures in three ways: it requires minimum or zero tillage, it retains adequate levels of crop residues to protect the soil from erosion, and intercropping reduces pest and disease incidence," explained Aquino.

Groundnut: A+ in nutrition

In her presentation, Aquino presented groundnut or peanut as the legume that could be graded A+ in nutrition for its low salt but high protein content, energy value, and dietary fiber. She presented data showing that groundnut contains unsaturated fat – the good fat – that helps to remove cholesterol from the blood. Likewise, it contains more protein than eggs, dairy products, and various cuts of meat and fish. As a source of dietary fiber, it also reduces the risk of having some types of cancer and controls blood sugar levels.

"Of the 13 vitamins needed by the body, half of it is present in groundnut. Moreover, of the 20 minerals necessary for normal body growth, seven can be found in groundnut," she added.

According to Aquino, the current climate change-ready varieties of groundnut are NSIC Pn 11 or Namnama-1, NSIC Pn 14 or Namnama-2, and NSIC Pn 15 or Asha. As the overall coordinating agency for agriculture and fisheries R&D, BAR has funded the adaptability trials and promotion of these promising peanut varieties, tapping CVIARC as one of the research proponents.

"The market potential of groundnut is great particularly in our country that imports 30,000 to 50,000 tons annually which is more than 50 percent of our national requirement. The demand of peanut processors in our country is at 343 metric tons monthly in the shelled form which sells at P50 to P60 per kilogram. In unshelled form, the farm gate price of peanut is ranges from P25 to P28 per kilogram," said Aquino.

"We have submitted samples of these promising peanut varieties to five major processors in Manila and they all gave positive feedback mainly due to their improved shells and bigger nut size," she added.

Mungbean: The black gold

If you used to think twice about eating mung bean, you'd be better off thinking twice about not getting the

PHOTOS: courtesy of DR. DIONISIO G. ALVINDIA

cutting of bunches into hands, quality checking to remove dirt and other impurities, initial washing, crown trimming, water-dipping, air-drying, weighing and packing into carton boxes, and shipment to Japan.

Problems

Similar to other crop production processes, non-chemical banana production also has its setbacks. Limited resources, packaging and transport difficulties, and postharvest diseases are among the major problems encountered.

"Due to limited availability of water in the packing houses, the processors are forced to re-use fresh water in the washing bin which becomes discolored with the large number of banana hands immersed and the presence of impurities like dried flowers. The impurities are simply removed with plastic scoops and the contaminated water is used again for washing the next batches of fruits," added Dr. Alvindia, project leader.

The main problems in packaging and transport are congestion, deficient cushioning, and piling and/or prolonged exposure to harsh environmental conditions that result to physical stress and fruit damage (scarring/bruising).

Before sending out to the market, the non-chemical bananas are scrutinized for defects and diseases. The most severe postharvest disease is crown rot, which is caused by several fungi. In the early 90s, crown rot occurrence was not a serious crisis because of the use of synthetic fungicides in the postharvest bathe treatment. But since the utilization of protective agricultural chemicals is unacceptable to the consumers, the intervention to be used has to be non-chemical.

Interventions

Three non-chemical methods were proposed and examined to prevent postharvest diseases. These are: 1) hot water treatment (HWT); 2) bio-control agent (BCA) utilization; and (3) integrated non-chemical methods for the development of postharvest dip treatment.

For the HWT, *Buñgulan* can tolerate up to 55°C of HWT for 10 minutes without physical injury. Beyond this, partial to total browning or blackening and failure to soften will be the result.

In the Bio-control Agent (BCA) utilization, a banana pathogen is best controlled by microbial antagonists. Certain bacteria and fungi have been found to have potentials as antagonists against postharvest pathogens. These are also useful for genetic characterization, and for the transformation and development of bio-products.

For the Integrated Non-chemical Methods for Postharvest Dip Treatment Development, among the methods tested were: 1) HWT with salt, 2) HWT with BCA, and 3) HWT with salt and BCA. These methods are currently being investigated to determine which among them is the most effective and the most efficient dip treatment that will control the occurrence of banana post-harvest diseases.

Non-chemical banana production expansion

Today, ATC is expanding its operations from Luzon and Visayan Islands to Mindanao areas. Project proponents and partner organizations are currently developing more methods to improve the production and distribution of organic banana. ###

For more information, please contact: Dr. Dionisio G. Alvindia of the Philippine Center for Postharvest Development and Mechanization (PhilMech) through email: dgalvindia@yahoo.com or mobile number: 09178818763.

> ***"The main problems in packaging and transport are congestion, deficient cushioning, and piling and/or prolonged exposure to harsh environmental conditions that result to physical stress and fruit damage (scarring/bruising).***

Increased budget earmarked for agri & fishery research

PHOTO: RDELACRUZ

Proving that the government is serious about R&D spending to achieve food security and national competitiveness, the budget for agriculture and fisheries R&D will increase next year by more than double its current amount.

Dr. Nicomedes Eleazar, director of the Bureau of Agricultural Research (BAR), announced this substantial budget increase during the opening program of the 7th National Technology Forum and Product Exhibition (tech forum) on 11 August 2011 at SM Mega Trade Hall 2, SM Megamall, Mandaluyong City. The annual four-day event is organized by BAR and participated in by exhibitors representing all regions nationwide.

In his welcome remarks during the program, Director Eleazar said that while the budget this year had also increased from the previous year's budget, he revealed that next year's impending fund is worth even more than what the Bureau had expected.

BAR's budget for this year amounts to P400M while the allocated budget for 2012 would approach the P1B mark. The budget includes grants from the Agriculture and Fisheries Modernization Act (AFMA) and allocations for various R&D-related activities from the flagship programs of the DA for corn, high value crops, and organic agriculture, among others.

"As the focal agency for funding and coordinating agriculture- and fisheries-related R&D, BAR has been at the forefront of programs, projects, and activities spearheaded by its partners from both government and non-government organizations such as the Department of Agriculture's (DA) regional field units, research centers, and attached agencies; state universities and colleges; non-government organizations (NGOs); and local government units (LGUs)," said Dr. Eleazar.

He recounted how, over the recent years, the efforts and investments made on agricultural research through BAR have focused on communicating research results to a wide audience including farmers and fisherfolk, businesspeople, policymakers, and the general public.

One of the ways it employs for R&D results to cross over to the mainstream of production and eventually the market is through the National Technology Commercialization Program (NTCP) which organizes the annual techno forum event to showcase appropriate technologies, products, and services on agriculture and fisheries.

Through the NTCP, BAR supports the commercialization of R&D breakthroughs and appropriate technologies developed by R&D institutions. It serves as a vehicle to develop the commercial potentials of agriculture and fisheries commodities featuring the use of appropriate technology and bring them closer to the market.

"Through the holding of national technology forums and exhibits, we have managed to reach a wider audience that includes various interested sectors and individuals from all walks of life. We were able to attract the attention of the public on the exciting opportunities in agriculture. More important is that we were able to communicate the results of agriculture and fisheries R&D which are relevant to the needs and demands of the changing market and agricultural landscape," said Dr. Eleazar.

Aside from NTCP, another banner program of BAR that strengthens the role of R&D in technology transfer and the production management system is the Community-based Participatory Action Research (CPAR). It also institutionalizes the active involvement of the community both in the identification of the most appropriate technologies that suit their needs and in the management of their own farm resources.

BAR is currently accepting project proposals from its stakeholders particularly research institutions such as the DA's research-implementing units, and state universities and colleges nationwide. To know more about BAR's programs, priorities, and upcoming events, downloadable forms and information can be accessed at its website, *www.bar.gov.ph.* ***(Miko Jazmine J. Mojica)***

Edible landscaping
demo garden launched at BAR

Dr. Fernando C. Sanchez (left) of UPLB and project leader of the Edible Landscaping project shows to BAR Director Nicomedes P. Eleazar (right) the components of the demo garden launched during the BAR 24th Anniversary celebration. PHOTO: RBERNARDO

In an effort to massively promote to the public the technology on Edible Landscaping (EL) and contribute to the food security drive of the Department of Agriculture (DA), the Bureau of Agricultural Research (BAR) launched a demonstration garden featuring "Edible Landscaping: The Artistic Technology of Food Production" at the back lot of the BAR building as part of its 24th Anniversary celebration.

Leading the launching ceremony were BAR Director Nicomedes P. Eleazar, Asst. Dir. Teodoro S. Solsoloy, and Dr. Fernando C. Sanchez of the University of the Philippines Los Baños (UPLB) who was also the project leader.

The demo garden is part of the project titled, "Technology Promotion and Commercialization of Edible Landscaping (Phase 2)" implemented by the Crop Science Cluster-College of Agriculture, University of the Philippines Los Baños (CSC-CA-UPLB) and funded under the National Technology Commercialization Program (NTCP) of BAR.

Phase 1 of the project began in November 2009 under the leadership of Dr. Leonido R. Naranja producing model plots as pilot studies for the edible landscaping concept.

"The technology of growing crops is already there, the twist is planting the crops in consideration of its aesthetic value, arranging crops in an artistic manner and assessing their qualities based on the colors and textures of their leaves and fruits, this is basically the essence of edible landscaping," explained Dr. Sanchez, project leader of the phase 2 of the edible landscaping project.

According to Dr. Sanchez, EL is part of the general concept of urban agriculture. It was conceptualized basically to address the food supply problem in the urban areas.

"We want common households to adopt to growing crops but with a twist, which is the art component. We will teach interested growers on how to execute the design following the components of landscaping considering the principles of balance, contrast, and emphasis. After teaching them the components of landscape design, we will also train them on choosing what specific crops to plant and how to arrange them in plots to enhance their aesthetic value," Dr. Sanchez said.

He added that, "majority of the crops used in EL are vegetables, that's why it's called "edible" you need to grow crops that can be consumed by humans on a daily basis. Also, in EL, we used organic agriculture techniques so we are ensured that the crops we produce and eat are safe both to human and the environment."

While phase 1 of the project focused on the edible side of landscaping, phase 2 will focus on the artistic side, according to Dr. Sanchez. "So now we are focusing on the artistic side in relation to the edible component so that we can produce crops with an art. Landscaping is both science and art. One of the outputs of the second phase is a manual wherein one can select the type of vegetable crops one wants to grow and where and how the crops will be sourced out. Also in phase 2 we will teach them how to grow vegetables or germinate vegetable seedlings and use it as landscape material, how to plant it, what kind of planting techniques, what organic fertilizer to use, and how to produce the organic fertilizer," said Dr. Sanchez.

The demo garden at BAR is only one of the EL models from the project, other plot models are located at the University of the Philippines Rural High School in Los Baños, Laguna; Makiling Elementary School in Calamba City, Laguna; and Jardin de Miramar in Antipolo City.

The EL project was also exhibited as part of the BAR special setting during the 7th National Agriculture and Fisheries Technology Forum and Product Exhibition at SM Megatrade Hall 2, SM Megamall. ***(Rita T. dela Cruz)***

Optimizing the production of chemical-free banana

Leila Denisse E. Padilla

PHOTO: courtesy of DR. DIONISIO G. ALVINDIA

Today, almost all crops are grown with the use of chemicals. From production processes to postharvest activities, chemicals like inorganic fertilizers and pesticides are among the main inputs. This is due to unfavorable factors like diseases and environmental hazards that affect the quality and quantity of yield for which, in order to prevent these from happening, farmers resort to chemicals since they give immediate relief and increases crop production and yield.

However, due to the reported negative effects on human health and the environment, emphasis on the use of chemicals in crop production is being lessened. Now, some crops can be grown successfully even without chemicals and are tagged as "organic crops". One particular crop that is being organically produced in the Philippines and is being distributed domestically and abroad is the so called "non-chemical banana".

The Bureau of Agricultural Research (BAR) has been holding technology colloquia and a series of demonstrations of the results of BAR-supported projects conducted by R&D-partner agencies in the annual Agriculture and Fisheries Technology Forum & Product Exhibition to provide for certain concerned stakeholders, the seminar and demonstration series were classified into two: technical and popular. In the recent 7th Techno Forum held on 11-14 August 2011 at the SM Megatrade Hall in Mandaluyong City, one of the featured seminars in the popular category was the "*Production and Post-production Management of Non-Chemical Banana*" conducted by project leader Dr. Dionisio G. Alvindia of the Philippine Center for Postharvest Development and Mechanization (PhilMech). The seminar highlighted the origin, issues and challenges, and management processes developed for the non-chemical banana project which was implemented through a collaboration between Alter Trade Corporation (ATC) and the Philippine Center for Postharvest Development and Mechanization (PhilMech).

How it began

In 1987, ATC (a people-oriented enterprise) was established in Bacolod City, Negros Occidental, which campaigned to reduce famine and poverty in the local communities. ATC became Negros' trading arm and since then it has been marketing the area's products nationally and abroad to affiliated associations. One of its well-known merchandise is non-chemical banana and this crop created and strengthened the partnership between ATC and the Japan Committee for Negros Campaign (JNCC) when ATC responded to JNCC's call for "Trade not Aid".

Since then, the local banana cultivar *Buñgulan,* a banana variety which is abundant and widely distributed in the Philippines, has been grown by small-scale Negros farmers in their backyards without the use of chemicals and has been marketed to consumer cooperatives in Japan. This partnership benefits local farmers and Negros communities since this concept is geared towards the economic recovery of Negros through trade linkages. "The economic benefits from the non-chemical banana industry is the employment of 20,000-25,000 people working as employees and handlers while steady and good market price of banana fruits are enjoyed by the small-scale farmer-producers," said Dr. Alvindia, PhilMech scientist and project leader.

Production and postharvest management

In the production of the non-chemical banana, usual practices like land preparation and field sanitation are carried out. The thing that differentiates it from the production methods of other crops is the non-use of chemicals for reducing pest and disease incidence, and the adoption of traditional farming techniques which can also provide optimum protection and maintenance if executed properly. Weeding, de-leafing, and removal of plant debris are also among the traditional practices incorporated in *Buñgulan* production.

After harvesting, certain procedures are done to prevent quality depreciation of produce. The steps in non-chemical banana postharvest management prior to consignment to Japan include: partial cutting and tilting of trunk mid-portion to carefully harvest fruit bunch, tying of the bunch tip for manual delivery to the trade center,

Pickling the bitter *Ampalaya*

Leila Denisse E. Padilla

PHOTO: LPADILLA

Sautéed *ampalaya*, *pinakbet*, *ampalaya* con carne, sautéed *mongo* with *ampalaya*, *ampalaya* omelet- these are among the usual bitter gourd or *ampalaya* foods that we cook and eat in the comfort of our homes or find in the ubiquitous Pinoy *karinderyas*. Ampalaya (*Momordica charantia*), an annual plant native to the country, is a crawling vine that bears an elongated, green, rumple-skinned fruit. This crop is known for its distinct bitter taste and rich nutritional value, and which is recognized as a reliable home remedy for various ailments like cough, fever, and diabetes.

Given its popularity among Filipinos, more dishes and preparations are being discovered and that make use of this high value crop. One recipe that has been invented and commercialized recently is the pickled *ampalaya*.

During the 7th Agriculture and Fisheries Technology Forum and Product Exhibition with the theme "*Galing ng Makabagong Teknolohiya Para sa Pag-unlad ng Magsasaka at Mangingisdang Pinoy*" on 11-14 August 2011, the Bureau of Agricultural Research (BAR) featured seminars and demonstrations of products resulting from the BAR-supported projects of R&D partner agencies. The seminar and demonstration series were classified into two: technical and popular, in order to cater to particular audiences. One of the popular seminars featured was the "Pickled Ampalaya" which was presented by Ms. Myrna S. Eguia of the Research, Development, and Technology Management Section of the Bulacan Agricultural State College (BASC).

Highlighted in this colloquium were food processing sanitation tips, cooking procedure, and the cost analysis of producing *ampalaya* pickles.

Cleanliness comes first

Ms. Eguia started the seminar with a discussion on proper sanitation as one practice that should be observed, not only in pickled ampalaya processing, but also in food processing in general. She described sanitation as "the aseptic practice in the preparation, processing, and packaging of food products." In addition, food sanitation is the pragmatic usage of hygienic measures in handling food to prevent the worst food problem – contamination.

She expounded on the steps in preparing pickled *ampalaya*. Ms. Eguia said that the palatability of the resulting dish depends on the freshness of the ingredients. "The bottles should be sterilized through washing it with soap and water and boiling for 15 minutes." Ms. Eguia explained that this would effectively prevent contamination. She also discussed that the ingredients can be altered slightly according to the preference of the person who will prepare the pickled *ampalaya*.

Cost analysis

Ms. Eguia presented the cost analysis of one-kilo pickled *ampalaya*. "One kilo can produce 15 bottles of pickled *ampalaya* at 350 grams per bottle." The suggested retail price of one pickled ampalaya bottle is Php 45.00 implying that one-kilo of pickled ampalaya could gross Php 675.00. The approximate cost of expenses in the ingredients, water, LPG, and transportation is Php 467.00, which means that the total earning from a one-kilo pickled ampalaya is Php 208.00.

Pickled ampalaya is not just a newly-explored delectable cuisine that will be celebrated by the Filipino taste. It is also another livelihood opportunity for the Filipino community. ###

For more information on the featured product, please contact: Ms. Myrna S. Eguia of the Bulacan Agricultural State Colleg (BASC). For more details please contact: (044) 677-2264 or myrna_eguia88@yahoo.com.

Ingredients for pickling ampalaya PHOTO: LPADILLA

Promising results from sweet sorghum R&D puts Phl in a good spot

PHOTO: RDELACRUZ

With the recent developments in the country wherein government agencies are looking into fuel feedstocks that have high potential for commercialization, sweet sorghum has risen to fame with its promise as an alternative source of biofuel. One of the government agencies that have set its priorities on sweet sorghum is the Bureau of Agricultural Research (BAR), focusing on how viable and competitive sweet sorghum as source of bioethanol feedstock.

Its strategies and activities toward commercialization of sweet sorghum for commercial production of ethanol have been formulated and started was discussed extensively in a talk presented by Professor Rex Demafelis of the University of the Philippines Los Baños (UPLB) during at the 7th Agriculture and Fisheries Technology Forum and Product Exhibition on 11 August 2011, SM Megamall.

Demafelis, a licensed professional chemical engineer and professor at the Department of Chemical Engineering, UPLB, discussed "Biofuels Feedstock Development," with an underlying aim toward commercialization of alternative biofuel feedstocks in our country—focusing primarily on the potentials of sweet sorghum.

The current mandatory provisions, according to Prof. Demafelis, include Republic Act 9367, or The Biofuels Act of 2006, that calls for mandatory blending of bioethanol and biodiesel to gasoline and diesel, respectively. Effective 6 February 2009, the blending of 2 percent biodiesel in all diesel fuels sold in the country was implemented. Not everyone may be aware of it, but diesel sold in gasoline stations all over the country today is 2 percent biodiesel. As of last 6 August 2011, 10 percent bioethanol blending with gasoline with certain octane levels was also implemented, thus increasing the demand for bioethanol.

Last year, there was a 5 percent mandatory blending of bioethanol with gasoline. The fuel displacement or bioethanol requirement reached 178 million liters. This year, by merely multiplying it by two, seeing as the requirement has now reached 10 percent blending of bioethanol to gasoline, the demand should increase to nearly 360 million liters. If the increase in percentage of blending continues, the projections of the good professor are that, if we have to blend 15 percent bioethanol by 2015, we will need about 645 million liters of bioethanol by that year.

In terms of biodiesel, the demand last year reached 107 million liters as per required 2 percent blending of biodiesel with all diesel fuel sold in the country. Projecting a 10-percent biodiesel blending requirement by 2015, studies showed that the requirement should reach 663 million liters annually.

As per Prof. Demafelis' presentation, the crop advantages of sweet sorghum as compared with sugar cane includes: lower water requirement and greater resilience to drought; relatively lower fertilizer requirement; shorter crop cycle (two to three croppings per year); higher cane yield per hectare per year (an average of 50 tons/hectare per cropping); and, it is considered a multicrop as both its stalk and grains can be used for ethanol production, its grains for poultry feed, and its stalks for sugar and vinegar production. However, it cannot be used for table sugar as it cannot be crystallized.

In terms of benefits to the sweet sorghum farmer, Prof. Demafelis presented an estimated cost/income potential, using a matrix provided by Dr. Heraldo Layaoen of the Mariano Marcos State University (MMSU). Dr. Layaoen has been heavily involved in the evaluation of sweet sorghum as a farmer's crop. With two croppings in the dry season, one as seed crop and the other as ratoon crop, the Prof. Layaoen's data included a set of parameters: yield of 50 tons/hectare of cane from the seed crop and 3,000 kg seeds per hectare. With these parameters, at a price of Php700 per ton of cane, a farmer could earn Php35,000 out of the cane and Php30,000 out of the seeds at Php10 per kilo, for a total gross sale of Php65,000. Production cost during this first cropping amounts to Php30,755 for a net income of Php34,245.

For the ratoon crop, with the same parameters of Php700 per ton of cane and Php10 per kilogram of seeds and the same tons of seeds and cane harvested, the cost of production decreased from Php30,000 to about Php15,000 with the deduction of the costs of seeds and land preparation. With a total sale of Php65,000, less the decreased cost of production for the ratoon crop compared with the seed crop mentioned earlier, the net income amounts to Php49,700. Adding up these net incomes projected for a single dry season, the total could reach Php83,960.

Prof. Demafelis reported that not only will farmers benefit from this new venture, but processors can also do as well. He presented a table outlining a projected selling price of ethanol coming

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BFAR 5 conducts techno demo on food products from seaweeds

New products from seaweeds: leche flan and spaghetti developed by BFAR/RFRDC 5. PHOTO: EAQUINO

The Bureau of Fisheries and Aquatic Resources-Regional Fisheries Research and Development Center 5 (BFAR-RFRDC) has turned seaweed into extraordinary dishes - literally, twists on your favorite snack and dessert. Seaweed spaghetti and leche flan from seaweeds are culinary preparations that would definitely soothe your taste buds.

These were showcased during the 7th Agriculture and Fisheries Technology Forum and Product Exhibition. RFRDC Manager Aida Andayog and her staff held a technology demonstration on how to prepare the dishes.

Seaweeds are endemic to marine waters. Local varieties are variously known as "*gulaman dagat*", "*guso*" or "*tambalang*". Based on the presentation, seaweeds are a valuable and nutritive product. In human nutrition, it can help build and sustain the broad nutritional requirements and balance of vitamins, minerals and vital nutrients on which optimum health and vitality depends.

According to Ms. Andayog, seaweeds are low-calorie foods with easily digestible sugars and fats. Seaweeds are a source of minerals, essential fatty acids, nucleic acids like RNA & DNA, and phytochemicals such as carotenoids, protein and fiber.

She added that value-added products from seaweed are easy to prepare, cook and eat. Delicious and nutritious recipes are readily available and are affordable.

Seaweed spaghetti and leche flan can give you a return on investment of 35.48 percent and 26.50 percent, respectively.

The development of these products were integrated in the project *"Product Development/Improvement and Commercialization of Seaweeds in Bicol Region"*. Funded by the Bureau of Agricultural Research, the project aims to standardize and commercialize seaweeds and processed seaweed products for market competitiveness.

Other seaweed-based processed products that have been developed by BFAR-RFRDC are: *morcon*, chocolate bar, juice, jam, *lumpia*, *longanisa*, tart, and *yema*, among others. ***(Ma. Eloisa H. Aquino)***

***Promising results**..from page 8*

PHOTO: RDELACRUZ

from sweet sorghum compared with petroleum gasoline at Php55 per liter. In the computation, should the processor buy the sweet sorghum cane at PhP700 per ton cane (or PhP/TC) with the estimated 9 percent, the selling price of ethanol coming from sweet sorghum amounts to Php33, a much lower price than Php55 for gasoline. Even if the processor buys the sweet sorghum stalks at a projected higher price of 1,700 (Php/TC), the selling price falls at Php53, still lower compared with gasoline. In addition, sweet sorghum has a °Brix or estimated fermentable sugar of 9 percent, and as the fermentable sugar of sweet sorghum increases, wherein studies show results higher than the estimated 9 percent, the more viable the ethanol's country production using sweet sorghum becomes. Thus, with a higher fermentable sugar of as much as 15 percent, with a Php/TC of 700, the projected selling price can be as low as Php28, much cheaper indeed than petroleum gasoline.

There is also the development of sweet sorghum hybrids, with studies funded by BAR and implemented by the Institute of Plant Breeding (IPB). In addition, under the collaborative work of Prof. Demafelis and Dr. Layaoen, plantation trials were implemented with the industry players which was further realized through the conduct of the "1st Sweet Sorghum Business Summit and Plantation Showcase" held in June 2011 in Negros Occidental.

Given these small yet promising results that are being looked into even further, the country sees a great chance that soon enough, it can fend for itself in terms of the availability of fuels and deal effectively with their externally influenced pricing, and even better, compete at the forefront with the rest of the world to provide a cleaner environment. ***(Maria Anna M. Gumapac)***

Project on cashew nut processing helps women's association in Bataan

Members of the Alion Kapit-Bisig SEA-K Association (left) producing various products from cashew nuts (top) using the nut sheller equipment developed by PhilMech.
PHOTO: ZREYNOSO

Through assistance given under various government programs and initiatives, rural community-based enterprises have flourished throughout the nation. Government agencies such as the Department of Agriculture (DA) continue to assist local families in their livelihood ventures not only through financial grants, but also through projects that contribute to the enhancement of their livelihood projects which, in turn, can provide for a more prosperous way of living.

Through the Self-Employment Assistance Kaunlaran (SEA-K) program of the Department of Social Welfare and Development (DSWD), families living below the poverty line now have the opportunity to reduce poverty and learn the skills that will allow them to become successful entrepreneurs and businessmen/businesswomen.

Through forums such as the recent 7th Agriculture and Fisheries Technology Forum and Product Exhibition organized by the Bureau of Agricultural Research (BAR), these families now have a venue where they can further their knowledge on the skills needed to bring their enterprise to a bigger market and, possibly, even gain more through BAR's flagship initiatives such as the National Commercialization and Technological Program (NTCP) and the Community-based Participatory Action Research (CPAR).

Locally known as *kasoy*, cashew nuts are one of the most versatile nut crops in the Philippines as they find use in both the food and feed industries. With the growing domestic and international demand for the commodity, cashew growers continue to seek innovations in creating new cashew nut products that could fare well in both the local and international markets.

Grown for its cashew nuts and cashew apples, *kasoy* can be consumed raw or used to create various beverages, jams, chutney, and even pickled. Its kernel is used for baking and in the confectionery trade. It is eaten as a simple finger food served in small bowls during a feast, or as an appetizer while waiting for the main entrée to arrive and is usually consumed in roasted form with a pinch of salt to taste.

The challenge to collecting the cashew kernel is fairly simple: the kernel must be extracted from its shell with minimal damage to preserve the unique shape of the nut. Extraction in small scale operations is performed manually, while bigger producers use equipment specially developed for this specific function.

In the case of the Alion Kapit-Bisig SEA-K Association producing for the Gracielos Cashew Processing headed by Mrs. Elizabeth Denzon Paglinawan, they use a cashew nut sheller equipment developed by the Philippine Center for Postharvest Development and Mechanization (PhilMech). The step-by-step manual cashew nut process was shared by Mrs. Paglinawan during the forum.

Mrs. Paglinawan explained how the simple business promoted by the Alion Kapit-Bisig SEA-K Association in Bataan, Region III of the Philippines, made possible the empowerment of the women in their town as cashew nut processing allowed them to contribute to their daily family finances. It takes a little amount of effort to grow cashew nuts because they are easy to grow as they are not susceptible to common pests and bacteria, and are generally better able to withstand abrupt weather changes. Apart from this, the postharvest processes are very basic and are easy to learn, and heavy equipment is not required.

With government agencies such as DSWD, PhilMech, DA-BAR, and the local government unit of Bataan continuing to collaborate with associations such as Alion Kapit-Bisig SEA-K, enterprises that are deemed impenetrable by small local communities with meager budgetary capabilities are not only able to make and distribute highly marketable products, but are also now able to support and provide for their own families. ***(Zuellen B. Reynoso)***

BAR-NSRI scholar presents study results on PhI coffee in a seminar

Dr. Ruel M. Mojica of the Cavite State University (CaVSU) presented his findings from his study titled "Influence of Roasting on Total Phenolic Content and Antioxidant Activity of Philippine Coffee" in a seminar organized and sponsored by the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) on 25 August 2011.

Dr. Mojica, a post-doctoral fellow, is a grantee of the DA-BAR and University of the Philippines Natural Sciences Research Institute (UP-NSRI) under the "Post-Doctoral and Senior Scientist Research Fellowship in Basic Research in Agriculture and Fisheries" program.

His study included four types of coffee: *Coffea arabica*, considered the best in quality due to its flavor and aroma; *Coffea liberica*, known locally as *Kapeng Barako*, which produces the biggest berry; *Coffea excelsa*, with smoother, thinner, and more rounded leaves with a smooth edge; and *Coffea robusta*, characterized by a large umbrella-shaped growth and berries closely clustered when ripe.

Coffee, before being consumed, has to undergo a number of processes, one of which is roasting. Proper roasting is an essential step for bringing out the aroma, flavor, and color of coffee. According to Dr. Mojica, the mode of heat transfer and applied temperature profile are the most critical parameters that have major impact on the chemical properties of coffee. During roasting, green beans are heated at 200–240 ^{0}C for 10 minutes, depending on the degree of roast required. Coffee is qualitatively assessed for moisture content, for example, with a single categorization as light, medium, dark or very dark roast.

Roasting leads to profound changes in the chemical composition of coffee such as proteins, amino acids, fatty acids, and many of which are due to the Maillard reaction. The Maillard reaction occurs when sugars condense with amino acids and proteins and this leads to the formation of a wide variety of compounds that are said to possess antioxidant properties. Similar to caramelization, the Maillard reaction is the result of a chemical reaction between an amino acid and a reducing sugar that usually requires heat.

Dr. Mojica presented his results, wherein lightly roasted coffee does indeed produce the highest amount of antioxidants. Antioxidant properties can be found naturally in many foods and beverages that provide health benefits in preventing diseases such as heart diseases, cancer, etc. In the body, antioxidants work by directly reacting with the free radical—donating an electron to the free radicals. Any antioxidant can supply the free radical with a replacement for its missing electron. In this study, it was shown that the degree of roasting strongly affected both the total phenolic content and antioxidant activity of Philippine coffee, and that

Dr. Ruel Mojica delivers the findings of his study during the BAR Seminar Series.
PHOTO: MGUMAPAC

light roast coffees contain the highest total phenols at all tested varieties.

With this regard, Dr. Mojica proceeded to show that, in the local setting, although there are already several studies on the chemical composition of different coffees, no basic research on coffee has been done. In fact, no studies were reported on the total phenolic content and antioxidant activity of our local blends. Thus, Dr. Mojica's research was conceptualized and conducted.

He adds that this research can be a useful tool in conducting applied research such as the formulation of special coffee blends with high beneficial effects on health. BAR Asst. Dir. Teodoro Solsoloy in his speech mentioned how Dr. Mojica's study will benefit the coffee industry and the agriculture sector as a whole given that coffee is an economically important commodity. "Seeing as the Philippines has been importing coffee for the past 10 years, with this research results we can hope to eventually export our own in the near future. Moreover, results of studies, such as this, could pave the way to enhance and promote the competitiveness of Philippine coffee against imported varieties," he said. ***(Maria Anna M. Gumapac)***

Roasting coffee beans can affect its phenolic content and antioxidant activity.

Seagrass as handicraft raw material explored

Richard Bach once quoted, "every problem has a gift for you in its hands". This is the scenario that best describes Camarines Sur, which is known as one of the best tourist destinations in the country. Despite an underlying problem that mars the economic development of the said province, its tourism progressing by leaps and bounds.

In the recently held technical seminar series of the Bureau of Agriculture Research (BAR), the 7th Agriculture and Fisheries Technology Forum and Product Exhibition, Mr. Emmanuel P. Oroyo of the Bicol Integrated Agricultural Research Center (BIARC) presented a BIARC project that promotes the exploitation of a heretofore, relatively unappreciated resource with the potential to answer the local farmers' problem on productivity.

This project titled, *Enterprise Development in Flood Prone Areas in Camarines Sur*, tackled the long-standing problem of low productivity in the vast flood-prone rice-producing areas (particularly along the Bicol river basin) and the solutions they came up with to solve this dilemma.

In his presentation, Mr. Oroyo said that because of no assurance on return of investment, plenty of farmers left their farms fallowed during rainy season. Due to this fallow period, it resulted to the dense growth of various weeds and seagrasses. However, removal of these weeds and seagrasses incurred additional costs for herbicides and labor.

With this, the Palayamanan project of PhilRice at San Fernando, Camarines Sur, spearheaded the development of integrated farming system for the flood-prone areas. The new cropping system that was developed gave birth to the local seagrass craft industry. Rather than considering the seagrass as a "pest" that should be removed, farmers were taught to look at it as a potential handicraft raw material.

Seagrass (*Rynchospora corymbosa*) is a coarse edge plant with

Products from seagrass *(Rynchospora corymbosa)*
PHOTOS: DDELEON

distinct triangular broad leaves measuring about one meter long. Locally, it is called *ragiwdiw* and is also known as *agas* elsewhere in the Bicol region. It grows abundantly in flood-prone areas of Bicol along swamps, streams, canals, and ditches. The *salapid*, the hand-twined dried stalks from the seagrass, can be used as a primary raw material in handicraft-making.

The potential of seagrass in the handicraft industry paved the way for BAR to extend institutional support. Through BAR's provision of handicraft welding machine, other production tools, and construction of curing room for produced seagrass handicrafts, it is now easy for the handicraft-makers to maximize the seagrasscraft industry's full operation. They can now accommodate large bulk of orders and supplying it to the local handicraft industry market mainstream.

The increasing popularity of using seagrass fiber among the handicraft-makers is due to its comparability to abaca sheath. Based on the comparative analysis done between seagrass fiber and abaca sheath as raw material for handicraft production, seagrass fiber cost less (P40.00 per bundle) than the abaca sheath (P300.00 per bundle), seagrass only takes 2-3 months before maturity for harvesting than the abaca sheath which takes 18-24 months, and seagrass fiber has greater resistance to molds during storage and rainy season than abaca sheath.

As an off-farm source of livelihood, engaging in seagrass enterprise is enough to sustain the daily needs of an average household. Amounting to P0.60 per meter, an average household (5 members) can produce 500 meters of *salapid* which fetches about P300.00 per day.

According to BIARC Manager Ms. Luz R. Marcelino, they have a wide array of seagrasscraft ranging with functional uses such as trays, bags, slippers, and hampers to decorative

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Grow-out culture of sea urchin worthy of investment

Sea urchins *(Tripneustes gratilla)* PHOTO: BFAR I

Notwithstanding its globular, spiny appearance, sea urchins (*Tripneustes gratilla*) have proven to be a lucrative shellfish industry worldwide. However, the high economic value of sea urchins prompted its depletion due to over exploitation. With this concern, the Bureau of Agriculture Research (BAR) included in the 7th Agriculture and Fisheries Technology Forum and Product Exhibition, a featured seminar that discussed a BAR-funded project that is looking into the problems, solutions, and future of the sea urchin industry in the Philippines and its status for commercialization.

The seminar was delivered by project leader, Ms. Amanda S. Galang, a senior aquaculturist of Bureau of Fisheries and Aquatic Resources – Regional Fisheries Office I (BFAR-RFO I) in San Fernando, La Union. In her presentation, she said that the country is not spared the problem pertaining to unregulated harvesting of sea urchins. One of the solutions that they have come up with is the practice of grow-out culture.

Locally, known as *'maritang-tang'* in the Ilocos region, *'kuden-kuden'* in Pangasinan and *'tuyom'* in the Visayas, the initial grow-out culture of sea urchins was undertaken in sea pens at Brgy. Nalvo, Ilocos Sur in 1998. Since then, BFAR-RFO 1 has been vigorously promoting the cage culture of sea urchins.

Grow-out culture simply means that the sea urchins are collected and raised to marketable size in bamboo pens installed on the reef flat. The grow-out cages are regarded as 'mini-reproductive reserves'. Grow-out culture effectively protects seedstock species (juvenile sea urchins) from natural predators, increases survivorship to reproductive maturity and enhances recovery of depleted natural population. As observed upon the introduction of grow-out culture, with the increase of sea urchin in the area, there has been a remarkable growth also of other species such as sea cucumbers, indicating that the practice may also be contributing to the survival of other vulnerable animal life nearby.

For those who want to engage in sea urchin grow-out culture in cages, some general considerations need to be heeded before starting. First, avoid building cages in area with very low salinity because this is stressful for sea urchins and may result in mass mortality. Second, cages should be ideally situated in a sheltered area where wild *T. gratilla* are naturally found. Third, avoid areas prone to *'kulaba'* or water poison. Fourth, stock the cages with fresh *Sargassum* (brown algae) regularly even if some food still remains. This is to ensure that urchins feed at maximum rates and consequently grow fast and develop large gonads. Finally, for beginners, the UP-MSI recommends to start with about 3-4 grow-out cages, each with approximately 1000 – 5000 seedstock species (about 25-500 individuals per square meter).

When harvesting, keep in mind that bigger urchins command a better price. Thus, it is stressed that only the biggest urchins should be harvested.

Production of sea urchins under grow-out culture promotes resource conservation for it prevents further depletion of sea urchins and, at the same time, provides an alternative source of livelihood to the community. Sea urchins fishery is a good livelihood because there is always a demand for the roe or gonads (the edible part of urchins) and is a high value product in the local and foreign markets. In the international market, Japan is the world's largest importer and consumer of roe (or *uni* in Japan). It is noted that during year 2000, roe was the most expensive marine product in the Tokyo central wholesale market. It is also considered a premium marine food delicacy in Korea, Greece, France, and New Zealand. In the domestic market, roe is considered a delicacy and is sold to specialty restaurants. The live sea urchin is sold at P60.00 - P70.00 per kilogram while the fresh chilled sea urchin roe fetches P1000.00 – P1200.00 per kilogram.

Aside being a food source, the shells of sea urchins can be used as fertilizer and as raw material for novelty items like candleholders.

Ms. Galang remarked that there are still issues that need immediate attention and long-term solutions such as the proper cage design and size, inadequate supply of juveniles at the start of project, sustainable harvest of *sargassum*, and poaching. Further interventions are therefore needed by

> ***"Production of sea urchins under grow-out culture promotes resource conservation for it prevents further depletion of sea urchins and, at the same time, provides an alternative source of livelihood to the community.***

Coconut sugar: A beneficial and highly lucrative rural-based enterprise

PHOTO: ZREYNOSO

In the seminar titled, "Rural Communities and Coconut Sap Sugar Production as a Farming Enterprise," presented in the technology forum of the 7th Agriculture and Fisheries Technology Forum and Product Exhibition last 11-14 August 2011 held at SM Megatrade Hall 3, SM Megamall, Mandaluyong City, representatives from the Philippine Coconut Authority (PCA) headed by Erlene C. Manohar shared with the audience the simple but effective process of producing coconut sap sugar that creates for a beneficial and highly lucrative rural-based enterprise. The forum serves as a venue for the exposition of current and ground breaking projects that have become vehicles of change for our local farmers.

Manohar explained the three basic components involved in coconut-based enterprises as production, which involves tapping of the coconut sap and processing; product development, that involves the standardization and regulatory processes; and marketing, which includes both the packaging and promotion.

To be able to perform these steps, key players in the different stages of production , development, and marketing are required. These basic components respond to the livelihood needs of the community, helping in the generation of income for families who become part of the team of workers that produce coco sap and other high-value coconut products.

Rural communities that engage in coco sap sugar enterprise share in the responsibilities of creating their product. The process begins with the coconut growers who are in charge of the raw materials. Toddy collectors then collect these raw materials and deliver them to the coco sugar processors who supply the finished product. Coco sugar processors, according to Manohar, are preferably women, "Nothing against the males… *Mas may pasensya ang mga babae at metikulosa*" ("women are more patient and are meticulous").

With the finished product, the local consolidator comes into the picture for product development, who then turns to the local trader for local market matching or the exporter trader for export marketing. For some of the products, shipping lines (outside the rural community) are involved in the movement of the products towards their specified markets. Government agencies monitor the standards and regulatory processes of the finished coco sap products. After regulation, agents who make marketing arrangements take the products, and present them to the last, but definitely not the least, key players which are the wholesale and retail buyers.

Since the inception of the PCA project in 2007 under the National Technological Commercialization Program titled, "Commercialization of High Value Coconut Products", development of coco sap enterprises have been flourishing. Not only have the products, particularly coconut sap sugar, developed to become competitive in the export market, but also the process has been enhanced to enable for almost zero waste coco sap after extraction. The popularity of coco sap sugar has also increased as numerous producers from North and South Cotabato, Zamboanga City, Misamis Oriental, Davao del Norte, and Davao del Sur have begun their own enterprises with some even producing to meet export demands.

Manohar emphasized in her lecture that most, if not all, of the recruited members of their workforce in North Cotabato are composed of simple housewives, once knowing only homemaking skills. After training, these women became equipped with skills and knowledge that have enabled them to venture out into business on their own and make their own coco sap sugar thus generating additional income for their families.

According to Manohar, because it is a simple process that can be learned in three days, as it only involves a simple heat evaporation process and toddy tappers could collect coconut sap multiple times in a day, this venture is a sure income-generating enterprise. Although it has been said that "coconut farmers are among the poorest of the poor," with this innovation, the coconut farmers' living condition should begin to change for the better. As most of the coconut businesses in the country are owned by big players in the industry, particularly those engaged in the copra business, the small coconut farmers is left with no choice but to work for these titans. With this innovation, small capital holders such as these farmers are now able to engage in a profitable business and compete in a bigger market, thus ensuring that they have better chances to survive and prosper.

"Dahil *sa funding na binigay sa atin ng BAR, maganda po ang tinakbo ng project na ito*," ("Because of BAR's funding, this project was a success") shared Manohar. Both the men and women shared the responsibilities in creating and maintaining, and in succeeding in rural-based enterprises. Government agencies and local government units have collaborated to provide a productive environment where ideas for sustainable livelihood projects can be tested. More families are able to rise above poverty, rural communities become key players in national and international markets, and our basic agricultural resources are further developed to reach their fullest production potentials. ***(Zuellen B. Reynoso)***