



## First int'l biomass conference concludes



Delivering a message on behalf of Department of Agriculture Secretary Proceso J. Alcala is DA Asst. Sec for Regulations Paz Benavidez II (top right). She highlighted the potentials of coconut as biomass for energy. She also recognized the efforts of the Bureau of Agricultural Research headed by Dir. Nicomedes P. Eleazar (bottom right) in supporting the DA-Biofuels Program.

PHOTOS: DBATTAD & EHERNANDEZ



Attended and participated in by major bioenergy players and investors both from international and local scenes, the University of the Philippines Los Baños (UPLB) in collaboration with the Bureau of Agricultural Research (BAR) concluded the first-ever "Philippine International Biomass Conference" on 16-18 June 2015 at Widus Hotel and Casino in Clark, Pampanga.

The conference with the theme, "Exploring the Market Potentials of Biomass for Bio-Based Fuels and Energy," served as a venue for information sharing on the status and market potentials of biomass in the country, as well as innovative technologies that are commercially-competitive and financially-sustainable in the conversion to bio-based fuels and energy of agricultural and forestry crops and residues and municipal solid wastes.

"Business, government and consumers must contribute to ambitious climate action that would have to include the massive shift from fossil fuels to green energy, including biomass energy," said Department of Agriculture (DA) Assistant Secretary for Regulations Paz Benavidez II in her discussion and presentation titled "Status and Potential of Agricultural Residues in the Philippines".

According to Asec. Benavidez II, "biomass is largely waste and nothing can be wrong in transforming waste into usable energy". She cited five reasons why biomass is a good alternative for biofuels: 1) it reduces dependence on fuel oil, 2) it is renewable, 3) it has practically no emission of greenhouse gas and other pollutants, 4) it improves rural income and employment by putting waste into good use, and 5) it reduces foreign exchange outflows.

In her presentation, it showed that coconut has greatest potentials in producing power from biomass residues. "Of the 2013

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# Dar lays out directions for Phl biomass energy



Dr. William D. Dar presenting on "Biomass Energy in the Philippines: A Global Perspective"

PHOTO: ABRION

**B**ioenergy will substantially contribute between a quarter and a third of global primary energy supply in 2050. Utilizing it will bring about significant reductions in greenhouse gas emissions, and potentially other environmental benefits," said Dr. William D. Dar, president of the Inang Lupa Movement and former director general of the India-based International Crops Research Institute for the Semi Arid Tropics (ICRISAT), during the 2015 Philippine International Biomass Conference held on 17 June 2015 in Clark, Pampanga.

In his presentation, "Biomass Energy in the Philippines: A Global Perspective," Dr. Dar discussed on the potentials of energy derived from biomass such as trees, energy crops, agricultural products and wastes, and

and social development in rural communities," he furthered. Dr. Dar cited sweet sorghum as an example, particularly its stalk, in the production of bioethanol. The local production of sweet sorghum for bioethanol can cut the country's importation of fossil fuels like gasoline, and therefore contribute in lessening vehicle-fuel costs and carbon emanation. In 2004, the Bureau of Agricultural Research (BAR) and ICRISAT embarked on the project, "Enhancing the Adoption of ICRISAT Legume Varieties and Technologies in the Philippines". Under the project, BAR supported field trials and varietal testing of sweet sorghum varieties that highly exhibit potentials for bioethanol production.

According to Dr. Dar, when it comes to biomass resources, long term

other residues. "By substituting imported fossil fuels with domestic biomass, there will be improvements in energy security and trade balances. Also, it will pave for opportunities both for economic

potential depends on land availability for the continuous growth of energy crops used for biomass-based energy. He also explained that the uptake of biomass will depend on production cost, logistics, resources and environmental issues. In exploring the potentials of biomass as an alternative renewable source of energy, the sector is still confronted with challenges such as ensuring the sufficiency of feedstock supply, economies of scale and logistics, competition, and acceptance from the public and non government organizations.

With these, Dr. Dar laid out that policy objectives should be aligned in having greater access to bioenergy, and are anchored on CO<sub>2</sub> emission reductions, energy security, and social and economic objectives. "Moreover, they should focus on improving land productivity, fossil fuel replacement efficiency, reduction of direct and indirect emissions from land conversion, and the importance of time scale," he reiterated.

Dr. Dar highly believes that such policy initiatives should be part of a long term vision, specific to the national or regional characteristics and strengths. "They should take into account the development stage of a specific bioenergy technology. Access to markets and to sectors that will ensure feedstock availability

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# Turning agri residues into viable biomass energy



UPLB-IBRSC Chair Rex B. Demafelis shares the potentials of agricultural residues as source of energy.

PHOTO: ABRION

**A**gricultural residues are traditionally used as compost, animal feed and additive for textiles, the residue conversion to energy is considered a prospect to attain economic progress thru energy sufficiency and independence,” explained Professor Rex B. Demafelis, vice chancellor for Research and Extension of the University of the Philippines Los Baños (UPLB) and chair of the Interdisciplinary Biofuels Research Studies Center (IBRSC).

The Philippines, considered to be one of the agricultural countries in the world, produces huge amounts of biomass from its major agricultural crops like rice, corn, and coconut. Other potential biomass feedstocks include algal biomass, fast-growing energy crops like grasses, forest residues, and municipal wastes. Awareness on the massive amount of residues has triggered experts and the government to look for ways on how to utilize them.

One solution being tapped is to convert the potential resources of residues to power and bioethanol. However, the conversion of agricultural wastes, forest residues, and grasses for power production is yet to be commercialized. There are a number of unconsolidated R&D efforts concerning biopower (power from biomass sources) production. Biopower is another area of R&D that needs to be accelerated.

an avenue for farmers to generate additional income. Researchers were also encouraged to conduct studies on the utilization of by-products and agricultural wastes. Studies on biomass utilization for bioenergy are supported through the Biofuels Program of the DA spearheaded by the Bureau of Agricultural Research (BAR).

The proposed biomass R&D program aims to accelerate the technology development and utilization of the country’s biomass resources through a systematic collaborative research and development as a way to promote food security, energy independence, environmental protection and generation of investments and income opportunities for the Filipinos.

This is in line with the country’s continuous efforts towards energy self-sufficiency that led to the implementation of Republic Act 9367 (R.A. 9367) also known as The Biofuels Act of 2006. The law mandates the blending of biofuels to all diesel and gasoline sold in the country. Biodiesel and ethanol have been recognized as very promising alternative fuels because their sources could be indigenous, sustainable, and renewable.

In response to the mandate of R.A. 9367, UPLB formed the Alternative Energy RDE committee in July 2006 and created a roadmap on alternative biofuels feedstock that covers the period 2005-2020 which

One of the DA’s thrusts is to promote sustainable agricultural development through the use of biomass, particularly agricultural wastes and residues. The Department of Agriculture (DA) supports the initiatives on biomass utilization not only for bioenergy production but also for other value-addition activities which provides

will include feedstock development and conversion improvement (2005-2010), pre-commercial and commercial stages (2010-2015) and advanced by-product and waste utilization (2015-2020).

The DA crafted the DA Biofuel Feedstock Program involving those in the academe, research institutions, LGUs, and other stakeholders to mobilize and to lay the foundation and to forge its structures through the conduct of various research, development, and extension initiatives on biofuels initiatives in the country.

BAR, as one of the member agencies of the Program, is in charge of developing viable and quality biofuel feedstock through research and development (R&D). The bureau has been funding and coordinating 50 different projects on biofuels and has been supporting R&D activities from the initial production to adaptability testing to full scale implementation to commercialization of the crop. BAR coordinates and channels efforts of key players and stakeholders under unified biofuels R&D plans, programs, and activities. ### (Ma. Eloisa H. Aquino and Lisa Stephanie H. Dizon)

## Dar lays out...from page 2

should be given attention. Equally important to consider are sustainability issues, addressing continuity and predictability, and broader energy and environment legal and planning framework,” he added.

As to what the Philippines should do in order to move forward, Dr. Dar pushed to stimulate bioenergy routes that generate heat and electricity derived from residues and wastes, and to increase the deployment of bioenergy. “Increased investments should also be given for research and development of new biomass and improved biomass conversion technologies. Policies that will encourage increased productivity in agriculture and forestry should also be strengthened,” Dr. Dar furthered. ### (Anne Camille B. Brion)

# Biomass conference participants visit Phl's first rice husk-fueled power plant



The San Jose City I Power is the first in the country fueled by biomass (rice husks) . It is located in San Jose City, Nueva Ecija.

PHOTO: DDELEON

To see what the future holds for the biomass-to-energy industry in the country, the participants of the 2015 Philippine International Biomass Conference visited the San Jose City I Power (SJC I Power) Corporation in San Jose City, Nueva Ecija.

SJC I Power is the country's first commercial power generation plant that uses biomass as feedstock. Specifically, the plant is powered by 100 percent rice husks, and is envisioned that using green technology will alleviate the problem in power shortage in Luzon.

Prior to the actual tour, participants were briefed on the plant's history. According to Engr. Christopher S. Corrales, SJC I Power industry support specialist, the basis of putting up a power plant that uses rice husks as its feedstock was the feasibility study on enhancing the energy self-sufficiency of rice mills done by the Philippine Rice Research Institute and Full Advantage Phils International, Inc. in 2004.

In 2012, using the result of this study, the San Jose City Rice Millers Association (composed of more than

20 rice millers of Nueva Ecija), together with national and local government and private investors, collaborated to build the first ever biomass-fired power plant in the country.

Engr. Corrales shared that there are already existing power plants in Isabela and in Mindanao that are fueled by rice husks but their produce are for their own consumption only. The SJC I Power is the only power plant in the country that makes their produce energy commercially-available. The plant is capable of generating 12 megawatts (MW) but can only distribute 10.5 MW to the Luzon grid as it also needs energy for its own operation.

The plant needs at least 12 - 14 tons of rice husks per hour to operate, and uses up to 110,000 metric tons of rice husks annually. Engr. Corrales assured that there is no foreseeable shortage on the supply of rice husks as the concentration of major rice-producing provinces is in Luzon.

After the briefing, the participants were toured inside the power plant, and went to see up-close the main components of the power plant such as the boiler (steam generator), steam turbine, turbine generator, among others.

The SJC I Power has been operationalized since 2014 and there is already a laid-out plan to put up again another 12 MW biomass power plant as expansion site. ### (*Diana Rose A. de Leon*)

## First int'l biomass...from page 1

coconut production of 15.35 million MT, recoverable biomass was estimated at 2.3 million MT shells and 5.07 million MT husks with Davao region and Northern Mindanao as the highest producer of shells and husks, respectively."

She acknowledged the initiatives of BAR in its support to the studies on biomass utilization for energy as part of the Biofuels Program of DA.

Meanwhile, UPLB Chancellor

Dr. Fernando C. Sanchez, Jr. presented the initiatives of UPLB on biomass research and development, most of which are being supported by BAR specifically its commercialization. He also mentioned the role of the UPLB in "strengthening linkages among the academe, government agencies, industries, and private sector through interdisciplinary exchange of information on biofuels".

Representing President Benigno Simeon C. Aquino III as a luncheon speaker was Department of Energy Undersecretary Raul Aguilos. He highlighted on the important role of agriculture in achieving sustainable power through biomass technologies.

Other invited speakers from different countries were: Dr. Jon Bennett, vice-president for Business Development for SDL Citadel, LLC (USA); Mr. Ryuichi Ikeda, sales division chief for SOL Asia Holdings (Japan); Mr. Hoong Chee Kean, business development manager for ABENGOA (Spain); and Dr. Anjan Ray, regional commercial director for Honeywell UOP (Canada). They presented their respective technologies and competitive business model in the production of power and fuels using biomass and municipal solid waste.

Other conference speakers present were: Dr. Bernardo D. Tadeo, president and CEO of Full Advantage Phils. International, Inc; Ms. Belly C. Cabelo, technical staff, Department of Energy and Natural Resources-Solid Waste Management Division; Mr. Archimedes B. Amarra, executive vice president for Agro-Industrial R&D and Farm Operations of Roxas Holdings, Inc.; Dr. William D. Dar, president of InangLupa Movement; Mr. Dexter S. Pajarillo, investment specialist from the Resource-based Industry Services of the Department of Trade and Industry-Board of Investments (DTI-BOI); and Ms. Anita C. Salayon, senior assistant vice president of the Development

# Evaluation for Gawad Saka nominees started

The Bureau of Agricultural Research (BAR), as the national coordinator and secretariat for the annually conducted search for the Gawad Saka Outstanding Agricultural Scientist (OAS) and Gawad Saka Outstanding Agricultural Researcher (OAR), officially commenced the rigid process of evaluation of all submitted nominations for both categories by holding a desk evaluation on 25-26 June 2015 at Midas Hotel, Pasay City.

Conducted through the faculties of the members of the 2015 National Technical Committee (NTC), a team composed of experts from different sectors of agriculture, the evaluation process for both categories has two phases. First was the desk evaluation wherein each nominee's portfolio of accomplishment and nomination form were assessed and scored for merit and significance. With both Gawad Saka Search for OAS and OAR having their own set of criteria, the NTC then conducts the next level of evaluation, which is the on-site visit and evaluation, to nominees who scored equal or better than the set grade in the desk evaluation. During the on-site visit and evaluation, members of OAR and OAR NTC validate and document the significance and impact of the shortlisted nominee's

Bank of the Philippines; Mr. Joseph B. Lledo, vice president of BDO Unibank, Inc.; and Ms. Josefina A. Ramos, environmental officer/program manager of the Environmental Program and Management Department of the Land Bank of the Philippines.

The second day of the conference closed with a market matching activity to foster linkages and agreements among the participants. Culminating the event was the field visit at San Jose City I Power Corporation on the third day to exhibit an actual power plant using biomass as feedstock.

The conference was co-organized by the Department of Energy (DOE) and the Department of Environment and Natural Resources (DENR). ### (Ma. Eloisa H. Aquino and Anne Camille B. Brion)



BAR Director Nicomedes P. Eleazar (left) and Asst. Director Teodoro S. Solsoloy (right) lead the evaluation of nominees for the Gawad Saka Outstanding Scientist and Researcher.

PHOTO: MVALDEABELLA

projects and initiatives.

Leading the evaluation was Dr. Nicomedes P. Eleazar, director of the Bureau of Agricultural Research, along with Dr. Teodoro S. Solsoloy, BAR assistant director, who serves as the chairperson and vice chairperson of the NTC for both categories, respectively. Dr. Eleazar officially opened the evaluation as he thanked the members of the NTC for their usual support and dedication in assisting the DA as they search for this year's awardees. He also recognized the BAR-Institutional Development Division (IDD) for facilitating and coordinating the process, along with other technical staff from other divisions of the bureau. Dir. Eleazar emphasized the significance of the evaluation in attaining the goals set by the DA for all categories in the annual search for outstanding achievers in agriculture and fisheries. He also shared how he has been part of the search's secretariat during its early years of institutionalization in the department and how the process has

indeed evolved for the better.

To ensure that everyone was on the same page prior the evaluation, IDD head and member of NTC for both categories, Ms. Digna Sandoval, discussed the criteria and other vital information regarding this year's search. This was followed by the separate discussion and workshop for the each category.

Ms. Marjorie Mosende, OIC, asst. head of IDD, facilitated the discussion. The 2015 NTC for Gawad Saka Search for OAS is composed of Dr. Roberto Rañola of the University of the Philippines Los Baños (UPLB), Dr. Jose Hernandez (UPLB), Dr. Mudjekeewis Santos of National Fisheries Research and Development Institute (NFRDI), and Dr. Jonar Yago of Nueva Vizcaya State University (NVSU) while the 2015 NTC for Gawad Saka Search for OAR is composed of Dr. Enrico Supangco (UPLB), Dr. Elda Esguerra (UPLB), and Mr. Len Garces (WorldFish Center). ### (Mara Shyn M. Valdeabella)

# 8 AFACI projects evaluated



Participants of the 2<sup>nd</sup> Evaluation of Completed and On-going AFACI Projects

PHOTO COURTESY: PLESACA

The Bureau of Agricultural Research (BAR), as the lead coordinating R&D agency of the Department of Agriculture (DA) for the Asian Food and Agriculture Cooperation Initiative (AFACI), affirmed its commitment by conducting the 2<sup>nd</sup> Evaluation of Completed and On-Going Projects on 3-5 June 2015 in Clark, Pampanga.

AFACI is a network of agricultural cooperation aimed at promoting sustainable agricultural growth in the Asian region and contributing to economic development in Asian countries. Established in November 2009, its member-countries include Bangladesh, Cambodia, Indonesia, Korea, Laos, Mongolia, Nepal, Philippines, Sri Lanka, Thailand, and Vietnam. The network is based at the International Technical Cooperation Centre of the Rural Development Administration (RDA) in South Korea.

Mr. Joell Lales, head of the Planning and Project Development Division, welcomed the participants and echoed on the importance of the event in terms of regional cooperation in promoting agricultural development. He also underscored the bureau's endeavor on Plant Genetic Resources.

BAR Director Nicomedes P. Eleazar acknowledged the support of project implementers and their respective agencies by coordinating with the bureau and thus presenting the updates and accomplishments of AFACI funded projects. He mentioned

that it is strategic that BAR has been identified as the coordinator of AFACI since most of the projects have applied and basic research domains. He cited that BAR has two on-going projects with AFACI, namely: 1) Strengthening the Country's PGR Management System on Solanaceous Crops Germplasm; and 2) The Agricultural Technology Information Network in Asia (ATIN).

Eight AFACI projects were presented and evaluated. The panel of evaluators was composed of BAR Technical Advisers, namely: Ms. Josephine Lantican, Ms. Virgie Agcopra, and Engr. Roberto Villa. The advisers zeroed-in on the economic aspects of the projects, impact to the farming and fishing communities, food value chain, as well as sustainability.

The first presenter, Ms. Digna L. Sandoval, BAR-Institutional Development Division head, reported the highlights of the completed project titled "Strengthening Plant Genetic Resources (PGR) Management System: Conserving the Diversity of Priority Vegetables (Solanaceous Crops) Germplasm of the Philippines." Ms. Sandoval explained that the project intends to strengthen the management system for PGR conservation, exploration, collection, characterization, among others for sustainable use. She also recommended further regeneration and characterization of the germplasm as the project progresses.

Ms. Jovette Tenorio of the Bureau of Soils and Water Management (BSWM) presented updates on AFACI – Asia Network for Sustainable Organic Farming Technology (ANSOFT) Phase II. The second phase is the establishment of a model organic farming village in Catarman, Camiguin Island, which, according to her, is gaining positive momentum, and added that the provincial government had played active role in promoting organic agriculture.

Ms. Corazon Ditarro, also from BSWM, reported the salient accomplishment of the project titled "Production and Service of Agro Meteorological Information System for Climate Change Adaptation." The historical and appended data, which were embedded in the system (database), served as guide to farmers.

Reducing postharvest losses and ensuring the quality of fresh horticultural crops have been given fresh insights by Dr. Perlita A. Nuevo of the University of the Philippines Los Baños in her project updates on "Establishment of Network and Model Manual on Postharvest Technology of Horticultural Crops in Asia." According to Dr. Nuevo, cabbage postharvest handling is the main concern of the project and thus necessitates the production of a manual, which has already been completed. With pride, Dr. Nuevo announced that the Philippine Postharvest was awarded "Most Outstanding" implementer among the member-countries.

Mr. Genaro S. Rillon of the

# BAR's support to UPLB students recognized



BAR Director Nicomedes Eleazar (3<sup>rd</sup> right) and UPLB Chancellor Fernando Sanchez Jr. (middle) attend the recognition for donor institutions of graduating scholars organized by UPLB-Office of Student Affairs. Also in the photo are UPLB Vice Chancellor for Academic Affairs Dr. Portia Lapitan (3<sup>rd</sup> left), BAR-IDD Head Ms. Digna Sandoval (2<sup>nd</sup> right), and UPLB-OSA Head Dr. Nina Cadiz (1<sup>st</sup> right).

PHOTO COURTESY: MMOSSENDE

In extension of its appreciation and gratitude to both government and private institutions who have been providing assistance to students of the University of the Philippines Los Baños (UPLB) through scholarship and loan donors, the UPLB Office of Student Affairs (OSA) held the “Isang Pasasalamat...Isang Parangal” on 11 June 2015 at Makiling Hall, UPLB, Laguna. The celebration was also part

of the 55th anniversary celebration of OSA.

One of the institutions acknowledged was the Bureau of Agricultural Research (BAR).

Conducted only for the first time, the event also gave recognition to each donor institution's graduating scholars.

Launched in 2012, in partnership with UPLB, BAR has been giving scholarship assistance to selected UPLB

agriculture and agri-biotechnology undergraduate students through its Undergraduate Scholarship Program (UGSP). To date, BAR has provided scholarship to 35 students, 7 of which have already graduated from which 2 finished magna cum laude and 3 were cum laude.

Receiving the award for the BAR was Dr. Nicomedes P. Eleazar, bureau director. He was joined in by Ms. Digna Sandoval, head of BAR-Institutional Development Division (IDD), the team which handles and coordinates all projects and programs under the Human Resources Development Program (HRDP).

Aside from UGSP, the program also provides assistance to R&D employees through the Degree Scholarship Program (DSP), for those pursuing graduate studies (MS and PhD), and the Non-Degree Scholarship Program (NDSP), for those conducting their thesis/dissertation studies as well as those who wish to attend specialized trainings, collaborative R&D undertakings, or international scientific fora. ### (Mara Shyn M. Valdeabella)

Philippine Rice Research Institute (Philrice) presented the project titled, “Construction of Epidemiology Information Interchange System for Migratory Disease and Insect Pest in Asian Region”. The project is aimed at setting-up a multinational collaboration network for rice planthoppers causing rice production losses in Asian countries.

Science Chief Specialist Mary Grace Mandigma of the Bureau of Agriculture and Fisheries Standard (BAFPS) explained the consequence once a certain farm has been GAP certified. In her presentation on the project titled “Development of Locally Appropriate Good Agricultural Practices (GAP) Programs and Agriculture Produce Safety Information System”, an explanation on the systematic approach on GAP as well as recommendation to boost certification has been laid out. Ms. Mandigma

likewise reported that the results of the study was used in evaluating the most appropriate intervention in order to increase the level of adherence or compliance to GAP at the farmer level.

Mr. Donald Mateo of Philippine Center for Postharvest Development and Mechanization (PHilMech) presented the project titled, “Enhancing Agricultural Mechanization Technologies for Crop Production and Postharvest Processing of Cassava,” which aims to address the issues and concerns regarding mechanization and postharvest of cassava.

Dr. Victoria C. Lapitan of the Philippine Rice Research Institute (PhilRice) presented the project titled “Genetic Improvement for Upland Rice through MAS for Tolerance to Phosphorus Deficiency”. To help achieve rice self-sufficiency, the DA was encouraged to engage in upland rice-based farming (if appropriate) in

every region of the country.

Finally, Ms. Maria Rosario Lourdes Em, AFACI national contact person, thanked the bureau and commended all presenters for the success of the project review and evaluation. She also recognized the achievements made by the following Principal Investigators, as follows: Most Outstanding : 1) Establishment of Network and Model Manual on Postharvest Technology of Horticultural Crops in Asia (Dr. Perly Nuevo), and 2) Development of Rice Production Technologies for Increased Self-Sufficiency of Staple Food in Asia (Dr. Vicky Lapitan). Outstanding: 1) Asian Network for Sustainable Organic Farming Technology - ANSOFT (Mr. Rodel Carating), and 2) Enhancing Agricultural Mechanization Technologies for Crop Production and Postharvest Processing of Cassava (Dr. Romualdo Martinez) ### (Patrick Raymund A. Lesaca)

# Training workshop on agro-ecosystem capacitates YLP implementers



Participants of the training workshop on agro-ecosystem development and management for building climate-resilient communities

PHOTO: DDELEON

As part of the continuing activities on capacity development under the Yamang Lupa Program (YLP), the Bureau of Agricultural Research (BAR) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) organized a training workshop on agro-ecosystem development and management (AeDM) for building climate-resilient communities on 23-25 June at BSWM, Quezon City.

According to Dr. Junel B. Soriano, visiting scientist from ICRISAT and a member of Program Management Group of YLP, the purpose of the training workshop was for the participants to be acquainted

on AeDM approach as a viable strategy to foster climate-resilient communities, and to gain a better understanding on the best-bet strategies and practices on AeDM that can be used as they proceed in implementing YLP on their respective sites.

According to Dr. Soriano, AeDM involves “research and development strategies through sustainable and integrated approach

by enhancing the impact of ecosystem services, managing natural resources, adapting/mitigating climate change and developing capacity of different stakeholders to build climate-resilient communities in vulnerable areas towards improving rural livelihoods.” YLP is considered to be the best vehicle to bring forth AeDM practices in the country especially on the part of strengthening the watershed management system on the YLP sites.

ICRISAT scientists were invited as resource speakers for the technical sessions of the training. Dr. KV Raju, director of ICRISAT Development Center, gave an overview of AeDM practices in India and best-best strategies and options for

integrated AeDM including capacity development of stakeholders and roles of community-based organizations, participatory monitoring and evaluation, policies and institutional arrangements, and the role of ICT to build climate-resilient communities. Dr. Angara Ventaka Raghavendra K Rao, an agroclimatologist, presented the impact of climate change to ecosystem services and natural resources. Lastly, Dr. Kaushal Kishor Garg, a hydrologist, shared some of the strategies on ecosystem services and natural resources management.

After the technical sessions, a general workshop was arranged for the participants to talk about the activities and the deliverables of the plan AeDM project that will be included as one of the components of YLP. The following areas were the point of discussion: 1) convergence and resource integration, 2) AeDM implementing guidelines and processes/activities, 3) indicators for evaluation of agro-ecosystem development, 4) improving agro-ecosystem or watershed policies, practices and knowledge to impact people and ecosystems and, 5) research gaps and priorities on AeDM in the Philippines. ### (Diana Rose A. de Leon)



(L-R): Scientists from ICRISAT namely: Dr. KV Raju, Dr. Angara Ventaka Raghavendra K Rao, and Dr. Kaushal Kishor Garg serve as resource speakers for the training workshop.

PHOTOS: DDELEON

# Medium term plan for Climate Change R&D updated



Participants of the workshop to finalize the BAR's Climate Change RDE Agenda for 2016-2022

PHOTO: RDELACRUZ

To mainstream climate change concerns across all its research, development, and extension (RDE) programs, projects, and plans, the Bureau of Agricultural Research (BAR) spearheaded a roundtable discussion on 9-11 June 2015 in Clark, Pampanga to review, update, and finalize the BAR's Climate Change RDE Agenda for 2016-2022.

BAR Director Nicomedes P. Eleazar, in his message, pushed for a responsive and science-based Climate Change R&D Agenda and Action Plan that will be the bureau's guiding policy in mainstreaming climate change concerns in its RDE plans and programs. According to the bureau chief, it is important that the identified specific strategies for RDE activities be aligned with the current climate change thrusts and directions of the National Climate Change Action Plan R&D Priorities 2011-2028 and the DA's Systems-wide Adaptation and Mitigation Initiatives on Agriculture (AMIA). "With the crafting of the revised agenda, we hope to include

landscape-scale research on food security and natural resources, policy, and governance in order to achieve agricultural resilience to climate change and build up our capacity to meet expectations," he said.

Director Eleazar furthered that the workshop's output will also aid in the crafting of the Philippines' integrated and unified position for the upcoming international symposium on "Planning a Collaborative RDE Program on Climate Change among APEC Member Economies" which will be held in September 2015. The symposium is expected to develop a joint RDE agenda on climate change adaptation and mitigation among APEC member economies and to identify enabling mechanisms to implement such agenda.

During the workshop proper, the pool of experts was divided into three sectors according to their fields of expertise: crops, livestock and poultry, and fisheries and aquaculture. Considering each component of the whole value

chain from input down to policy, researchable areas for each sector were revalidated and further fine-tuned. After which, outputs were presented: Ms. Amavel Velasco of BAR-Project Monitoring and Evaluation Division (PMED) for the crops sector; Ms. Cynthia Remedios de Guia of BAR-Planning and Project Development Division (PPDD) for the livestock and poultry sector; and Dr. Mudjekeewis Santos of the Bureau of Fisheries and Aquatic Resources-National Fisheries Research and Development Institute for the fisheries and aquaculture sector.

Mr. Joell Lales, head of PPDD, also presented the "Strategic Anchors of the BAR's Climate Change R&D Program" which focused on the reference points/guiding principles in revisiting climate change outputs while Ms. de Guia, gave an overview on the international symposium on planning for collaborative climate change RDE among APEC-member economies. ### (Anne Camille B. Brion)

# BAR to coordinate AMIA projects in 2016



BAR Director Nicomedes P. Eleazar announces that the bureau will now handle the coordination of all AMIA R&D projects starting next year.

PHOTOS: RDELACRUZ

climate change policies and thrusts and directions of the Department of Agriculture (DA).

One of goals in updating the unified agenda for Climate Change is to ensure the mainstreaming of the bureau's initiatives when it comes to climate change R&D concerns, particularly program operations and implementation. Thus, during the meeting-workshop, specific strategies for RDE activities were identified and were aligned

with the implementation of the DA-Systems Wide Adaptation and Mitigation Initiative in Agriculture (AMIA).

AMIA is DA's national framework in addressing climate change in agriculture and serves as the umbrella program covering climate change that cuts across all programs, functions, and agencies at DA. It is one of the seven systems-wide mainstreaming programs of DA at both the strategic and operational levels, across agencies and programs. This means transforming current systems, adjusting development programs/projects, and capacitating people to achieve efficiency at all levels of AMIA implementation.

As announced by the bureau director, starting 2016 BAR will manage the R&D Funds of AMIA as well as coordinating all projects charged to it. Prioritizing of projects under AMIA will be based on the revised, unified agenda for Climate Change in close coordination with the set goals and strategies set under the framework of AMIA.

"How we approach climate uncertainty has great consequence on the development status of the country. For a developing country such as the Philippines, the approach to climate uncertainty has been focused on stabilizing and boosting food production, improving incomes, and building adaptive capacity. The Climate Change RDEAP serves as an important basis on which specific research proposals are funded and supported by BAR; and as reference document in planning and implementing climate change RDE programs and projects that are attuned to the needs of the sector," reiterated Dr. Eleazar. ###  
(Rita T. dela Cruz)

**S**tarting next year, BAR will be supporting the DA-Climate Change Office in coordinating all AMIA R&D projects," announced by Bureau of Agricultural Research (BAR) Director Nicomedes P. Eleazar in his speech during the "CY 2015 Roundtable Discussion to Update BAR's Climate Change RDE Agenda for 2016-2022" held on 10 June 2015 in Clark, Pampanga.

BAR, as the focal agency for Climate Change R&D Program, together with its partner-agencies, has crafted a revised and unified agenda for climate change to ensure that it is relevant and the priority projects are aligned with the current

# BAR promotes soybean microbusiness in food conference



**T**he Bureau of the Agricultural Research (BAR) participated in the 14<sup>th</sup> ASEAN Food

Conference on 25 June 2015 at SMX Convention Center, Pasay City both as sponsor and as presenter during the technical paper presentation.

Mr. Elmer Enicola, vice chair of the National Soybean Technical Working Group (TWG) of the Department of Agriculture (DA), presented the paper titled “Promoting Soybeans for Food in the Philippines”. Joining him was Ms. Rosemary Aquino of the DA-Cagayan Valley Research and Development Center (CVRDC) and chair of the National Soybean TWG.

In his presentation, Mr. Enicola provided a brief background on the history of soybean production and processing in the Philippines. He also cited the challenges of the industry including low local production and consumption of soybean as well as lack of awareness and widespread misconception about soybean food products. In response to the following challenges, Mr. Enicola presented the government initiatives specifically that of DA’s Soybean Development Program which includes promotion of production and utilization, community-based soyfood enterprise development, and linkage to commercial market. Development of soybean micro-enterprises was highlighted as one of the end-results

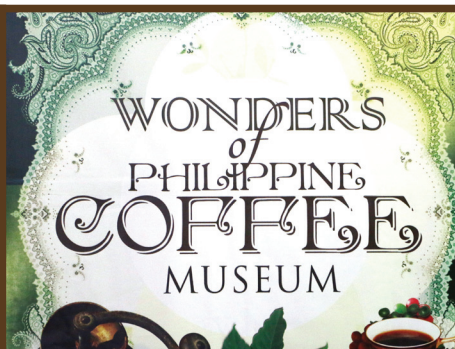


of the program which emphasized soyfood microbusiness as very profitable due to soybean’s health benefits known by health-conscious consumers. As concluding statement, the resource speaker advised the participants who are interested to invest in soyfood microbusiness. He encouraged them to identify their target consumers by understanding their culture and discovering new acceptable food products. He also emphasized on the health benefits of soybean as an important factor in convincing consumers to engage into the microbusiness.

The ASEAN Food Conference is held once every two years gathering all scientists, technologists, researchers, academicians, industrialists, entrepreneurs, policy planners,

students, government and non-government organizations related to the food industry in an effort to enhance scientific knowledge by sharing new findings, develop strategic alliances to further develop the food industry and accelerate trade and growth of the economies of ASEAN. With the theme, “The Bigger Picture: One ASEAN through Food Technology,” the goal of this year’s conference is to promote ASEAN cooperation in food science and technology and to update scientists on the development and progress of food technology in member states. Further, it aims to provide various perspectives, insights, and trends in food production and development in preparation for the ASEAN integration. ### (Liza Angelica D. Barral)

# Phl coffee museum launched



Coffee is a popular beverage in the Philippines and abroad. Coffee production ranks among the top 10 agricultural crops in terms of value and second most traded commodity in the world. The country produces four coffee varieties: Robusta, Arabica, Excelsa, and Liberica (Kapeng Barako).

“The Philippines used to be a major exporter of coffee products before the 1990s. But now, the country’s supply of coffee is only about half of the overall demand. We import about 60,000 metric tons of coffee just to meet the demand,” revealed Dr. Ruel Mojica, director of the National Coffee Research, Development and Extension Center (NCRDEC).

Bringing back the Philippine coffee to the domestic and international markets has been the vision of Dr. Mojica and having this coffee museum dubbed as “Wonders of Philippine Coffee Museum” is part of NCRDEC’s effort to strengthen the coffee industry in the Philippines and make it competitive in the global market once again.

The “Wonders of Philippine Coffee Museum” is a one-stop information shop about the various coffee varieties that may be found in the Philippines. The information it contains range from the knowledge of coffee farmers to the strategies and practices used by businessmen-entrepreneurs. Located in the main campus of the Cavite State University (CVSU) in Indang, Cavite, the coffee museum officially opened on 9 June 2015.

Surrounded by coffee nurseries, demonstration areas and the NCRDEC, the coffee museum is a place for visitors to learn and know firsthand how to make coffee and have

a greater appreciation for farmers and their product. Inside the coffee museum are rooms and displays of coffee varieties, local coffee brands, coffee processing machines and “coffee maps,” which are accessible to the public. Proudly displayed in the coffee museum is a wide collection of locally produced coffee brands such as CVSU’s exclusive brand, Aguinaldo Blend Coffee. This special blend is a roasted and blended mix of Cavite Barako, Robusta and Arabica coffee beans. In the lobby, visitors can smell its sweet aroma and be served with a steaming cup of the Caviteño blend.

Although a small unit, NCRDEC has received P80 million worth of research grants from different funding entities and does a lot of research on coffee including on germplasm, coffee quality, climate change, small-scale processing machines and marketing. The center also serves as training facility, nurseries, demonstration areas and conference areas for farmers, investors and government units. One of its active supporters is the Bureau of Agricultural Research (BAR).

“It all started when the university had been designated by BAR to lead the First National Integrated Research Development and Extension Program for Coffee in

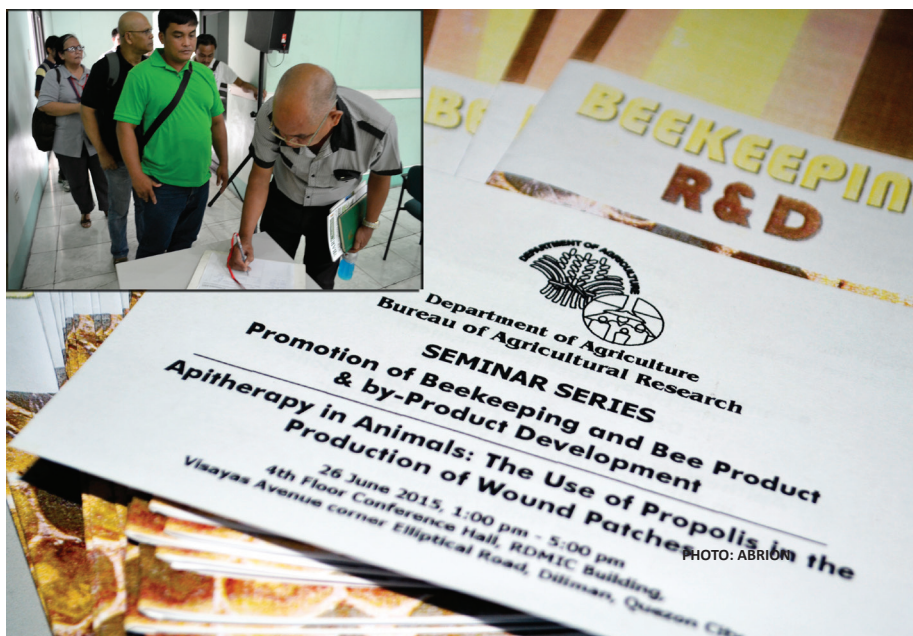
The coffee museum houses information, technologies, and products on various coffee varieties found in the country.

PHOTOS: PLESACA

1999-2001. Since then, the clamor for a coffee R&D center was put forward --- and to continue the momentum and similarly place the country in its full swing mode, the NCRDEC, in which BAR has been instrumental, was created in 2005,” said Dr. Alejandro Mojica, senior vice president for Research, Extension, Continuing Education and Training Services (RECETS), in his welcome message. He added that BAR’s Php 5M support for the improvement of the NCRDEC and the on-going BAR-CVSU projects has been instrumental in Center’s continued growth.

Dr. R. Mojica described NCRDEC as a bid to strengthen the R&D activities and enhance the extension delivery system that will lead to increased productivity, sustainability, and global competitiveness of the Philippine coffee. Their goals are to improve coffee varieties, maintain a genebank and germplasm collection for coffee, develop production and processing technologies, capacitate coffee farmers and stakeholders, and improve national and international linkages. ### (Patrick Raymund A. Lesaca)

# Bee products featured in BAR seminar



**B**eekeeping or apiculture, an emerging industry and livelihood activity in the country, is one of the major programs of the Bureau of Agricultural Research (BAR) seeing its potential in addressing food security and providing source of income to farmers, beekeepers, and entrepreneurs.

Benefits and income-generating opportunities from the development of bee products and by-products highlighted the seminar series held on 26 June 2015 at BAR.

Presenting on the project, “Promotion of Beekeeping and Bee Product and By-Product Development” was Mr. Emmanuel Pangilinan, in-charge of apiary of the Pampanga State Agricultural University’s (PSAU) Alternative Low-Input Agriculture System (ALIAS). “This project funded by BAR seeks to upscale the apiary of PSAU for training, research, and extension purposes. It also aims to conduct relevant researches on beekeeping and to extend beekeeping technologies to farmers through trainings,” he said. Through the project, emphasis and greater attention is given on the important contribution of bees in the productivity of different crops through pollination. As reported by Mr. Pangilinan, an increase in fruit set percentage or the percentage of

blossoms that are producing fruit, was recorded with the presence of bees: sweet tamarind (42 percent), squash (61 percent), cucumber (45 percent), cashew (68 percent), and cherry tomato (49 percent).

On the other hand, Dr. Estrella Zabala, in-charge of food product development of PSAU-ALIAS, cited the different food and non-food products that were developed by PSAU alongside their benefits. These include honey and honey wine for food products, while honey moisturizing soaps, lotus honey soap, tamarind soap with honey, adlay honey soap, tamarind honey body scrub, and lotus beeswax lip balm, among others for the non-food products. In addition, she mentioned on the researches that have been conducted as a component of such various product development initiatives. These were on the effectiveness and acceptability of lotus-honey products, potentials of lotus and beeswax as an anti-inflammatory product, and utilization of plant extract for honey and honey-based non-food products.

In another presentation, “Apitherapy in Animals: The Use of Propolis in the Production of Wound Patches,” Dr. Maria Amelita Estacio, professor from the College of Veterinary Medicine at the

University of the Philippines Los Baños, discoursed on the utilization of propolis, a resinous mixture collected by bees from plants and trees, as a raw material in the development of a biomedical product. Propolis finds its way in biomedical research due to its therapeutic effects including enhanced wound healing rate, anti-inflammatory, antibacterial, antioxidant, and antiseptic properties, and many others. In her presentation, Dr. Estacio showed treatments in animals, wherein depending on the type, wounds are healed 7-21 days after the application of propolis-based patches. “The premise of this project is to provide an alternative low-cost biomedical product for wound healing. Hence, we came up with this project funded by BAR that aims to test the effect of propolis-based patches in different types of wounds and compare the effectiveness with the conventional antibiotic dressing in wound healing,” Dr. Estacio explained.

The development of new biomedical products that are at par with international standards such as the propolis-based wound watches presents opportunities in domestic and international markets. It will also pave for conservation strategies towards a sustainable apiculture for the Philippine stingless bee. “Propolis has high economic potential, specifically in the development of biomedical products. One, it can offer higher income to our beekeepers and raisers since we are using the Philippine stingless bees that are native in the country. The same goes for the capitalists who are investing on biomedical product development,” Dr. Estacio concluded. ### (Anne Camille B. Brion)



Sample of propolis-based patches

PHOTO COURTESY: UPLB-COLLEGE OF VETERINARY MEDICINE

# Revving up the bioethanol industry with Super Sorghum

by Daryl Lou A. Battad



According to the presentation of Mr. Ryuichi Ikeda, chief of the Sales Division of SOL Asia Holdings, there are advantages of using the Super sorghum as a biomass in bioethanol production.

PHOTO COURTESY OF IKEDA

Various researches and initiatives have been done in exploring the potentials of sweet sorghum in the Philippines. This ranges from alcohol, sugar, wine, vinegar, silage to biomass and energy production. While this useful crop is continuously being promoted, another milestone for the agriculture sector is recently being undertaken to further discover the possibilities of Super Sorghum, a hybrid of the sweet sorghum that revealed outstanding features surpassing the commercial varieties in terms of biomass, yield, brix, sugar, and bioethanol yield.

Mr. Ryuichi Ikeda, Sales Division chief of SOL Asia Holdings, presented a topic Super Sorghum during the First Philippine International Biomass Conference conducted by the University of the Philippines Los Baños (UPLB) and the Bureau of Agricultural Research (BAR) in Clark, Pampanga on 16-18 June 2015. In his presentation, he revealed why Super Sorghum is “super” in terms of its adaptability in almost any soil condition, has great biomass potential, has high

sugar content, features hybrid vigor breeding, and has the capacity of multiple harvesting per year even with only one seeding. A non-GMO selective breeding hybrid, Super Sorghum develops faster growth, growing up to five meters in just about three months.

Mr. Ikeda also shared the case of Super Sorghum in Indonesia, stating that in 2012, the annual yield (sum of three harvests) of Super Sorghum was 430 tons/ha, in which the potential bioethanol yield from the same cultivar was calculated at 17.7 liters/ha, which is 2-4 times higher than sugarcane, corn, cassava, sugarbeet, and rice. Sugar yield could reach from 29.8 to 38.3 tons/ha. This crop performance has been consistent in countries where Super Sorghum is being grown including Thailand, Mexico, Indonesia, Vietnam, Australia, and Cambodia.

## Philippine efforts

The introduction of this incredible crop led the team of researchers from UPLB to further study on the possible adoption of producing Super Sorghum in the Philippines. Led by Dr. Domingo E. Angeles, dean of the Crop Science Cluster, College of Agriculture and Professor Rex Demafelis of the Department of Chemical Engineering, College of Engineering and Agricultural Technology, this project on the “Adaptability Trial of Super Sweet Sorghum” aimed to conduct a performance evaluation of super sweet sorghum hybrid developed in Japan under tropical humid condition in the Philippines through characterizing the vegetative and reproductive structures of the super sorghum; performance testing of the hybrid under three fertilizer regimes; determining the stripped stalk, grain, sugar, and ethanol yield; and determining the cost-benefit analysis using the hybrid against a control variety.

This BAR-funded project is still on-going and awaiting results, but sees a potential impact that once proven superior than existing hybrid and variety under Philippine condition, the Super Sorghum will advance the bioethanol industry from the existing sweet sorghum variety, thus leading to a significant increase in the produce and income of sorghum, bagasse, and bioethanol growers.

Introduced in 2006 through the International Crop Research Institute for the Semi-Arid tropics

(ICRISAT), sweet sorghum has proven its potentials in Philippine soils, quoting Prof. Demafelis that a “collaborative effort with private institutions in producing sweet sorghum syrup and fuel-grade bioethanol made the Philippines the first country in Southeast Asia to produce ethanol from sweet sorghum on a commercial scale in 2013.”

## A good biomass resource

Compared to other crops like corn and sugarcane, super sorghum showed a significantly higher biomass produce based on the comparison of yield in Okinawa, Japan in 2008 with 117 tons/ha/harvest against 70.8 tons/ha/harvest and 67 tons/ha/harvest for corn and sugarcane respectively. This could mean a similar potential in the Philippines given the same characteristics that super sorghum will execute once developed in the country.

Over the years, government agencies and other interest groups have put in a greater concern in using renewable energy sources because natural gases and other fossil resources are believed to be nearly exhausted. However the demand for these resources will only continue to increase steadily, generations after generations. Energy is essential across economies. That is why the need for an alternative and sustainable, renewable energy sources has to be given priority.

An organic matter used as a fuel, biomass is used to meet a variety of energy needs, including—and most importantly—generating electricity by undergoing different processes. Biomass resources include animal wastes, wood and wood wastes, agricultural crops and their waste byproducts, and wastes derived from food processing. Super Sorghum falls under the energy crops. For a developing country such as the Philippines, this crop provides the biggest advantage in reducing the importation of petroleum products.

Harnessing the full potential of Super Sorghum provides promising benefits not only for the country’s economic gain, but also its social and environmental impacts. BAR welcomes partnerships and collaborations with all stakeholders in its campaign to strengthen Super Sorghum production in the Philippines. With the promising and wide-range market of this crop, it is no wonder that this will rev up the agriculture sector in the next few years.

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# GUIMARAS SUPER GALILA:

## The sweetest Carabao mango

by Rita T. dela Cruz

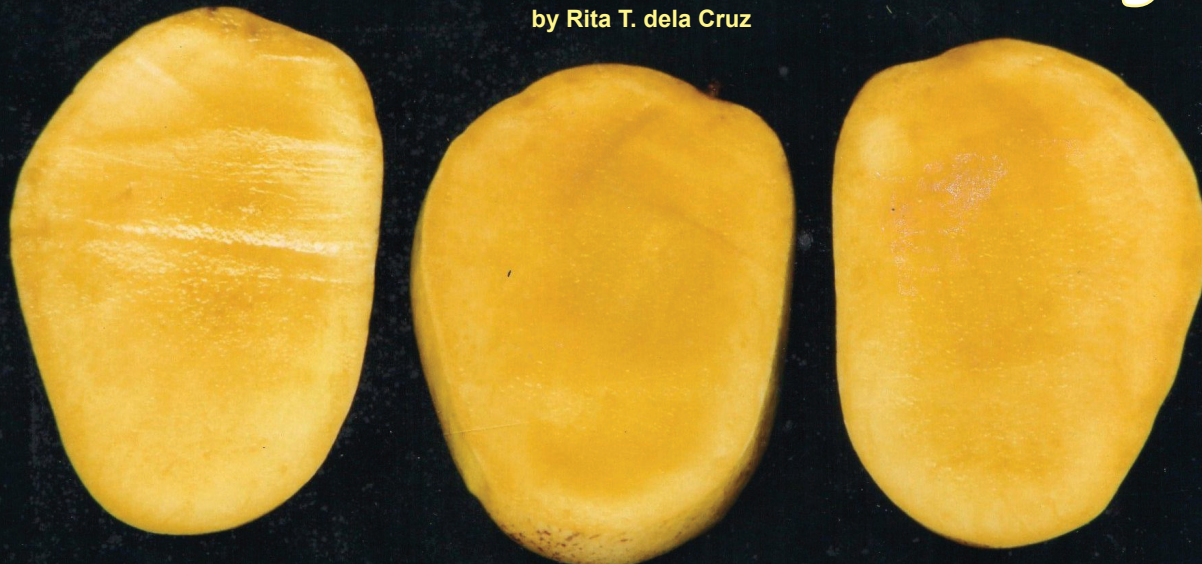


PHOTO COURTESY: BPI-GNCRDPSC

People have come to associate Guimaras with mangoes, the island's most important agricultural crop and the country's export champion. Guimaras mangoes are internationally-certified as free from mango seed and pulp weevils making its way into the US and Australian markets through "Area Freedom Certification".

Also located in the island is the Guimaras National Crop Research, Development and Production Support Center or GNCRDPSC (formerly, the National Mango Research and Development Center or NMRDC) of the Bureau of Plant Industry. The center has been spearheading the development of effective and appropriate pre-production, production, and post-production of mango technologies and its wide adoption. One of the center's most important functions is on varietal improvement wherein through different accessions they were able to continually increase the number of their mango germplasm collection which they use to develop new and promising strains.

To date, the center has developed 15 National Seed Industry Council (NSIC) - registered mango fruit varieties. The NSIC is the office responsible for the approval and registration of crop varieties in the country. Among these include: GES 73', GES 77', GES 84', GES 85', MMSU Gold, Fresco, Talaban, Sweet Elena, Tanaleon, Guimaras Super (Galila),

Efondo, Corcino, Prima, JTA Sweet, and P1-King Rodolfo.

The CODEX Standard for Mangoes (CODEX STAN 184-1993) stated that quality mangoes must be clean, free of damage caused by pests, free of any foreign smell and/or taste, firm, fresh in appearance, free of black necrotic stains or trails, free of marked bruising, and sufficiently developed and display satisfactory ripeness.

Although consumers buy fruits on the basis of appearance, subsequent purchases depend on their satisfaction with how these fruits taste. One criterion that is often looked upon to is mangoes' sweetness.

Guimaras' mangoes rose to fame not only for its physical good looks and distinct aroma but more importantly, for its sweet taste. In fact, among the 15 strains of Carabao mango that the center has developed, Guimaras Super (Galila) ranks as the sweetest. "While many articles have contended that Zambales' Sweet Elena is the sweetest Carabao mango strain, in terms of Degrees Brix (°Bx), the Super Galila tops them all," explained Helen Bignayan, senior agriculturist at GNCRDPSC and project leader of Bureau of Agricultural Research-funded projects on mango.

Brix is the sugar content of an aqueous solution. One degree Brix is one gram of sucrose in 100 grams of solution and represents the strength of

the solution as percentage by mass. The °Bx is traditionally used in the wine, sugar, carbonated beverage, fruit juice, and honey industries to measure the sugar content.

Bignayan explained that according to their data, Guimaras Super (Galila) has 22.3 °Bx while Zambales' Sweet Elena has 18.98 °Bx only. When it comes to fruit weight, a Sweet Elena fruit can weigh to as much as 357 grams while a Galila fruit weighs heavier with 367 grams. In terms of peel and flesh color, Sweet Elena has orange peel and yellow orange flesh while Galila has bright yellow color in the outside and orange in the inside. The peel thickness of Galila mango is slightly thicker (0.93 mm) compared to Sweet Elena (0.80 mm). The flesh of Sweet Elena is soft while Galila's flesh texture is smooth and firm.

The Guimaras Super (Galila) is owned by Cesar Galila in Barangay Poblacion, Nueva Valencia, Guimaras. Mango strains are often named after the surnames of the owners of the mother tree. ###

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# Asian Bank executives visit BAR



Delegates coming from the Asia Pacific Rural and Agricultural Credit Association (APRACA)

PHOTO: LBARRAL

Eighteen middle and senior level bank officers from member-institutions of the Asia Pacific Rural and Agricultural Credit Association (APRACA), namely: Bangladesh, Laos PDR, Cambodia, Sri Lanka, Myanmar, Bhutan, Indonesia, and India visited the Bureau of Agricultural Research (BAR) on 23 June 2015. The visit was part of their four-day "International Exposure Study Visit Program on Financial Risk Management and Agricultural Insurance and Guarantee for Sustainable Agricultural Development".

The visit was requested by the official training and research arm of APRACA which is the Center for Training and Research in Agricultural Banking (CENTRAB) headed by Ms. Lecira V. Juarez, managing director of APRACA CENTRAB and Dr. Marlowe U. Aquino, program manager of IFAD-

APRACA FinServAccess Regional Project. The main purpose of the visit was for the delegates to know more on the overall perspective of Philippine agricultural sector particularly on the holistic approach in research and development (R&D).

Welcoming the delegates and facilitating the briefing were Ms. Salvacion Ritual, head of the Project Monitoring and Evaluation Division (PMED) and Mr. Victoriano Guiam of the Applied Communication Division (ACD). Other BAR staff who were present during the briefing were Ms. Cynthia Remedios de Guia, assistant head of the Planning and Program Development Division (PPDD), Juan Nikolas Paller of PMED, Mr. Jacob Anderson Sanchez of the Institutional Development Division (IDD), and Liza Angelica Barral of ACD. The video primer was shown to the foreign

visitors to understand the functions and mandate of BAR as an attached agency of the Department of Agriculture (DA).

The discussion focused on the bureau's roles and initiatives particularly on crafting the BAR's Climate Change RDE Agenda specifically on reviewing the enabling mechanisms and other researchable areas on climate change, providing funding support for R&D initiatives, ongoing partnership with other international R&D institutions, and distinct features and overall outputs of the banner programs of the bureau.

APRACA is a non-government international organization composed mainly of central banks, agricultural banks, development banks, commercial banks, apex organizations and federations of financial institutions, rural development institutions, institutes and non-government institutions in the Asia Pacific region involved directly in agricultural credit and rural development. Established in 1977, its main goal is to alleviate poverty in the Asia Pacific Region through rural and agricultural finance by facilitating cooperation as well as exchange of information and expertise among its member institutions. Meanwhile, the CENTRAB was formed in Manila, Philippines in 1989 to facilitate training and research and promote better understanding of financial, monetary, banking and economic development issues, particularly to agriculture and rural areas. ### (*Liza Angelica D. Barral*)



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