

Bureau of Agricultural Research

### 2013 BAR ANNUAL REPORT



Making R&D Responsive to the Needs of the Agriculture and Fisheries Sector





## Contents



8 5 10 18 26
10 18 26
18 26
26
-
26 28 29 30 31 32 33 34 35 36 37 38 39 40 41
42
42 43 48



...

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	Global Environment Facility Supports Biodiversity Project	59 64
	ICRISAT Initiatives on Sustainable Rainfed Agriculture Development	67
6	BAR R&D Priorities	71
	Basic and Strategic Researches Research Policy and Advocacy Human Resource Development R&D Facilities Information and Communication Technology Knowledge Management	71 72 76 79 82 85
7	Client-Oriented Services	90
	R&D Technology Commercialization Center Scientific Literature Services Intellectual Property Management	90 93 94
8	Major Activities and Institutional Updates	96
	Major BAR Activities Awards and Recognitions	96 103
9	Annexes	
	BAR in the News About BAR BAR as a Top-performing Agency for 2013 BAR Key Officials	105 109 110 112

# message from the **DIRECTOR**

he agriculture and fisheries sector, the prime mover of a country's development, is always hounded by various challenges that can affect its productivity and profitability. And since this sector provides both food and livelihood for its people, its two greatest concerns are securing food and reducing poverty.

As the world population continues to grow, the need to produce and secure food also rises. And as the need for food heightens, the greater is the demand for farmers and fishers to produce higher yields and this puts even more pressure on our already fragile environment, depleting valuable land and water resources.

The Department of Agriculture (DA), as the government's lead agency for promoting agricultural and fisheries development in the country, must ensure that the sector is able to keep pace with increasing demand and contributes to the overall economic growth of the country. Simply put, DA needs to ensure that there is sufficient and affordable food on the table. "Rice and Fish for All" is the guiding principle of the DA's efforts on agriculture and fisheries given by Agriculture Secretary Proceso Alcala. With ensured supply of rice and fish, consumers will have access to affordable and nutritious meals whenever they need it and farmfamilies will have sustained sources of income.

To realize this, DA has provided the necessary policy framework, investment, and support services including implementing national programs that will respond to the specific needs of the sector. One important support service is Research and Development (R&D). To make the agriculture and fisheries sector productive and competitive, it must craft RDE (research and development and extension) agenda and strategies needed in the implementation of programs that promote productivity enhancement and develop environment-friendly and efficient technologies throughout the value chain of food production.

As the institution tasked to coordinate the nation's agriculture and fisheries R&D, the Bureau of Agricultural Research (BAR) takes these mandatory conditions into account. The bureau has therefore realigned its R&D plans and programs to harmonize with the DA's national programs. To ensure that its initiatives are in synergy with the efforts of the Department, BAR's R&D programs are anchored on the thrusts of the reference legislation, the Agriculture and Fisheries Modernization Act or AFMA, which include: 1) food security, 2) increased productivity and profitability, 3) poverty eradication and people empowerment, 4) sustainable agricultural development, and 5) global competitiveness.

In 2013, BAR intensified its efforts in making R&D responsive to the needs of the sector by implementing programs that will not only address food production, increase production and profitability, and reduce poverty but will also empower the farming and fishing communities and sustain agricultural development.

Currently, BAR is implementing at least 11 R&D Programs: Organic Agriculture, Climate Change, Biotechnology, Indigenous Plants for Health and Wellness, Adlai, Rubber, Biofuels, Rainfed Agriculture, Apiculture/Beekeeping, Soybean, and Breadfruit.

While led by BAR, these R&D programs are multi-sectoral in nature involving various R&D In 2013, BAR intensified its efforts in making R&D responsive to the needs of the sector by implementing programs that will empower the farming and fishing communities and sustain agricultural development.



partners, both international and local. These programs serve, not only as responses to the various challenges of the agriculture and fisheries sector, but more importantly, they serve as testimonies to the fact that the government, through its R&D programs, is working hard towards making the hope of improving the lives of farmers and fishers in the country a reality.

On top of these 11 programs are BAR's two flagship programs, the Community-based Participatory Action Research (CPAR) and the National Technology Commercialization Program (NTCP), which continue to work from the grassroots level to improve and raise every farming/ fishing community to commercial scale entrepreneurship and in improving the profitability side of the sector. To date, we have 231 CPAR projects implemented in 549 sites nationwide benefitting 11, 291 farmers. Meanwhile, NTCP has 42 newly funded and 63 on-going projects, which totalled to 105 projects coordinated for 2013.

In 2013, BAR also heightened its collaborations with international agricultural research centers (IARCs) and agencies under the National Research and Development System for Agriculture and Fisheries (NARDSAF). The bureau recognizes the importance of forging ties with local and international R&D institutions given that agricultural research is a global activity and a country has to exploit all opportunities for effective partnerships in order to accelerate technology and knowledge generation and transfer.

This 2013 BAR Annual Report takes into full account the bureau's accomplishments, which would have not been possible without the unwavering support of our proactive and able partners in R&D.

We still have a long way to go, but we realize that success is never achieved as a lone effort. For us in agriculture and fisheries R&D, our willingness to cooperate and collaborate, coupled with strong dedication and perseverance, brings us closer to our ultimate goal of a food-secure country!

Dr. Nicomedes P. Eleazar, CESO IV Director, BAR

## Introduction

griculture posted a 1.15 percent growth in 2013. All subsectors registered output gains although increase in crop production was minimal. The livestock, poultry, and fisheries subsectors contributed to the improved performance of the sector in 2013.At current prices, gross output in agriculture was valued at P1.5 trillion, representing a 3.51 percent increase from the 2012 earnings. (BAS, 2013).

Given this scenario, the perspective of the sector is bright and part of the success can be attributed to the increased support for the Research and Development (R&D) in agriculture and fisheries.

For the last six years (2008-2013), there has been an average increase of 11 percent in the funding support for R&D in agriculture and fisheries. This amounts to Php249M total BAR allotment (regular



and banner funds) in 2008 increasing to Php 703M in 2013.

Along with the increase in budget funds for R&D is the crafting of programs that address the needs of the





sector. Currently, the bureau coordinates and facilitates the R&D components of I5 DAled programs that respond to the major challenges of food security, poverty alleviation and people empowerment, increased productivity and profitability, sustainable agricultural development, and



global competitivess. These are on: organic agriculture, climate change, rainfed agriculture, adlai, soybean, corn and cassava, rice, high value crops, indigenous plants, breadfruit, apiculture, biofuels, rubber, biotechnology, and native animals.

Aside from these DA-led programs, BAR's two banner programs, the Community-based Participatory Action Research (CPAR) and the National Technology Commercialization Program (NTCP), continue to work from community level to commercial scale improve the productivity and profitability side of the agriculture and fishery sectors. across the value chain.

In 2013, the bureau strengthened its partnerships with various international R&D institutions including AFACI, Bioversity International, IRRI, The WorldFish Center, GEF, and ICRISAT through the implementation of R&D projects. These projects were on plant genetic resources, agricultural technology information network, banana projects addressing Foc TR4, rice self-sufficiency, adaptation strategies of coastal communities to climate change, biodiversity conservation project, and sustainable rainfed agriculture.

Aside from the banner programs and DA-led programs, BAR supported R&D initiatives in basic and strategic researches, and policy research. On top of these, BAR capacitated NaRDSAF member institutions in both infrastructure (R&D facilities) and manpower (human resource). Other support services to R&D were on knowledge management, and information and communciation technology.

### Banner Programs

n an effort to implement R&D initiatives that are responsive to the needs of the agriculture and fisheries sectors, the bureau institutionalized two programs to set the groundwork for life-changing impact at the grassroot level. These are the: Community-Based Participatory Action Research (CPAR) Program and National Technology Commercialization Program (NTCP).

These programs provided the platforms that enable BAR to support specific R&D projects that

benefit the sector, both productionand profit-wise.

In CPAR, mature technologies are verified and polished at the farmers' level prior to widespread adoption. And because the program uses a community-based participatory approach, the community is being empowered through informationbased decision-making.

In NTCP, technologies generated and developed by R&D institutions are strategically placed and transferred to areas and communities that most need them. Through this program, emerging technologies that enhance value-adding of products and processes are promoted leading to the development of enterprises and the improvement of agriculture and fisheries-related industries

CPAR and NTCP are complementary programs of the bureau. CPAR serves as the entry point of NTCP wherein the former serves as on-farm technology demonstration and assessment arena for potential technologies suitable or the communities.



The success of CPAR in over a decade prompted BAR to further intensify its implementation. Over the last seven years (2007-2013) there has been a significant increase in the number of of CPAR projects (Figure 1), areas utilized (Figure 2), and the number of farmer beneficiaries who directly and indirectly benefitted (Figure 3).

The CPAR approach espouses community-based research specifically designed to empower the community. It is also active in technology promotion for improvng the agriculture and fisheries communities.

Figure 1. CPAR Projects from 2007 to 2013.



Aimed at contributing to the modernization of agriculture and fisheries sector through efficient and effective community-based R&D system, CPAR envisions a strengthened participatory research by enhancing the role of RD&E in technology transfer and production management system. It also focuses on institutionalizing active community participation in the overall management of farm and aquatic resources and continuously develops strategies for effective integration of support services for fisheries/agribusiness and enterprise development.

The implementation of CPAR has reached thousands of farmers and fishers in hundreds of sites across the country. In 2013, there were 231 CPAR projects implemented in 549 sites nationwide, of which 200 are focused on agriculture while 31 are on fisheries.

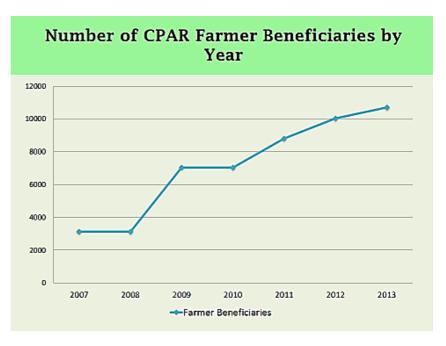
To date, 11, 291 farmers have benefitted from CPAR, consisting of 6,005 farmercooperators, who are directly involved in the project, and 5,286 farmer-adopters who have embraced the technology and interventions introduced in their communities through CPAR.

The Project Monitoring and Evaluation Division (PMED) of BAR conducts site visits to monitor and validate the implementation of the CPAR projects. As part of the improvement of the CPAR implementation, BAR, led by PMED, organized the revision of the CPAR Operational Manual. It is a four-series book consisting of: 1) Overview, 2) Participatory Rural Appraisal (PRA), 3) Proposal Packaging, Evaluation and Approval, and 4) Project Implementation and Management. The revision of the existing guidebook was initiated for better and smoother implementation of CPAR projects.

#### Figure 2. CPAR Project Sites from 2007 to 2013



Figure 3. CPAR Farmer Beneficiaries from 2007 to 2013





here are many different ways to measure a program's effectiveness. In the case of CPAR, it has succeeded in at least three: 1) it has addressed the agriculture and fisheries needs of the community, 2) CPAR interventions brought about change in the lives of the farmers, and 3) there is greater impact made in technology adoption and expansion.

The CPAR approach is a unique strategy of downstream research because it is fashioned holistically, creating a platform for researchers, implementers, and community members to improve the conditions of the farming and fishing sector.

For 2013, these 10 stories are examples of success of the CPAR projects.



Peanut MAGIC: CPAR Approach towards Enhanced Productivity in Cereal-based Areas of Region 2

Implementing Agency: DA-CVIARC

Peanut products, dubbed as Market Attractive to Growers and Import Competitive (MAGIC), were launched in Isabela City as Region 2's *pasalubong* brand. Made possible through CPAR, the project developed effective cropping systems and promoted the use of high-yielding peanut varieties which resulted in enhanced peanut productivity achieved through valueadding business ventures and improvement of marketing strategies. These peanut products are already being sold in selected markets and tourist spots in the region.







#### CPAR on Upland Farming Communities in the Provinces of Albay and Camarines Sur Implementing Agency: DA-BIARC

With the aim of empowering farmers and the communities, this project promotes Farm Capability Advancement and Resource Empowerment (Farm CARE). Its ultimate goal is to produce and capacitate farmers who in turn will influence other farmers within and outside of their communities to adopt specific interventions through CPAR. For only over a year of implementation, it has been commended for its achievements. The integration of a farming system helped in maximizing the full potential of the cooperators' farms. Moreover, the farmers were able to adopt and practice organic farming and are now trading their produce with other communities.



## **CPAR** on Organic Vegetable Farming

Implementing Agency: PLGU-Ifugao/DA-CIARC

The province of Ifugao makes its mark in implementing the organic agriculture program as it widely promotes organic farming as one of its agriculture production strategies. Through this endeavor, CPAR has capacitated the farmers on appropriate organic farming practices. To date, the CPAR intervention has benefitted farmers and vegetable growers and the coverage area is continually expanding. From an original 100 square meters, it has expanded to 400 square meters of organic vegetable nurseries. Farmers are also producing their own vermicompost fertilizers using rice straw as raw material. Strong market support services have been established for the farmers' produce, which now ensure sustainable organic vegetable production.

#### **CPAR on Seaweeds Production and Processing in Bicol**

Implementing Agency: DA-BIARC

Seaweed farming in Region 5, particularly in the provinces of Sorsogon, Camarines Sur, and Albay, has been boosted through production and processing of seaweeds. With a minimum of operational requirements, CPAR was able to assist in the acceleration of seaweed farming and technology transfer while empowering fishers and their communities through development activities. To date, members of the farmers' organization have been producing and marketing seaweed products in the region.

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#### **CPAR** on Upland Diversified Farming Systems in Sultan Kudarat Region 12

Implementing Agency: DA-CMIARC/PLGU-Sultan Kudarat

Cropping systems and practices through the interventions introduced in CPAR increased production and generated added income for the farmer cooperators in Brgys. Bugso and Kuden in Senator Ninoy Aquino, Sultan Kudarat. Existing farmers' practices of corn-peanut, corn-corn, and upland rice-corn monocropping systems yielded average annual incomes of Php32, 920.00, Php20, 800.00, and Php18, 914.00, respectively. Meanwhile, the diversified rubber-based farming system (rubber + coffee + corn-peanut + goat) resulted to an average income of Php53, 650.00 during its first year of implementation. The good results of the CPAR project encouraged other farmers from nearby barangays to adopt the same technology. Through the initiatives of the municipal local government unit and DA-RFU 12, a total of 38 farmers, 9 of which are farmers from other barangays who opted to adopt the CPAR technology.



#### CPAR: Blue Crab Fishing Using Gill Nets for Marginal Fisherfolk in Bataan

Implementing Agency: BFAR 3



The Samahan ng Malilit na Mangingisda ni Apo San Rafael farmers' association of Balanga, Bataan is now using and promoting this crab-fishing technique introduced through CPAR. Apart from the project's aim to alleviate poverty and attain food security, it assures that the fishers practice safe and environment-friendly fishing livelihood.

The project resulted in an increased income by about 60 percent especially during the peak months. This made other fishers interested in the intervention such that more than 70 fishers eventually engaged in gill net fishing. The project was turned over to the local government unit of Balanga for continued implementation. To date, the organization is handling trainings for its increasing number of adopters.



7

CPAR on Organic Rice Farming in Brgys. Hugpa and Canila, Biliran Implementing Agency: DA-EVIARC

Barangays Hugpa and Canila in Biliran City are now being recognized within the municipality and the province as the source/producer of organic fertilizer. This is only one among the many benefits that the farmer cooperators are reaping since CPAR was introduced to them. During the implementation of the project, reports showed an increase in the number of adopters from other barangays who are practicing the technology. Almost 20 farmer-adopters have embraced the technology. There was also an increase in the total rice area applied with organic fertilizer from 12 to 33 hectares. Part of the components of the project is the production of IEC materials on organic rice farming for wider promotion and adoption of the technology. CPAR Program: Bangus Processing in Masao, Butuan City

Implementing Agency: BFAR-CARAGA



Enhancing production efficiency through the establishment of milkfish processing is seen as a profitable opportunity for fishers in Masao, Butuan City. The CPAR project employed this approach for the community members to make the most out of their resource as one of the core problems identified in their locality was bangus marketing. Fishers were capacitated on proper handling of fish, fish processing methods, packaging and labeling, food safety, and good manufacturing practices. These enabled the fishers in the community, including housewives, to engage in enterprises on bangus deboning and other processed products from bangus.

#### Sesame-based Farming System in the Fifth District of Camarines Sur

Implementing Agency: DA-BIARC

Technologies on production and processing of Sesame seeds through CPAR have resulted in community productivity in selected project sites of Camarines Sur. The Sesamebased farming system is comprised of a combination of food and cash crops that adopt well in a rainfed ecosystem and changing climatic conditions (the region is prone to extreme weather situations). The successful adaptability trials on different high yielding varieties of Sesame and fertilizer calibration facilitated the development of products and by-products from Sesame seeds which are now marketed in the localities.





#### **CPAR on Tinawon Rice Production using System** of Rice Intensification

Implementing Agency: PLGU-Ifugao



Ifugao farmers are known for preserving and protecting their resources as part of their heritage. Tinawon, one of the heirloom rice varieties thriving in the Cordilleras, is beginning to make its own spot in the world market. Its exquisite aroma, distinct taste, unique texture, and its organic components have made it very attractive to rice eaters even outside the country. The incessant demand for Tinawon rice was the reason for the CPAR project to focus on technologies that will sustain its export volume. The effects were beneficial to farmers because of the assured market. In 2012 alone, the **Rice Terraces Farmers Cooperative** (RTFC), which serves as one of the ready market of the Tinawon rice, exported 11 tons of heirloom rice to the United States. Through this project, the farmers were taught the use of bioorganic and foliar fertilizers, early transplanting, weed control, proper distancing, and water management.

## NATIONAL TECHNOLOGY COMMERCIALIZATION PROGRAM

Since its inception in 2006, the NTCP has generated significant impacts in the agriculture and fisheries sector through the utilization, adoption, and promotion/ marketing of mature technologies developed by various R&D partner institutions. These provided the opportunities for agribusiness and sustained agriculture enterprise development.

For the last eight years (2006-2013) of its implementation, BAR, through its Technology Commercialization Division (TCD) has supported 387 NTCP projects averaging to 48 projects every year (Figure 4).

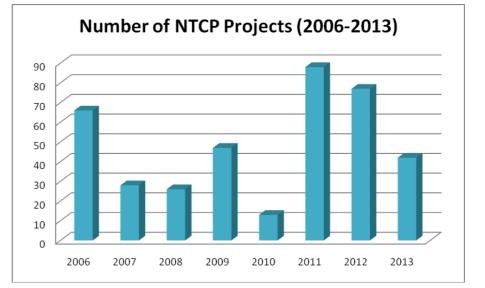
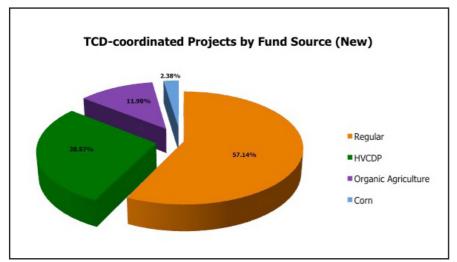
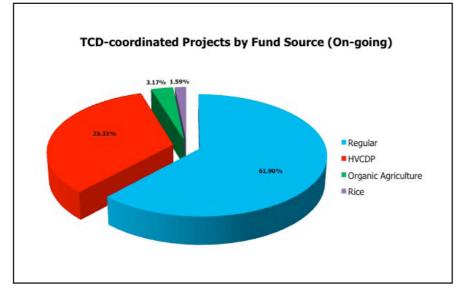


Figure 4. NTCP Projects from 2006 to 2013.

#### Figure 5. New NTCP Projects Coordinated by Fund Source



In 2013, 177 proposals were submitted to TCD for review and evaluation. A total of 105 projects were supported through various fund sources including DA Banner Programs. Out of the 105 projects, 42 are newly-funded and 63 are ongoing. Shown in *Figures 5* and 6 are the breakdown of new and on-going projects according to fund sources.



#### Figure 6. On-going NTCP Projects Coordinated by Fund Source

Under AFMA Regular Funds, BAR funded 24 new and 39 on-going NTCP projects. These were divided into crops, livestock, fisheries, and other commodities (including soybean, biofuels, rainfed agriculture, apiculture, rubber, native animals, and capacity building (Table I).

#### Table 1. NTCP Projects Funded Under AFMA Regular Funds

Commodity	CY 2013 Physical Accomplishments		
(AFMA)	New	Ongoing	
Crops	9	15	
Livestock	1	4	
Fisheries	4	1	
Other commodities	10	22	
Total	24	39	

BAR has strengthened its partnerships not only with various R&D institutions, but also with other entities including LGU and the private sector, individulas/ organizations, leading to more established and stronger publicprivate partnerships.

Through the NTCP, R&Dgenerated technologies, along with commerciable technologies and products displayed in the R&D TechCom Center, paved the way to new market linkages and networks for unified agribusiness ventures. BAR gives high priority to the monitoring and evaluation (M&E) of all its funded projects to see whether the targets have been achieved and the potentials of a project are not overlooked. In 2013, BAR through TCD, conducted the "Progress and Terminal **Review of BAR-Funded** Projects under the National Technology Commercialization Program" wherein 88 completed projects and 44 ongoing projects were reviewed and assessed.

## **NTCP Success Stories**



ore than generating technologies for farmers' adoption and improving farm yield, one important aspect of implementing NTCP is looking into their potentials as income-generating opportunities for the beneficiaries. Through the projects, linkage and partnership between and among R&D institutions are also established benefitting a number of farmer-cooperators and other interested individuals who want to venture into agribusiness.

Technologies generated are on crops, livestock, and fisheries, agricultural mechanization, among others, generated by researchers and scientists from the DA family, SUCs, and other R&D-implementing agencies.

For 2013, there are at least 10 stories of success from the NTCP projects that have created income-generating opportunities for beneficiaries.



#### Production, Processing and Marketing of Herbs and Spices Implementing Agency: SLSU-JGE

Implementing Agency: SLSU-JGE

This project was conceptualized to make more people, students in particular, aware of the healthful benefits of herbs and spices by establishing a garden that will provide immediate access for culinary and medicinal uses. A demonstration garden (100 sq. m.) for herbs and spices established in the campus and a demo garden (100 sq.m.) at Agri-Park in Tagkawayan, Quezon serve as the project sites. Among the herbs and spices planted were ashitaba, ginger, malvarosa, tanglad, asparagus, citronella, purple basil, gynura, marjoram, aloe vera, mayana, rosemary, tarragon, sage, thai basil, sweet basil, turmeric, spearmint, oregano, Italian oregano, dill, java mint, lavender, pandan, peppermint, talinum, cat's whiskers, and chocolate mint. A component of the project is the processing of herbs and spices to better promote their uses in the country.



Commercialization of Postharvest Technologies for Off-Season Supply of Tomatoes

Implementing Agency: UPLB

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The testing of coconut coir dust for tomato storage was carried out in Liliw, Laguna using commercial volume of freshly harvested mature green tomatoes. Results showed that the use of polyethylene bag (PEB) and plastic or wooden crates as packaging containers resulted to higher recovery of good quality, marketable fruits compared to the use of bamboo baskets. Based on the partial budgeting technique, a higher net benefit was realized by using the above-mentioned combination and when tomatoes were withdrawn and marketed on the fourth week following coir dust storage. A cooperator of the project in Liliw adopted the technology to take advantage of the price difference as the tomatoes get scarce towards the end of the production season. The Evaporative Cooling Pad for Low-Cost Storage of Fruits and Vegetables and the Modified Atmosphere (MA) packaging are alternative methods to conventional refrigeration for extending the shelf life of perishable crops like tomato. Benefits of the technology include minimized weight loss and delayed ripening of tomatoes.



Lowland Mushrooms Products Dev't & Packaging for Commercialization, and Product Dev't and Commercialization of Lowland Mushrooms for Village Level Production Implementing Agency: DA-RFU III/CLIARC

From simply being adopters of technology, a group of farmers decided to establish an association that consequently increased members and become a cooperative. The Mushroom Producers Cooperative is composed of mushroom growers from the towns of Paniqui, Gerona, Anao, Victoria, and Pura in Tarlac Province with one member from Munoz, Nueva Ecija. In addition, 500 OFWs from Hongkong were trained on mushroom production and processing. Mushrooms were developed into processed products including pickled mushroom, jam, meals (siomai, burger, bola-bola, and sisig), tocino, mushroom longganiza, mushroom candies, crackers, cookies, polvoron, wine, pandesal with malunggay, barquillos, and mushroom powder. An estimated value-added income for producers ranges Php 40-239 per kilo of mushroom. New product lines were developed from mushroom including noodles, muffins, marmalade, and mushroom fettuccine/linguine. A standardized processing protocol per product has been developed.

The project introduced the Farmer's Livestock School on Integrated Goat Management (FLS-IGM) which presented options to farmers to choose and assess their relevance and compatability on how they can improve livelihoods through hands-on adaptation of alternative technologies. Through the project, 44 farmer-participants were able to produce maps and graphical calendars and make their bioresource flow which they have adopted in goat production. With interventions and learnings, farmers increased their goats by 360 percent. Through the FLS-IGM, there are now 20 commercial goat farms with more than 100 heads and 210 new goat raisers in Tarlac.

A multiplier farm of upgraded goats (Boer bucks, Anglo Nubian bucks) was also established at Tarlac College of Agriculture (TCA). This provided better and bigger breeder stocks of goats which the farmers can avail of and set the requirements to increase the sale of stocks. The project resulted to bigger and better goat production thereby increase progit. Upgraded goats are sold for Php3,500-Php5,500 per head which is higher compared to the Php800-Php1,200 per head of native goat. To empower the farmers, they established their own coop, the Farmer-participants formed the MASINAG Multi-Purpose Cooperative. Meanwhile, the FLS-IGM graduates are mentoring and assisting other farmers and reaching about 1,237 farmer-visitors.



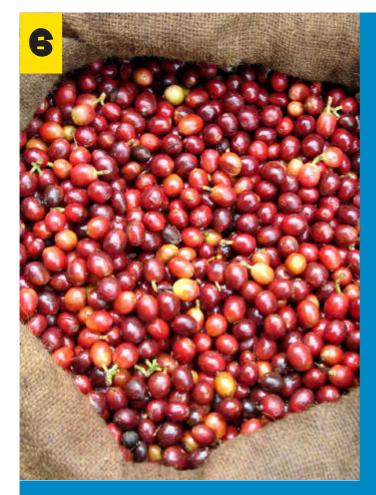
#### Technology Adaption of Farmer's Livestock School on Integrated Goat Management Implementing Agency: TCA





Commercialization and Development of Malunggay for Dairy Goat Implementing Agency: BAI

The project aims to utilize malunggay as feed for lactating goats. This is geared towards cutting the cost of feed concentrate and supplements needed in goat milk production, and towards increasing the farmer's income. By commercializing malunggay as a feed for dairy goat production, milk production may increase while reducing production cost. This could be achieved by: 1) development of malunggay for feed, 2) on-farm feeding of malunggay leaf meal and pellets, 3) cost-benefit evaluation, and 4) production and distribution of malunggay leaf meal and pellets. In the project, the researchers promoted the use of malunggay as forage for goats, which were raised for milk production. Its high nutrient content increased milk production by 134 percent. As reported, "daily supplementation per head with one tablespoon of malunggay powdered leaves produced the highest daily milk".



#### Processing Technology Development and Utilization for Organically Grown Arius Fruits in Batanes; and Arius Fruits Product Development

Implementing Agency: BSC

With the appealing sweet taste and succulent texture of Arius berries, the Batanes State Colleges has conducted projects focusing on developing various food products using this berry that is native to Batanes. The projects aimed to develop various product technologies through value-adding thereby improving livelihood and profit. The products developed through these projects were: Arius candies (e.g., pastillas, yema), jelly, jam, juice, pastries (e.g., tart), preserve, prunes, tea, and wine. Other products being developed used Arius as additive for animal feeds and as fertilizer when fermented.

#### Mindoro Arabica Coffee for Agroforestry Enhancement (MACAFE) Project: A PPP in Agribusiness, Reforestation and Poverty Reduction

Implementing Agency: PLGU-Oriental Mindoro

The two-year project covers planting of 120,000 Arabica coffee seedlings to rehabilitate 60 hectares of open/ barren areas and coconut areas. This is in support to the National Greening Program of the government and to create additional livelihood opportunities for farmers and increase their income. The project benefitted 75 farmers including indigenous peoples, upland farmers and coconut farming families. Project sites include the municipalities of Baco, Bongabong, and Victoria in Oriental Mindoro. For each site, farmer-beneficiaries, along with local government unit (LGU) personnel, are trained on organic farming and farm management; organic fertilizer production, harvest, postharvest, and packaging; and coffee enterprise development and marketing. As reported, the Philippines is currently importing 40,000-65,000 metric tons of coffee every year. To be self-sufficient in coffee, the country requires an estimated 50,000 hectares additional areas planted with coffee. The PLGU of Mindoro will start at 60 hectares and is geared towards establishing 10,000 hectares of coffee plantations.





#### Technology Promotion and Utilization of Window Pane Oyster Product

Implementing Agency: BFAR III

The project focuses on technology promotion and utilization of kapis-based products. Through the project, processing equipment were awarded to three organizations as the project beneficiaries which are: Berting Shellcraft, Kaliwanagan-Rural Improvement Club, and Capili Sash Factory. The project covered the development of new kapis products, packaging and labeling, facilities improvement and capability building of the beneficiaries on marketing and enterprise development. With the project, it is hoped that steady production of kapis in Bataan will be secured and jobs generated for the community. Findings of the study will serve as a reference in crafting the national program on kapis. This will help resuscitate the diminishing kapis industry and help Bataan reach the status of market leader on exports of kapis-based products.



#### Technology Commercialization of Cashew-based Products/Agri-based Enterprise Development Project Implementing Agency: DA-PAES

With the establishment of the "Agri-based Processing and Techno Center" in Puerto Princesa, Palawan, farmers are now selling the cashew apple at Php I 1.00 per kilo, not bad for something not valued before. With the value-adding technologies developed, the apple extracts are now being used as raw material for making cashew juice, cashew wine, cashew prunes, and cashew soap, the latest product of PAES. If the cashew soap development will progress, it will be the first of its kind. Other cashewbased product lines are bandi, nougat, brittle, polvoron, and pastillas, other than the traditional roasted and fried cashew nuts.

Cashew product diversification in terms of value adding will boost farmers' income and more importantly, address the issue on wastage. With value adding, the price of cashew could go as high as P200-300 per kilo. This in turn will benefit local farmers. With this development, the cashew industry will not only be known for its processed nuts, but also for other high-valued cashew-based products, making the province of Palawan among the list of exporting provinces in the country.







Value Added Technique in Sweet Syrup: Spray Drying and Packaging for Convenience Market Implementing Agency: BAPAMIN Enterprise

The goal of the project is to convert sweet sorghum syrup into a high value food products, such as powder sweetener, and to package them into sachets for convenient handling and longer shelf life. A natural sweetener from sweet sorghum syrup comes in fine, milkylooking powder form and has a distinctly sweet taste that does not leave any after taste in the tongue or add any unnecessary flavor to your beverage. It is considered to be all-natural and it has mediumlow glycemic index compared to other sweeteners which is good for diabetics.

Engr. Antonio Arcangel explained that an important component of this project which was conducted in llocos Norte is the acquiring of a spray-drying machine to do the main job: convert the syrup into powder in large volume. In a six-hour operation, the spray-drying machine can process and convert 10 kilos of sweet sorghum feedstock (syrup) into powder form. This is packaged in sachet, each containing 10 grams. The 10-kilo powder sweetener produces around 1,000 sachets. The suggested retail price is at P3.50 per sachet which makes it competitive to those which are already available in the market.



ddressing the need of agriculture and fisheries sector through R&D initiatives must always be attuned to the major challenges of the time. A unified effort is vital in transforming the farming and fishing communities towards a desired level where the potential economic gains are within reach and the impact are evenly felt in the communities.

Over the years, BAR has transformed itself into a dynamic and responsive agency wherein R&D alone is not a mere dictum but a work in action—implementing research programs that matter to the sector down to the grassroot level.

This section highlights the accomplishments of BAR, particularly the 15 R&D programs which are being implemented in harmony with the national programs of DA. These are: organic agriculture, climate change, rice, corn and cassava, high value crops, biofuels, rainfed agriculture, adlai, soybean, breadfruit, apiculture, rubber, indigenous plants, biotechnology, and native animals.

#### **Organic Agriculture**

Organic agriculture is a priority thrust of DA particularly in the implementation of agriculture and fishery projects. The integration of this approach is within the context of food production, which warrants food safety and has a direct bearing in environmental protection.

BAR, as mandated under Republic Act 10068, also known as Organic Agriculture (OA) Act of 2007, shall coordinate, develop, enhance and support and consolidate activities and related technologies for the formulation and implementation of unified and integrated organic agriculture RDE plans and programs. In compliance with the Act, BAR has coordinated with other agencies of government, bureaus and attached agencies, regional field units, the academe and the private sector, and has funded and implemented several OA projects across the country.

For 2013, BAR funded 36 OA R&D projects out of which 25 are on applied research, 6 are on R&D facilities, and 5 are on technology commercialization. From the 25 applied researches, 9 are new, and 16 are on-going projects focusing on the documentation and assessment of OA crop production, socio-cultural aspects, food quality and safety, organic livestock production, soil quality management, organic seed production, and supply chain analysis of organic produce. The 6 R&D facilities projects focused on providing infrastructure that are specific to organic production, while the 5 techcom projects were devoted to production and post-production related technologies, while the remaining five gives importance to the establishment of OA R&D facilities.

In consultation with BAFPS, the agency prepared the design and layout of the Regional Organic Agriculture R&D Center to be established in Regions I, 4A, 8, 9 and 12. The constructions of the centers are on-going in Regions I and 4A.

Director Eleazar and other key officials of BAR attended the 10th National Organic Agriculture Congress and participated in the 1st Natural and Organic Product Expo on 17-19 October 2013 at PICC, Manila. BAR also served as a member of the National TWG on OA Project Proposal Evaluation and National Technical Search Committee for OA Local Government Unit (LGU) Awards 2013, taking part in the preparation of the guidelines, assessment and evaluation of nominees, and site validation of the qualified candidates, and post-evaluation of the conducted OA LGU Awards 2013.

BAR staff actively participated in the National Technical Search Committee Meetings for Outstanding Local Government Units Award Meetings, Pre-Implementation Workshop on National Validation and Documentation of Organic Production Systems for Rice and Vegetables, Agriculture and Fisheries Extension Network (AFEN) Training on Organic Agriculture at Costales Farm, Majayjay, Laguna; and the IT Workshop for the Implementation and Intensified Promotion of the National Organic agriculture Program.

Other BAR officials likewise served as resource speakers during the SUC consultation titled Roles of SUCs in the Implementation of RA10068 and the National Organic Agriculture Program held on 14 November 2013 at Hotel Supreme Convention Plaza, Baguio City; and in the National Conference on Soil Fertility Management Researches and Organic Fertilizer Production and Regulation held on 19 November 2013 at BSWM Convention Hall in Diliman,



#### **Climate Change**



The BAR Climate Change R&D Program covers specific measures designed to address the short-term adaptation, long-term adaptation, and mitigation strategies. This serves as quick response to the damaging effects of changing weather phenomenon and to prepare the country from the perceived threats to the sector.

BAR's accomplishments can be categorized as support to the R&D efforts of the government and other stakeholders like SUCs, scientific and research communities, international institutions as well as private-led organizations.

The bureau's program on Climate Change is centered on strengthening the conduct of climate-resilient and demand-driven researches that focuses on improving the adaptive capacity of farmers and fishers as well as mitigation of GHG through climate change sensitive technologies and practices.

As part of the continued support to mainstream climate change in agriculture, 15 on-going projects with climate parameters were funded. From these, 6 are short-term adaptation, 8 are long-term adaptation, and 1 mitigation strategy. The funded projects have been categorized depending on the time significant outputs will be generated.

In terms of adaptation innovations, the government has taken various initiatives in response to the urgent call for adaptation and mitigation actions to attain a climate changeresilient agriculture and fisheries sector. With this in context, BAR collaborated with other DA-operating units for the submission of their respective updated list of available tools, technologies and existing practices for climate change adaptation and mitigation ready for transfer and adoption by farming and fishing communities.

A roundtable discussion on "Updating DA-BAR's Climate Change RDE Program was conducted on 23-25 April 2013, Tagaytay City. It aimed to assess the initial accomplishments and milestones of the program in terms of its projects and activities and identified challenges and opportunities to strategically position the bureau's Climate Change R&D Program.

BAR coordinated 22 climate change-related BAR-funded projects being implemented by different institutions, which were mostly from SUCs. Out of the 22, 6 projects have already been reviewed and 5 were monitored in 2013.

Other significant events that took place during the year were the 1) 2013 Climate Change Orientation Workshop held in 17 September 2013 at BAR, and 2) Asia-Pacific Economic Cooperation (APEC) Seminar-Workshop on Mainstreaming Climate Change Adaptation and Mitigation Initiative in Agriculture (AMIA) held on 22-24 October 2013 in Makati City. The AMIA event was participated in by 25 international delegations from 14 countries.

#### Rice



The Agri-Pinoy Rice Program is one of the banner commodity programs of DA and is mainly concerned in rice farming and uplifting the lives of Filipino farmers. It integrates government initiatives and interventions for the agriculture sector and plays a key role in the Food Staples Sufficiency Program (FSSP) of the department.

One major service intervention of the rice program is R&D, in which BAR is closely working and coordinating with the DA-National Rice Program and with other rice-led agencies of DA. The agency ensures that through rice R&D development initiatives, relevant and updated information, technologies and products will be generated, verified, disseminated and promoted to help and support the national rice program.

From 2009 to 2013, a total of 31 funded projects under the Rice Program were supported by BAR (Table 2).

#### Table 2. Projects under Rice R&D Program (2009-2013)

Year	Number of Projects
2009	4
2010	1
2011	4
2012	5
2013	17

In 2013, various rice R&D initiatives were supported. Specific to this are applied research projects including programs on technology commercialization that aimed on improving rice productivity.

For CPAR projects, several rice-based integrated farming system R&D projects were supported in the provinces of Pangasinan, Isabela, Nueva Vizcaya, Romblon, and Bukidnon.

In addition, the bureau was tasked to facilitate the funding support and assist in coordinating the implementation of the DA-IRRI R&D projects under the renewed partnership program between DA and IRRI on "Sustaining Rice Self Sufficiency and Food Security in the Philippines" which was signed through a Memorandum of Agreement on December 3, 2012 by Sec. Proceso J.Alcala and Dr. Robert S. Zeigler.

BAR participated in several meetings and workshops spearheaded by local and international rice agencies including participation to the 26th National Rice R&D Conference held on 6 September 2013 in Nueva Ecija and the "1st National Hybrid Rice Congress and the Rice Achievers Award" held on 3-5 April 2013 also in Nueva Ecija.

#### **Corn and Cassava**



Corn and cassava are crops of primary and importance in Philippine agriculture. Corn, like rice, is one of the country's main staple crops. Corn is also an important feed ingredient for livestock and poultry, while cassava is considered as one of the cheapest among the major starchbased feedstock for ethanol production.

The implementation of the Corn and Cassava Program aims not only to sustain the requirement of white corn eating populace and address hunger problems, but also to encourage rice consumers to include white corn in their usual eating habit. Consumption of white corn, cassava and other food staples is being promoted by the government in support to the Food Staples Sufficiency Program.

In coordination with the DA-National Corn Program, the Corn and Cassava R&D Program was institutionalized to help address corn production and other related concerns. It aims to increase productivity through SSNM, varietal development for food and nutrition for health, address negative perception of corn as food for the Filipinos through promotional activities, and address the grain and grits quality/postharvest handling by improving the storage and taste of white corn grits.

A total of 44 on-going (white and yellow) corn and cassava projects were funded in 2013. Out of this, 16 projects on white corn are currently being implemented by the different RFUs, while 28 projects are national projects in collaboration with the DA-Corn Program. The various accomplishments of BAR under the Corn and Cassava Program include: 1) the creation of the Corn and Cassava TWG that would set the policy directions and priorities for the industry; 2) participation in the Agri-Pinoy Corn Program Quarterly Performance Review and Planning Workshops held on 12-15 February 2013 and 22-25 May 2013; and 3) participation in the review of the "Calibration of Fertilizer Recommendation for NPK using Yield Response to Corn" held on 15 March 2013.

BAR also coordinated the implementation of the capacity building and study visit project titled, "Capacity building on Corn RDE Program for the DA Research Managers and Regional Field Researchers," with the UPLB-College of Economics and Management Alumni Foundation (CEMAFI). Study visits were conducted in Indonesia and Thailand on February 18-March 1, 2013, and on 12-23 April 2013 in Vietnam and Thailand.

The bureau also launched the "SSNM Fertilizer Quick Guide" on 18 October 2013 during the 25th NRS Awarding Ceremony. The quick guide is a one-page summary of plant nutrition and crop management guidelines for larger areas. The guides are designed to provide farmers with location-specific production guidelines based on the principles of SSNM, which capture the most important factors that affect fertilizer recommendations for a given region. The information material was distributed to DA-RFUs, private sector, researchers, and other corn stakeholders.

#### **High Value Crops**



The country is highly suitable for the production of high value crops. It is one of the few countries in the world that is endowed with an abundance of fruits, vegetables and other commercial crops. Capitalizing on the richness of these resources, DA has included high value crops in the food agenda of the government.

The High Value Crops Development Program (HVCDP) is one of the banner programs of DA created through Republic Act (RA) 7900 or the High Value Crops Development Act of 1995. It seeks to address food security, poverty alleviation and sustainable growth. The R&D component will assist the HVCDP in the development of sustainable cropping patterns and specific packages of environment-friendly technologies for the production of high-quality products. Technology promotion and commercialization schemes for priority high value crops will also be done to increase the use of developed technologies.

BAR is working closely with HVCDP in the strategic management and coordination of R&D thrusts and programs of DA. This partnership resulted to the funding of 74 R&D projects; of which 67 are production-related and 7 are post production-related researchers. These projects are comprised of applied researches and technology commercialization projects.

In 2013, there were 16 on-going HVCDP-funded projects being coordinated by BAR with various

proponents. A total of 58 new projects were funded in support to the R&D needs of the different commodities under industrial crops, fruit crops, and vegetables, as well as support to the implementation of the adlai and soybean R&D programs.

Aside from BAR's intervention with regard to the other R&D major programs, the agency, through HVCDP, funded projects on coffee, cacao, mango, and upland and lowland vegetables

Moreover, BAR and HVCDP worked together and launched the "Yamang Lupa R&D Program" patterned after ICRISAT's "Bhoochetana" which is focused on soil rejuvenation. The program is one of HCVDP's priorities.

Other activities undertaken with HVCDP were: I) Adlai National Review and Planning Workshop, 21-24 February 2013, Baguio City; 2) National Soybean Review and Planning Workshop, 24-28 February 2013, Baguio City; 3) Review cum Workshop On The Multi-location Adaptability Trial Of Several Imported Seeds From Singapore And Japanese Sweet potato (SPJ) Projects, 2-5 July 2013 in Clark, Pampanga; 4) National Food Legumes R&D Roadmap Workshop, 9-11 July 2013 in Clark, Pampanga; 5) National Strategic Planning cum PRA Workshop for the Bhoochetana Program, 12-14 August 2013 in Lucban, Quezon; and 6) Roundtable Discussion Meeting for Drafting R&D Agenda for the Development of High Value Commodities for the Agro-Processing Sector.

#### **Biofuels**



After the passage of the Biofuels Act of 2006, the DA crafted the Biofuel Feedstock Program which aims to reduce the country's dependence on imported fuels with due regard to the protection of public health, the environment and natural resources. BAR, alongside other government agencies, took active role in the identification and promotion of other feedstock that will support the advocacy of the Act. The agency likewise took the lead in coordinating with the private sector and the academe the further development of viable feedstock.

Since 2006, BAR has funded and implemented 42 biofuels-related projects.

For 2013 alone, 3 new projects are added to the program to spur the development of the biofuel industry. Furthermore, 16 projects were subjected to technical review and on-site monitoring, while 13 projects were completed.

The BAPAMIN, a private enterprise that has been a partner of the bureau in various sweet sorghum initiatives, implemented a BAR-funded project that aims to produce sweet sorghum value added products on a commercial scale using developed technologies. Meanwhile, a UPLBFI project that is focused on the economic study of biodiesel production from palm oil will venture on the study of carbon emission savings and debt analysis. The bureau further explored the evaluation of the viability of organic sweet sorghum production in Negros Occidental, lloilo, and Laguna, respectively.

One notable achievement in the aspect of partnership was the agency collaboration with UPLBFI, San Carlos Bioenergy Inc. and the local government units of Northern Negros which resulted in the production of the first-ever anhydrous bioethanol from sweet sorghum in the Philippines. This is another marked endeavour in the biofuels R&D.

BAR took part in biofuel-related symposiums and TWG meetings. Among the major events were the "Conference on Financing Renewable Sources of Energy: Prospects for the Future" held in Makati City on 12 July 2013; "1st ASEAN Conference on Agricultural and Biosystems Engineering" held in Manila on 24-26 September 2013, and "Seminar on Project Formulation Study on the Development of Decentralized Bioethanol Production Systems at the Rural Areas in the Philippines" held in Makati City on 6 December 2013.

#### **Rainfed Agriculture**



In a bid to sustainably manage the country's rainfed agriculture and contribute to poverty reduction, BAR partnered with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and launched the Philippine Rainfed Agriculture Research, Development and Extension Program (PhiRARDEP). The program, also known as Rainfed Agriculture, serves as a platform and unified scheme in planning and prioritizing R&D to efficiently identify strategies and prospects vis-à-vis the emerging issues and concerns of the dryland sector.

One significant feat of the program was the launching of the "Yamang Lupa Program (YLP): Adoption of Bhoochetana Principles and Approaches for Natural Resources Management towards Sustainable Philippine Agriculture" in partnership with ICRISAT and HVCDP during the second quarter of 2013. The Yamang Lupa was patterned after the successful program implementation in India by ICRISAT called Bhoochetana in which the core strategy is soil rejuvenation. The program was piloted in four provinces within the three major islands: Quezon (Luzon); Leyte and Samar for the (Visayas); and Zamboanga-Sibugay in (Mindanao).

Prior to the formal launching of the program, several consultation-meetings and dialogues with Dr.William D. Dar, director-general of ICRISAT, and other visiting ICRISAT scientists took place until the MOA signing between BAR and ICRISAT was held on 8 October 2013. A Special Order for "Creating the Steering Committee, Program Management Group and Technical Working Group for Yamang Lupa Program," was signed by Secretary Proceso J.Alcala in December 2013. BAR in partnership with ICRISAT spearheaded the program, while BSWM implemented the program.

In terms of program implementation, 17 rainfed projects amounting to Php32.120 million have been funded for implementation. Of the 17 projects, 5 were reviewed, 12 were monitored, and 6 have been already been completed.

BAR initiated capacity building for the 10 YLP regional team members in ICRISAT, India from November to December 2013 and likewise participated in the "National Conference on Development Initiatives in the Philippine Marginal Uplands" on 22 - 24 October 2013 at Visayas State University.

The bureau also launched the publication titled, "Philippine Rainfed Research, Development and Extension Program: The Updated Framework and Action Agenda 2013 and Beyond," which was launched during the 25th NRS Awarding Ceremony.



Adlai, also known as Job's Tears (*Coix lacryma-jobi* L.), comes from the family Poaceae or the grasses, the same family where wheat, corn, and rice belong. The use of adlai, an indigenous crop included in the R&D domain in 2010, has been receiving positive feedback as a viable alternative crop to rice and corn. In fact, according to a study published by BAR in its October-December 2011 issue of the *BAR R&D Digest*, it was found that adlai contains the highest food energy content compared to white and brown rice.

Exploring the potential of the crop was made possible through the BAR Adlai R&D Program in coordination with the HVCDP. The program aims to determine the adaptability of available varieties in selected regions, RIARCs and SUCs; develop packages of technology (POTs) on cultural management practices, postharvest/processing, and seed production systems; develop food products as well as by-products; introduce and promote its uses as food for the table, feed for livestock/ poultry and for other purposes; and recommend promising strains/varieties for NSIC registration.

As of 2013, a total of 27 adlai projects has been funded and implemented, 14 of which are on-going, and 13 were completed. Adlai food products and by-products such as wine, coffee, crunch, flour, sushi, arroz caldo, puto, biko, among others, developed, validated and disseminated in various forums and commercial establishments as a means to mainstream the crop in the farmer's production cycle and cropping patterns.

In 2013, the program produced 11.6 tons of adlai seeds of which 5.7 tons were distributed to 5,922 beneficiaries. Meanwhile, a total of 5,942 kgs. have been earmarked for distribution in six regions, namely: Reg. 2 (435 kg), Reg. 4A (470 kg), Reg. 5 (50 kg), Reg. 9 (100 kg), Reg. 10 (4,775 kg), and Reg. 11 (112.1 kg).

Six areas in Regions 6, 7, 8, 12, 13, and ARMM have also been included among the adlai production sites for a total of 16 adaptability yield trial across the country.

The bureau coordinated a series of TWG planning meetings, site visitations, and facilitated the conduct of project reviews and monitoring including the "Adlai National Review and Planning Workshop of Adlai Projects" (being implemented in DA-RFUs and selected SUCs) on 21-24 February 2013 in Baguio City. Another significant endeavour was the collaboration with BPI on adlai NSIC registration. DA-RFU 4A facilitated the nutrient analysis of adlai with FNRI. Analysis showed that 100g of adlai grits contains Na (2.0mg), Fe (0.4mg), Ca (5mg), K (84mg), and Zn (0.4mg). It has been suggested that analysis for adlai bran be considered to determine its potential for processing into tea or other products.

#### Soybean



Soybean is a legume known for its high protein, oil characteristics and medicinal properties. The DA, through the HVCDP, has included soybean as one of its priority crops because of its many health benefits and industrial uses. BAR handles the R&D component of the program and is in close coordination with HVCDP in the production, processing and promotion of soybean as a champion crop. This strong partnership together with RIARCs and other stakeholders has resulted to the successful implementation of the DA Soybean Program. The program aims to increase its target seed production to 7,115 hectares in 2014 through On-Farm Trials (OFTs) and Techno Demo (TD) commercial production.

In 2013, soybean hectarage has increased to 5,280 hectares from the 1,685 hectares in 2012 and has produced 422 tons of seeds as compared to 100 tons the previous year which is equivalent to 213 percent and 200 percent increase, respectively. Region 3 dramatically increased its production area from its initial target of 100 hectares to 300 hectares at the end of the year. Idle lands in Pampanga and Nueva Ecija were planted with soybean as part of the expansion program. And to meet the demand for planting materials, the region even sourced its materials from the CARAGA region. Also, BAR and HVCDP funded and implemented 13 soybean related projects.

Recognizing the importance of the crop in the daily lives of Filipinos as food and feed ingredients, BAR facilitated and spearheaded the conduct of several trainings on production and processing soybean technologies for farmers' and peoples' organizations. Specific to this were collaborations extended with Golden Beans and Grains Cooperative, a newly organized cooperative in Nueva Ecija, in product development like soymilk, and the Seventh Day Adventist in terms of market development. Farmers' Field Schools were also conducted in coordination with LGUs in Regions 2, 4B, 5, 10, 11, 12, CARAGA, and ARMM. BAR is conducting on-station and on-farm testing in selected regions.

BAR, in partnership with HVCDP and DA-RFUs, packaged and published the "Healthy Cooking with Soybeans" recipe book featuring 50 easy to prepare food recipes from soybean-based ingredients. The book was launched during the Awarding Ceremonies of the BAR's 25th National Research Symposium in October 2013 at the BSWM Convention Hall.

#### Breadfruit



Breadfruit is another neglected fruit crop but has recently been given attention by DA by exploring its potential through R&D. Breadfruit, scientifically known as *Artocarpus altilis* smells like fresh baked bread when baked or roasted. This fruit may not be so popular in the Philippines, but it shows high potential to become a rich source of nutrients for many Filipinos especially in poverty-stricken regions, as an ingredient for pharmaceutical products, and as a raw material for industrial products.

BAR is the lead agency for the Breadfruit R&D program in close coordination with HVCDP.The program explores the potentials of this underutilized crop. The utilization of the neglected and underutilized crops is gradually taking place with better understanding of their potential brought about by an extensive R&D. This is a good starting point to explore the potentials in triggering economic activity in the country as the Philippine fruit industry is a vital component of Philippine agriculture.

Since the inclusion of breadfruit in the major programs of the bureau, a total of five projects have been funded. For 2013, two breadfruit projects were funded on the production of quality planting materials in 2013. These are: 1) Establishment of Rapid Propagation Techniques for Seedless Breadfruit in Marinduque implemented by the Marinduque State College; and 2) Identification, Rehabilitation, Development and Establishment of Breadfruit Nursery in Zamboanga Peninsula by DA-RFU 9/ZAMPIARC.

One significant result of this undertaking is product development, the most popular of which is breadfruit ice cream spearheaded by DA-RFU5/ BIARC. This BAR-BIARC initiative also involved biodiversity study of breadfruit in Albay, Sorsogon, Camarines provinces, and Catanduanes and conserving the region's breadfruit germplasm.

### Apiculture



Beekeeping or apiculture is the deliberate rearing of honeybees for the production of honey and other bee products including propolis, beeswax, and pollen. It is given importance because of the significance of bees as pollinators. Bees pollinate flowering plants, fruits, and vegetables which is vital in maintaining and promoting biodiversity. It is a promising business and has a huge potential in providing additional sources of income to a greater sector of Filipinos.

The R&D role in this area is focused on the natural elements that can be extracted from bees as raw material and ingredients for food and non-food products. In terms of medicinal value, honey from bees is the only one with high anti-fungal and antibacterial properties.

Considering the importance of bees, particularly honey, and its potential as an economic driver, the bureau in coordination with the UPLB Bee Program and HVCDP has included apiculture as one of its major programs. As of 2013, 12 projects have been funded and implemented. Two projects: 1) Bee RD and E Roadmap Development, and 2) Commercialization of Beekeeping Technologies: Product Processing and Bee Production in Selected Bee Communities in Luzon, have been completed while the remaining 10 are on-going.

To mainstream apiculture, BAR, UPLB Bee Program and HVCDP published the Philippine Apiculture Status and Research and Development and Extension (RD&E) Agenda 2012-2016, which was the result of two workshops conducted in 2011 and 2012. The Bee Roadmap was authored by Dr. Cleofas R. Cervancia and Mr. Alejandro C. Fajardo, Jr., of UPLB. The roadmap is envisioned to provide a profitable bee industry that supports agriculture, forestry and biodiversity conservation capable of supplying quality bees and bee products to local and foreign markets.

Other interventions include the establishment of demo apiaries and Technology Processing Centers in Quezon (Lucena, Tayabas, Atimonan, and Nakar); Bicol (Bulusan, Albay, ); and Laguna (Alaminos).

In terms of bee product development, honey, bee soaps, massage oils, lip balms, bees wax, and propolis were produced. These products are being promoted by the Office of the Secretary for wider promotion.



Rubber is considered a profitable agroindustrial crop in Southeast Asia. It is one of the crops which can be integrated in agroforestry systems that encourage the sustainable use of land. The DA is implementing the Rubber Development Program (RDP) as a component of the HVCDP. The goal is to develop a globally competitive rubber industry and to empower the small farmers, plantation owners and cooperatives as well as entrepreneurs and investors.

In response to the endeavour, BAR is supporting the technology commercialization of the recommended rubber clones in the country and other production and processing technologies through technology promotion and demonstration in suitable rubber areas nationwide. BAR has provided funding assistance to the Dulangan Manobo Free Farmers Organization (DMFFO), a rubber farming-based NGO located in Sultan Kudarat and two projects being implemented by the University of Southern Mindanao (USM) and the Agropolis Free Farmers, Inc. in Candoni, Negros Occidental.

Realizing the importance of the rubber industry as a viable industrial crop, BAR together with HVCDP jointly implemented several rubber projects, which aim to increase the level of investment through the provision of production facilities and technologies, access to financing, policy reforms that will increase income opportunities of farmers and other stakeholders from production and value adding activities.

For 2013, BAR supported the "Technology Utilization and Promotion of Rubber Production in the Upland of Kalamansig in Sultan Kudarat" being implemented by DMFFO. The project resulted to the development of the local rubber industry in response to the principles of the RDP of DA. To date, 20 rubber projects have been funded, of which 13 were completed, 5 are ongoing, and 2 are still in the pipeline for review and evaluation.

BAR also organized a short course on carbon market with the International Rubber Research and Development Board (IRRDB) and the International Energy Centre on 13-14 June 2013 in Quezon City. This arose following a commitment of the IRRDB during the "International Conference on Smallholder Rubber-based Agroforestry" held on 5-6 December 2012 in Manila. The workshop was attended by 50 participants from different research institutions and regional partners of DA. Highlighting the event was the signing of the Implementing Rules and Regulations of the R.A. 10089 also known as the Philippine Rubber Research Institute Act of 2012.

### **Indigenous Plants**



The Philippines is blessed with abundant indigenous and medicinal plants with claimed therapeutic benefits. It is home to at least 13,000 species of high variety and is characterized as having one of the highest variability in living organisms in the world.

The Indigenous Plants for Health and Wellness (IPHW) is another R&D program of BAR engaged in the study of Philippine biodiversity particularly plant species and their contributions to biological diversity. It is being promoted for its varied uses particularly for food and other health promoting benefits. The program aims to help improve the health and wellness of each and every Filipino through natural but effective products.

BAR, through its indigenous health and wellness program, is evaluating on-farm conservation systems for neglected crops. In 2013, two projects supported were: 1) "Technology Promotion and Packaging Development of High Value Products from Selected Indigenous Fruits" implemented by UPLB-FI; and 2) "Promotion and Utilization of Indigenous Vegetables" by DA-ZAMPIARC. The first project is focused on the development of high value products from selected indigenous fruits while the second is geared towards the establishment of Achuete (*Bixa orellana* Linn) in Zamboanga Peninsula.

BAR through its indigenous health and wellness program, is evaluating on-farm conservation systems for neglected crops.

### Biotechnology



BAR's focus on biotechnology is centered on informed decision through accurate and science-based information. This provides farmers options on what kind of technology to use and apply thereby ensuring them of an informed decision towards a better production.

The bureau has been supporting the DA-Biotechnology Project Implementation Unit (PIU) in funding priority R&D projects and activities of the different agencies within the DA and other stakeholders including NAST, UPLB BIOTECH, SUC's and private organizations. DA and BAR supported the harnessing of biotech in developing the industry for natural ingredients as well as applied biotechnology for improving crop yield, resistance to pests, and adaptation to climate change. Through the program, long term solutions to some of our major crop production problems are provided.

BAR coordinates and facilitates the funding for the implementation of programs and projects under the Applied Biotech Research (ABR), Information Education and Communication (IEC), and Institutional Capacity Enhancement (ICE). For 2013, DA Biotech PIU and BAR facilitated the funding of 11 new projects which were categorized under the following disciplines:

- Varietal improvement using genetic engineering
- Varietal improvement using other biotech tools
- Development of molecular markers for varietal improvement
- DNA Fingerprinting/bar coding, genetic/ molecular markers
- Pest/disease diagnosis and management
- Improvement of bio-processing, bioinputs, feed ingredients, products and by-products
- Upscaling of technologies
- Identification of industrially-useful substances
- Propagation of planting materials

The bureau sees the potential applications of these R&D major programs in the food and non-food industry as well as the roles they may play in the promotion of sustainable agriculture, and thus, we need to vigorously pursue these attributes and translate these as building blocks for DA's call for food self-sufficiency.

### **Native Animals**



Launched in 2010 by the Bureau of Animal Industry (BAI), the Philippine Native Animal Development (PNAD) program aims to promote the conservation and utilization of domesticated native animals for food. It highlights the significant role that native animals play in providing food and income-generating activities for the Filipino people.

To support the conservation advocacy of the government, BAR has coordinated with BAI and with other livestock-oriented groups on how to actively promote this endeavour. This undertaking has resulted to the funding of seven R&D related projects geared towards the promotion and development of native animals in 2013.

The projects funded in 2013 ranges from sourcing baseline data for native pigs, recommended feeding rations, information on the existing native pig gene pool in the country as well as breeding management and production, among others.

BAR also took part in various PNAD-TWG meetings in discussing issues and concerns relative to the development and utilization of native animals.

The program aims to promote the conservation and utilization of domesticated native animals for food. It highlights the significant role that native animals play in providing food and income-generating activities for the Filipino people.

# International Partnerships in Agriculture & Fisheries R&D-

or as long as there are mouths to feed, there has to be more research, more knowledge, newer technologies, and more efforts to produce sustainably.

In today's world of interconnectedness, the name of the game for agricultural research is maximization of the resources at hand. This is particularly true for research institutions that have limited funding and limited facilities. It is but logical that one does not do what another has done especially if it is readily available at least cost.

The collaboration between international agricultural research centers (IARCs) and the National Agricultural Research Systems (NARS) of countries, whose development relies heavily on agriculture, is a necessity in the traditional areas of research, in the recent disciplines such as biotechnology and information technology applications, and in addressing emerging challenges such as climate change and the conservation of biodiversity resources. The challenge is to create symbiotic relationships that promote greater interaction in innovative ways.

Recognizing that agricultural research is a global activity and therefore linkage is crucial, a country has to develop mechanisms for effective partnerships to accelerate technology and knowledge generation and transfer. This section is about partnerships with international partners that BAR has engaged in for the betterment of Philippine agriculture.



### **AFACI Pan-Asia Projects in the Philippines**

welve member countries make up the Asian Food and Agriculture Cooperation Initiative (AFACI). This agricultural cooperation network was established in November 2009 in response to the need for close international collaboration among these 12-member countries in sharing technology and experiences on common agricultural concerns, and in contributing to sustainable agriculture and food security in Asia. The major activities of AFACI involve international collaboration to deal with emerging issues and persistent concerns in the agricultural environment that include climate change, need to conserve the environment and genetic resources, capacity building, technology transfer, and the twin specters of poverty and hunger.

Led by South Korea, the other member countries are: Bangladesh, Cambodia, Indonesia, Laos, Mongolia, Nepal, Philippines, Sri Lanka, Thailand, Uzbekistan, and Vietnam. The network is based at the International Technical Cooperation Centre of the Rural Development Administration (RDA) of the Republic of Korea.

Soon after its establishment, the First AFACI Assembly Meeting was hosted by the Philippines' Department of Agriculture on 15-16 April 2010 in Tagaytay City where the setting up of Pan-Asia (general territory of Asia) projects geared to promote sustainable agricultural green growth in the Asian region was discussed. To date, the Philippines has been involved in a number of AFACI's Pan-Asia projects with BAR looking after two of these: 1) Plant Genetic Resources (PGR) Management; and 2) Agricultural Technology Information Network (ATIN).





# **1** Strengthening the Country's PGR Management System

On March 20-21, 2012, the AFACI held a Principal Investigators' Meeting in RDA, Suwon, Korea. The Philippines was represented by Ms. Digna Sandoval of DA-BAR as the country's principal investigator. As an outcome of the meeting, an agreement was signed between AFACI and DA-BAR for the implementation of a project on the management of plant genetic resources in the Philippines titled, "Strengthening PGR Management Systems: Conserving the Diversity of Priority Vegetables (Solanaceous crops) Germplasm of the Philippines." This is part of the Pan-Asian project of AFACI, "Integrated Management System of Plant Genetic Resources (IMPGR)".

Cultivated crops, and their closely related wild species, form part of what is known as "plant genetic resources" or PGR. Plant genetic resources are plant materials with actual or potential value for present and future generations and are therefore a vital component of agricultural biodiversity.

Agricultural biodiversity provides economic, environmental and sociocultural benefits. It enhances agricultural productivity and ensures food security. Diversity in genetic resources useful to food and agriculture provides sources of raw materials for genetic improvement of crops. Vulnerability to attack of pests and diseases, and changes in weather and climate can be decreased. PGR for food and agriculture (PGRFA) can also play a major role as sources of materials to address the challenges of climate change adaptation and mitigation.

There is global concern for PGR because of genetic erosion and loss of biodiversity. The major causes have been the: 1) introduction and spread of high yielding and new varieties of crops that have displaced indigenous plants; 2) intensification of the agricultural system and establishment of commercial plantations that have made growing habitats less favorable for indigenous plants, and overexploitation and excessive gathering of wild plants, inadvertent introduction of pests; and 3) destruction of the natural ecosystem, due to population pressures and urbanization, including environmental pollution. Natural disasters like volcanic eruptions and tsunamis that can destroy the habitat of indigenous plants, and abiotic stresses such as droughts and floods are also threats. However, the biggest threats are in

people's neglect and apathy towards conservation of this national patrimony.

The main goal of the project is to strengthen the country's management system for plant genetic resources conservation, exploration, collection, characterization, evaluation, distribution, monitoring and documentation for sustainable use. It focuses on strengthening the National PGR Network and management system and will give priority to conserving the diversity of traditional tomato, eggplant and *capsicum* germplasm and its related species, as these are the most important vegetables in the country in terms of hectarage and volume of production, among the Philippines' PGR species. Specifically, it hopes to: 1) strengthen networking among different stakeholders and promote sustainable use of plant genetic resources; 2) document and monitor existing plant genetic resources available in the different stations in the DA regional field units; 3) conduct exploration, collection, regeneration, characterization and evaluation, and conservation of traditional tomato, eggplant and sweet and chili pepper germplasm and related species; and 4) select and identify traditional germplasm accessions with

#### **Project Components**

The project has two major components that deal with the strengthening of the national PGR network and conservation of *solanaceous* vegetable species. The two components include 1) strengthening of the National Plant Genetic Resources Network and Management System, and 2) conserving the diversity of traditional tomato, eggplant and *capsicum* germplasm and its related species.

#### 2013 Accomplishments

In 2013, various activities were carried out under each project component. Under the first component, a training and workshop for DA-RFU staff on the characterization and documentation of PGR on solanaceous crops was conducted at IPB-UPLB on April 8-16, 2013. The objective of the workshop is to technically equip the DA RFUs with basic skills and knowledge on PGR conservation and management, identify the regional stakeholders and focal persons that will be involved in the development of PGR management systems at the local levels. The topics covered PGR characterization and evaluation, morphological

characterization; botanical description and identification of parts; collecting germplasm; and data gathering procedures.

Still part of capacity building of the PGR network stakeholders, actual collection of specimens and samples of indigenous crops was done during a collecting trip to Santa Rosa, Laguna during which the participants gained first hand knowledge on data gathering, data analysis and PGR documentation; and on collection and characterization.

For the second component of the project, an exploration, collecting and conservation of solanaceous crops germplasm was conducted. This is needed to increase the diversity of the collection in the NPGRL-IPB genebank. Exploration for and collection of different traditional varieties and related species of eggplant, tomato and pepper was conducted in 12 provinces. There were 209 specimens collected from 12 provinces including Ilocos Norte, Isabela, Nueva Ecija, Iloilo, South Cotabato, Ilocos Sur, Kalinga, Aurora, Bohol, Bukidnon, Camarines Sur, and Occidental Mindoro (Table 3).

For the regeneration of priority vegetable crops, activities consisted of the establishment of field layout, viability testing, determination of alternate crops, and harvesting and processing of individual crops. For characterization, the gathering of data characters at various growth stages and seed yield were done while determination of the incidence of pests and diseases on the gathered solanaceous crops at field level was done for the evaluation. Plant breeders of IPB were able to distinguish ten accessions of eggplant, nine accessions of pepper, and four accessions of tomato based on appearance and vigor. As of late 2013, seed viability testing was on going along with seed preparation for the next planting while data gathering continued.

BAR also participated in local and international trainings/workshops. These include: 1) "International Training Workshop on Germplasm Management Systems (GMS) in Asia" held on 20-29 May 2013 in Suwon, Korea; 2) "AFACI PGR Project Consultation and Planning Workshop held on 15-17 December 2013 at Widus Hotel in Clark, Pampanga; and 3) "Expert Workshop on Integrated Management System of Plant Genetic Resources (IMPGR)" held on 23-27 September 2013 in Kathmandu, Nepal.

#### Table 3. Collecting of Solanaceous Crops Germplasm by Island Group

Area	Total number of Provinces	Provinces Explored	Total crop collected
Luzon	38	8	126
Visayas	16	2	44
Mindanao	26	2	39
TOTAL	80	12	209



# 2 Establishing Agricultural Technology Information Network in Asia

It is unwise to reinvent the wheel when it has been done elsewhere. While a country may develop its own resources for research and the information platform to provide for its citizens, it is advantageous to relate with other countries to gain new knowledge and improve on what it already has.

In order to facilitate the sharing of agricultural information in the region, AFACI is setting up the Agricultural Technology Information Network (ATIN) in Asia through a three-year Pan-Asian project titled, "Establishment of Agricultural Technology Information Network in Asia". The project was developed as a Pan-Asian project of AFACI that is aimed at facilitating a webbased sharing of agricultural information and knowledge among AFACI member countries that include the Philippines which is represented by BAR.

The development of information and communication technology (ICT) has led to the development of tools that facilitate technology development and the dissemination of information to specific users. In agricultural research, information that it generates are available, however, effective dissemination and easy access to these information is a question as it both researchers and farmers face a hurdle in getting to this wealth of information. Even though agricultural information has much to offer in terms of knowledge to the researchers and farmers, poor networking and absence of deliberate management remains a barrier. The difficulty in accessing webbased information is a major constraint to agricultural development.

It is against this backdrop, that ATIN was envisioned to facilitate the setting up of a network of collaboration that will make available a standardized agricultural information platform for sharing agricultural knowledge and data gathering. The ATIN also serves as a venue for sharing R&D and technology outputs for mutual understanding among Asian countries.

The standardized information platform will allow easy inter-country access to agricultural technology and information and its database to its users. Through the information gathered by ATIN and made available, skills and knowledge of farmers, agricultural researchers as well as other stakeholders are expected to improve. As the database is continuously updated, use of information will be expanded to policymakers, as well as R&D managers, which will help them in making decisions in their respective organizations. Other ATIN outputs to be generated include annual country reports and statistics in agriculture, global analyses of agricultural R&D system, and other information relevant to agricultural development of individual countries.

As envisioned, ATIN focuses on forging partnerships among existing agri-based database systems and networks of the AFACI member countries in Asia. It was implemented initially for three years (2010-2013) with a budget of US\$300,000 and a yearly allotment of US\$10,000 for each of10 agencies representing 10 of the AFACI member countries. These agencies are: Bangladesh Agricultural Research Council (BARC), Cambodia's Ministry of Agriculture, Forestry and Fisheries (MAFF), Indonesian Agency for Agricultural Research and Development (IAARD), Lao PDR's National Agriculture and Forestry Research Institute (NAFRI), Mongolia's National Agriculture Extension Center, Ministry of Food, Agriculture and Light Industry (MoFALI), Nepal's Ministry of Agriculture and Cooperatives (MOAC), Philippines' Bureau of Agricultural Research (BAR), Sri Lanka's Department of Agriculture (DOA), Thailand's DOA, and Vietnam Academy of Agricultural Sciences (VAAS). Korea's Rural Development Administration (RDA) led this initiative.

#### **Project Activities**

The ATIN member countries are expected to: 1) construct and network the standardized agricultural information platform for sharing agricultural knowledge among the member countries; 2) collaborate with existing agri-based networks and websites, update and renovate the website previously constructed; and 3) publish literature including 'Annual Country Reports' of agriculture-related topics for mutual understanding on agricultural status among the 10 member countries.

For the AFACI member countries, project activities in the 10 member countries in the first project phase for July 2010 – June 2013 include: 1) establishing web networking, 2) organizing collection of agricultural information, 3) collecting data, 4) data processing, and 5) analyzing collected data and uploading it on the standard platform of ATIN.

#### 2013 Accomplishments

The year 2013 marked the end of the first phase of ATIN with the second phase starting at the end of the year.

Part of the accomplishments of the bureau was the renovation and updating of agricultural technology website. Among the activies included the migration/ transfer of archives of BAR's publications, BAR Chronicle and BAR R&D Digest, to the AFACI platform using Joomla.

Agricultural knowledge and database were developed and uploaded including agricultural technologies and production guides. Publications of techologies were also dissiminated specifically, printing of a crop calendar that featured 10 commodities: bitter gourd cabbage, eggplant, garlic, okra, onion, pigeonpea, squash, sweet pepper, and tomato.

In collaboration with the UPLB Crop Science Cluster, AFACI and DA RFU-5, BAR conducted the "Regional Seminar on Edible Landscaping and Simple Nutrient Addition Program or SNAP Hydroponics" on 8-9 May 2013 at the DA-Bicol Integrated Agricultural Research Center (DA-BIARC) in Pili, Camarines Sur. There were 51 participants including agricultural researchers and staff from the local government units.



### **Bioversity's Initiatives on Banana R&D**



mong the first to raise international concern about Foc Tropical Race 4 (Foc TR4), the banana pathogen, is Bioversity International. For the last two decades, Bioversity Int'l, specifically its Commodity Systems and Genetic Resources Programme Asia-Pacific Office (APO), has been operating in the Philippines. Through fruitful partnerships with local national agricultural research systems (NARS), academe and private institutions in the region, Bioversity Int'l has continuously carried out research endeavors and capacity building to advance the science and practice of banana R&D with the end view of bringing about needed impacts to the string of stakeholders along the industry's value chain.

Bioversity Int'l is one of the founding members of the Banana Asia-Pacific Network (BAPNET) which was established in 1991. From the early years of BAPNET and up to the present, Bioversity has served as the Coordinating Agency and Secretariat of the network. With the key role that Bioversity plays in the network, research priorities and results from the region are scaled-out and scaled up to member countries, the Philippines included, and vice-versa. This has strengthened banana R&D programs and projects at both in-country and regional levels, greatly contributing to the greater public good.

### The Fight Against Banana Fusarium Wilt

The pathogen responsible for Fusarium wilt in bananas (also known as Panama disease) is the fungus, *Fusarium oxysporum* f. sp. cubense (also known as Foc). The Foc fungus is soil borne and persists for many decades. It also spreads efficiently in water.

Infection occurs when the pathogen penetrates the roots of the banana plant. Eventually the stem is colonized and above-ground symptoms appear which include thin pseudostems, small bunches and poorly filled fingers with atypical yellowing and wilting of the leaves. The oldest leaves initially turn bright yellow and wilt. As the disease progresses, younger and younger leaves are affected until a skirt of dead leaves surrounds the base. Affected plants eventually die after a few months. Fusarium wilt may be found in all banana-growing areas but it previously did not affect all or most varieties until the emergence of the broad-ranging Foc 'Tropical Race 4', an extremely virulent strain of Race 4.

Foc 'Tropical Race 4' has caused immense production losses for commercial and

subsistence farmers in many bananagrowing countries particularly in Asia. In 1977, this race initially appeared in Taiwan where it attacked Cavendish bananas. Since then, Foc TR4 has been found in other Asian locations and has become a threat to entire banana industries. The danger of Foc TR4 is that it has the capacity to affect banana varieties that are unaffected by other Foc races. Of immense importance is its ability to infect Cavendish types of banana (AAA) which includes the banana variety that the Philippines exports. The AAB varieties, such as the Philippines' *latundan*, are also at risk.

Reports of Fusarium wilt epidemic in some Cavendish commercial plantations in the Philippines have alarmed the Philippine export banana industry which is understandable as the country is presently the second largest banana exporter in the world after Ecuador. The new epidemics in commercial plantations have been confirmed to be of the dreaded Foc TR4.



from Bioversity International

### **Joint Projects Addressing Foc TR4**



from Bioversity International

On 28 March 2012, a Memorandum of Agreement (MOA) was signed between BAR and Bioversity International for two projects: 1) Mitigating Banana Fusarium Wilt Tropical Race 4 through a Farmer-participatory Approach of Developing Disease Management Strategies; and 2) Enhancing Capacities of Farmers, Extension Agents and Local Researchers towards the Effective Management of Foc (Fusarium oxysporum f. sp. cubense) for Smallscale Cavendish Banana Sector. Signing the agreement were Dr. Nicomedes P. Eleazar, director of BAR and Dr. Agustin B. Molina, senior scientist of Bioversity International and project leader.

Both projects are being conducted in Davao and Los Baños, Laguna from 2012 to 2015. Collaborating agencies include: BPI - Davao National Crop R&D Center, DA RFU-11 Regional Crop Protection Center, and Institute of Plant Breeding of UP Los Baños, with Dr. Lorna Herradura, Dr. Susan Razo, and Dr. Lavernee Gueco as collaborating scientists, respectively.

The overall goal of the projects is

to address the effects of the disease. Fusarium wilt as caused by Foc TR4 that has begun to ravage the Philippine banana industry and which, in the process, is beginning to affect small-scale banana growers who contribute 40 percent of the country's banana output. The projects focus on the reduction of risks to food security and livelihoods of small-scale farmers in banana-based agricultural systems by preventing the further spread of Fusarium Tropical Race 4 (TR4), and by generating scientific knowledge for improved grower management of Fusarium wilts.

The first project which is on mitigating banana Fusarium wilt aims to provide smallholder farmers an urgent solution to alleviate the epidemic of Foc TR4 that presently damages their farms through formulating strategic disease management procedures. It focuses on the mitigation of Fusarium wilt disease through the introduction of a Foc TR4- resistant variety. The project will conduct a farmerparticipatory selection of improved GCTCV (Cavendish banana variant) genotype(s) with improved yield and agronomic traits, disease

tolerance, fruit quality and marketability. Through these projects, affected plantations can be rehabilitated and planted with Foc-disease resistant banana varieties.

As for the project on capacity building for the effective management of Foc in smallscale Cavendish banana sector. this aims to develop and execute various capacity-building methodologies that would boost local capabilities on participatory varietal selection, disease management, and appropriate eradication techniques. It complements the first project as it enhances the capacities of project stakeholders in addressing Fusarium wilt. The beneficiaries of the project are farmercooperators but it will also train local researchers and extension agents to enhance their technical capacities in doing research on Foc TR4 management. To efficiently facilitate and enhance the skills of the stakeholders. effective information, education and communication (IEC) will be produced and disseminated for information awareness.



#### 2013 Accomplishments

For the first project, "Mitigating Banana Fusarium Wilt Tropical Race 4 through a Farmer-participatory Approach," a resistant somaclone, the giant Cavendish tissue culture variant, GCTCV 219, was introduced to 20 volunteer small-scale banana growers for piloting in their farms, which have severe Foc infestation. A total of 34,400 seedlings were distributed for planting in the 20 farms and evaluation was done from October 2012 to August 2013. For comparison of performance, the susceptible variety, Grand Naine, was also planted as the control or check variety.

The initial results showed that GCTCV 219 is demonstrating less incidence of Foc disease as compared with Grand Naine. Fruit and fruiting traits were

also recorded for post-harvest and market purposes. The taste of GCTCV 219 was noted as sweeter than Grand Naine, a characteristic appreciated by a potential export buyer.

On the negative side, some inferior traits compared to Grand Naine, were also seen particularly incidences of splitting and the tendency for hand malformation which need to be addressed.

Initial activities towards the improvement of the agronomic traits (e.g., plant height, days to shooting), yield, and fruit characteristics (e.g., bunch characteristics) of GCTCV 219 through farmer-participatory selection were also done. For the second project, "Enhancing

Capacities of Farmers, Extension Agents and Local Researchers towards the Effective Management of Foc." a survey was conducted among the farmer-cooperators to gather baseline data and information on farmers' and farm profiles, farm management, the farmers' knowledge of Fusarium wilt, and training needs.

Various learning tools were used in the first of a series of trainingworkshops that included lectures, focus group discussions, and field visits. The pilot farms were used as platforms for building up the capacities of participating banana growers. To improve the capacities of research and extension partners, the project sent them to a short-term training abroad and to scientific workshops/symposia.

from Bioversity International

### **IRRI's Renewed Partnership on Rice Research**



s the country plays host to the International **Rice Research Institute** (IRRI) headquarters, the Philippine government has the first call on any research output that IRRI produces before it gets released to its other partner countries. Its proximity also makes it possible for Filipino researchers and agricultural administrators to gain immediate benefits from the institutional R&D strengths. This advantage is crucial for a developing country located in Asia like the Philippines where rapidly-growing populations are affecting and slowing down rice productivity and the growth of rice-dependent livelihoods and industries.

In recent times, the assistance of IRRI was called on anew by the government. As the DA's Food Staples Sufficiency Program gained headway, it tapped IRRI for technical support in enhancing the productivity of the small and marginal rice farmers and for inputs to policy formulation.

Late in the 2000's, the country was also beset with severe rice shortages and the DFA sought to contribute to its alleviation by providing a special fund from its International Commitments Fund that enables IRRI to quickly assist Philippine public and private sector institutions in their individual efforts to respond to such situations through capacity building (short term training programs), technical assistance, and seed support.

## **Projects for Rice Self-Sufficiency**



In 2012, DA and IRRI entered into a new partnership to be implemented in five years to jointly pursue major areas of collaboration for achieving the country's goal of food self-sufficiency. A Memorandum of Agreement for the program, "Sustaining Rice Self Sufficiency and Food Security in the Philippines", was signed by Sec. Proceso J. Alcala and Dr. Robert S. Zeigler on 3 December 2012. BAR was tasked to facilitate the provision of the required support (with funds from the DA Rice Program) and assist in coordinating the implementation of the R&D projects under the DA-IRRI partnership.

Under the agreement entered into by the parties are eight areas of collaboration to be implemented by IRRI, DA, PhilRice, BAR, and selected DA staff bureaus, agencies and regional field units. Among these eight areas, BAR is involved in four and is monitoring an initial batch of four projects being implemented by IRRI and PhilRice as co-implementers, namely:

# Accelerating the Development and Dissemination of Associated Technologies for Direct-Seeded Rice in Irrigated and Rainfed Ecosystems

The project aims to contribute to increased production and reduction of inputs/cost of production through the development and dissemination for adoption of appropriate crop management technologies that are resource use-efficient. The target areas for the dissemination of technologies promoted by the project are in 41 provinces in CAR, and in Regions 1, 2, 3, 4A, 4B, 6, 8 and 12.

Component 1 is on accelerating the dissemination of associated technologies for increasing yield and profitability in irrigated and rainfed ecosystems. Component 2 is on research and development for direct-seeding of rice which focuses on water and weed management techniques of direct-seeded rice adopting AWD water management technique, agronomic and energy efficiencies of mechanical direct-seeded rice crop establishment in combination with zero tillage, and development and dissemination of zero-till planter with fertilizer applicator for direct-seeding.

#### **Rice Crop Manager: A Comprehensive Decision Support** Tool for Increasing Yields and Income for Farmers in the Philippines

The project provides the Rice Crop Manager with accompanying Rice Doctor as field-tested and verified decision tools that can be accessed through personal computers and mobile phones by DA staff, LGU staff, and farmers in rice-growing regions across the country.

The Rice Crop Manager is a comprehensive decision-support tool which includes all the capabilities of the Nutrient Manager developed by IRRI plus the capability to provide customized guidelines to individual farmers on crop management practices best suited for their specific rice-growing conditions before the start of the growing season.

The technology is expected to improve rice management practices matching the conditions and needs of farmers to enhance/increase their yields and income.



#### Philippine Rice Information System Management (PRISM): An Operational System for Rice Monitoring in Support to Decision-making towards Increased Rice Production in the Philippines

The project aims to operationalize PRISM for rice monitoring to support decision-making and strategic planning for actions and interventions to be crafted towards increased rice production in the Philippines. It will estimate actual rice area, rice yields, yield gaps; detect and map rice-growing areas affected by flooding and drought, and pests and diseases; and characterize the risks of disease epidemics and pest outbreaks, and expected yield losses due to yield-reducing factors.

It will also assess or characterize the rice production situations in the major rice environments in the Philippines and the attainable yield (or yield gains) which could be derived from optimized disease, pest, and weed control practices.

Activities could include the strategic mapping of current rice production and expansion areas using geographic information system (GIS) and remote sensing to get a more holistic picture of the country's total rice production, and area planted and harvested.

The system has the potential to improve decision-making, strategic planning and responsiveness of government programs and interventions on rice farming.



#### Benchmarking the Philippine Rice Economy Relative to Major Rice-Producing Countries in Asia

The project is aimed at determining government policies that affect competitiveness of rice production and marketing of the Philippines, along with selected Asian countries (China, India, Indonesia, Thailand and Vietnam), thru examining and comparing their rice yield, input use, marketing practices, cost of producing and marketing commercial rice, and cost of producing hybrid rice seed in the Philippines and compare it with China and India; and determining the comparative and competitive advantages of the Philippines in production of commercial rice and hybrid seeds.

The project's outputs can help provide a proper perspective on how the country can further improve its competitiveness in rice production and marketing and make appropriate decisions on how to best position the country's interest in terms of rice food security

# IRRI-BAR Initiatives for Local R&D Capacity Building

#### Cybervillage Project, "Enhancing Knowledge Exchange and Decision-making among Rice Stakeholders through the Development and Promotion of Location-Specific Rice Knowledge Products and Delivery Systems"

The goal of the project is to help improve farmers' productivity by improving their access to and application of rice and other related knowledge, through the use of alternative models of technology transfer combined with relevant ICT. It aims to further test and develop approaches in solving the range of problems faced by farmers and identify how best to make these options more widely known at the village and municipal levels through the use of ICT. More specifically, the project will further study the effectiveness of computer-based information and knowledge dissemination to rural farmers and extension workers throughout the municipal level.

The project is being implemented in 8 municipalities across the Philippines which are: 1) Batac, Ilocos Norte; 2) Apalit, Pampanga; 3) Infanta, Quezon; 4) Victoria, Laguna; 5) Oton, Iloilo; 6) Dingle, Iloilo; 7) Banaybanay, Davao Oriental; and 8) Kabacan, North Cotabato. From these municipalities, several pilot barangays numbering from four to seven per municipality agreed to participate as pilot areas for the project. In all, a total of 39 barangays are participating in the project with a potential to benefit at least 6,624 rice farmers residing in the said barangays. Two very useful ICT-based services were introduced to different rice stakeholders (e.g., farmers and extension workers), which have since been used under the DA-funded projects, are:

**The Pinoy Rice Knowledge Bank** – a web-based service that provides very useful information to farmers such as best rice management practices (land preparation, seed selection, pest and disease management, water management, postharvest management), seed sources and availability, rice farm advising through chats and emails, among others;

**The Rice Crop Manager** formerly called Nutrient Manager for Rice or NMR – a web-based service that is accessible either through computers or through smartphones. This application provides farmers with site-specific guidelines on nutrient/ fertilizer application, and pest and disease management.

#### Nutrient Manager for Rice Philippines Version 2.2



#### **Outcomes/Tangible Benefits**

From 2011-2013, the project trained a total of 420 Farmer-Intermediaries (agricultural extension workers, farmer leaders and barangay staff/officials) who will assist farmers in accessing ICT-based services in the Cybervillages.

The project also introduced different ICT services such as the Pinoy Rice Knowledge Bank and the Nutrient Manager for Rice, to as many as 1,331 rice farmers and other rice stakeholders in 39 barangays through information dissemination campaigns.

In coordination with an Agricultural Training Institute project with IRRI, the Cybervillage project distributed Canon digital cameras for documentation use by each of the eight Municipalities of the project. It encouraged and partnered with local barangays to connect to the Internet using a combination of local and project funds. To date, 25 of the 39 participating barangays are Internet-connected. As many as 731 rice farmers, extension workers and other stakeholders were trained on what are considered best rice management practices through either face-to-face meetings or on-site trainings conducted in the project Municipalities and/or online video conferences. These trainings included important topics such as: Seed Health Management; Rice Pest Management; Nutrient Management; and Water Management, among others.

At least 390 farmers from the 39 barangays (from 2012-2013) tested benefitted from improved fertilizer management recommendations generated by the Nutrient Manager for Rice program (NMR). Trial results indicate that farmers can gain, on average, an additional 0.7 tons/ hectare of yield by following NMR recommendations. This translates to higher incomes from rice farming. From January 2012 to June 2013, a total of 1,544 rice farmers received Nutrient Manager Guidelines to help them improve fertilizer application practices to increase yield and reduce input costs. IRRI, along with the trained Agricultural Extension Workers (AEWs) and Farmer Leaders in the Cybervillages, spearheaded the dissemination of these essential guidelines to farmers using the Cybervillages and tablet smartphones given to AEWs.

IRRI, through this project, partnered with the IT Association of the Philippines (ITAP) – a federation of ICT hardware and software producers in the Philippines who donated a total of seven brand new and used computers to be given to performing barangays of the Cybervillage project.

# **IRRI-BAR Initiatives for Local R&D Capacity Building**

URGENT Project, "Improving and Sustaining Local Capacity in Rice Research and Development through Unified Rice and Rice-based General Educational and Technical Assistance"

The project aims to provide opportunities and support in training the new generation of rice scientists and extension workers thereby improving the capacity of participating Philippine academic and local government institutions in rice science and development.

More specifically, the project aims to provide support to staff and faculties of

Philippine academic and local government institutions to collaborate with IRRI through training and research; to provide resources for the visit of IRRI scientists and rice experts to participating academic and local government institutions; and produce quality seeds of high-yielding and newly-released varieties for rapid dissemination of these varieties to many locations in the Philippines.

#### **Project Components**

The project has three components: capacity building, technical assistance, and seed production.

Capacity building is being implemented as a support mechanism to supplement existing initiatives of the government for rice R&D workers especially those from the academic community who have very little resources or chance of participating in the IRRI-sponsored scientific and training events and programs. This widens the collaborative base of Philippine-IRRI partnership and improves the training opportunities for new generation of rice scientists and extension workers.

The technical assistance component enables IRRI scientists and experts to promptly visit local government units during occurrences of major rice problems that require



expert's advice. The requests for technical assistance are received and processed at the National Programs Relations (NPR) unit of the External Relations Office (ERO) of IRRI which will contact and invite the concerned IRRI expert upon receiving request on the occurrence of a technical problem in the region or provinces. The Project dispatches the appropriate expert(s) to the site in coordination with local provincial and regional partners including the local government officials of the affected area. Seed production on the other hand, refers to the currently-released high yielding varieties including those varieties for unfavorable areas (submergence, drought, saline) which will be produced and packed and stored for distribution to requesting visiting farmers throughout the year. A kilo pack will be prepared so it can be distributed easily. These seeds will be multiplied by the farmers who requested them and are regularly monitored by the project.



For the capacity building component, IRRI extended scholarship support to a total of 27 rice researchers from PhilRice (1), Provincial Agriculture Office (1), Municipal Agriculture Offices (6), IRRI project staff (1), and University staff and students (18) from 2011-2013.

From 2011-2013, IRRI has regularly invited and supported the participation of qualified individuals and groups from different institutions in the different trainings, short courses, symposia, etc., that IRRI conducts or co-organizes. These include: Rice Research to Production Course (120 hours), Community Seed Production and Banking (40 days), Modern Methods of Rice Breeding (16 days), Ecological Management of Rodents, Weeds and Insects (10 days), International Rice Genetics Symposium (2 days), and Extended Thesis Support to 1 PhD student from the UPLB Graduate School.

For the technical assistance, from 2011-2013, IRRI has dispatched rice

scientists to at least 6 locations requiring rice expert advice and/or Training facilitators. IRRI scientists were also invited as guest speakers/ resource persons during farmers' field days held separately in Cavite, Albay, Batangas with a total of 453 participants (average of 151 per field day). Aside from this, IRRI organized three field days in Los Baños with total participants of 1,139 farmers/ extension workers/ government officials. IRRI also received 32 batches of visitors with an average of 45 participants per batch (or a total of 1,448 farmers/ extension workers) who went to IRRI for study tours. IRRI scientists gladly shared their expertise and answered their queries related to rice production during their visit. They were also able to get the latest rice varieties after their visit.

For the last component which is seed production, IRRI was able to produce and disseminate 16 newly-released "climate change-ready varieties" (4 varieties for irrigated, 6 varieties for rainfed, 1 variety for upland, 2 varieties for submergence, and 3 varieties for saline-prone areas) readily adapted to the different agro-ecological systems of rice farms around the country.

In 2011-2013, IRRI distributed a total of 7,101 kilograms of high quality rice seeds of newly released, climate change-ready varieties, to a total of 581 municipalities and 68 provinces of the 16 regions of the country.

At least 3,100 farmers across the country directly benefited from the seeds distributed by IRRI through the URGENT Project in 2011-2013. This number does not include farmers who may have benefitted by sharing or exchanging seeds with these 3,100 direct recipients.

To aid the DA and the Philippine Government in the Typhoon Yolanda rehabilitation efforts for rice farmers, IRRI provided 11.6 tons of high quality rice seeds for farmers of the affected areas of the Visayas.

### WorldFish on Empowering Philippine Coastal Communities

he WorldFish Center (previously known as the International Center for Living Aquatic Resources Management or ICLARM) has been working closely with a number of national research institutions and regional international organizations based in the country to resolve critical technical and socioeconomic constraints in order to increase fish production, improve resource management and equitable distribution of benefits, and protect the environment. It is now assisting countries in the Southeast Asian region address climate change effects on aquatic and marine resources.

The WorldFish Center is committed to meeting two key development challenges: 1) improving the livelihoods of those who are especially poor and vulnerable in places where fisheries and aquaculture can make a difference, and 2) achieving large scale, environmentally sustainable, increases in supply and access to fish at affordable prices for poor consumers in developing countries. To meet these challenges, WorldFish research focuses on generating and synthesizing knowledge which it shares and helps apply locally.

#### **Project on Economic Analysis of Climate Change Adaptation Strategies**

The project, "Economic Analysis of Climate Change Adaptation Strategies in Selected Coastal Areas in the Philippines", was implemented by The WorldFish Center from March 2012 to February 2013 with funding from BAR. A key objective of the study is to help decision makers at both the national and local levels integrate robust adaptation strategies into their development plans and budgets in a context of high uncertainty, competing needs and limited financial resources.

The study covered three coastal areas in the Philippines that are most vulnerable to climate change and which have experienced negative impacts of flooding due to sea level rise, namely, Babuyan Channel in Region 2 (Cagayan Province), Sogod Bay in Region 8 (Southern Leyte), and Macajalar and Iligan Bay in Region 10 (Misamis Oriental and Iligan City). The study sought to find and compare common



experiences and results across a range of options and hazards in the three areas. The individual studies adopted a common framework in analyzing climate change hazards, vulnerabilities, impacts, policies, and adaptation options specific to sites. In general, the approach was adaptive in nature and the new methods/ issues were incorporated as new information arose.

Six coastal barangays in each of the provinces covered by the study were chosen as project sites based on the findings from an initial scoping activity that showed that these barangays are highly vulnerable to climate-induced hazards such as flooding and typhoons, sea level rise and coastal erosion, and saltwater intrusion. The study focused on qualitative and quantitative vulnerability and hazard assessment, economic analysis of viable planned adaptation strategies, and behavioral aspects of autonomous household adaptation.

The project generally aims to study and assist selected coastal communities gain a better understanding of the risks associated with climate change and assess available adaptation strategies and policy options to face these risks more efficiently and effectively. Its specific objectives are: 1) validate and assess climate change impacts on selected coastal areas in the Philippines; 2) measure the economic costs and benefits due to specific effects of climate change in selected coastal areas in the three regions; 3) assess adaptation strategies to climate change in the selected coastal areas; 4) recommend viable adaptation options; and 5) explore and identify emerging issues in the assessment of vulnerability and economic analysis of adaptation based on the results of the regional case studies.

Dr. Maripaz L. Perez, WorldFish regional director for Asia and Country Manager – Philippines, is the main project proponent. Aside from BAR, other collaborating agencies are: the Bureau of Fisheries Aquatic Resources (BFAR) offices in regions 2, 8, and 10; Cagayan State University (CSU); Department of Science and Technology (DOST) regional offices in regions 2, 8, 10; Mindanao State University-Iligan Institute of Technology (MSU-IIT); and the Visayas State University (VSU).

#### **Project Results**

In Region 2 barangays, it was found that the surrounding waters are valuable for breeding and fishing. Recurrent typhoons, flooding, coastal erosion, and drought have caused fish kills and farm losses. The same anomalies were also felt in Regions 8 and 10. The type and magnitude of impacts were found varying across the study areas. The damage in Region 10 is high in terms of assets and properties while the damage in Region 2 is high in terms of agriculture production.

The Hazard and Vulnerability Assessment revealed that flooding/typhoons are the dominant hazard affecting more than 50 percent of households in Region 2 and at least 27 percent of households in Region 10, while only 7 percent of the households are affected in Region 8 due to a number of existing interventions in the area. There was low incidence of coastal erosion/sea level rise and saltwater intrusion. Income and livelihood were found to be most affected by flooding/typhoon and coastal erosion and artificial environmental problems were confirmed to worsen the impacts of hazards. Damage to property and assets were less compared to income losses but this is not surprising since households in coastal communities are poor and



the value of their assets and income are low to start with. It also showed that residents who are highly dependent on fishing are the most vulnerable group. As results varied by location, it is recommended that planning of climate change adaptations be done at the local level and tailor-made for specific sectors of coastal communities.

On Public and Planned Adaptation Strategies, the study found that there is a wide variety of adaptation strategies that the communities in the coverage area make in response to varying magnitude and frequency of climate change impacts in each site. These ranged from hard and long-term structural measures (e.g., sea walls, dikes, establishment of floodgates) to soft and regular activities (e.g., planting, river dredging, repair of infrastructures). Common ecosystem-based adaptation choices include mangrove reforestation, tree planting and vegetative river control systems which have ancillary benefits, specifically, environmental and livelihood values. Relief and rescue activities (e.g., early warning systems, and first aid and emergency facilities and personnel) are seen as strategies to address climate change effects. Another identified planned adaptation strategy is alternative livelihood. The analysis also showed that cost-effectiveness is useful but is not an absolute gauge as to the adaptation strategy choices of the different communities. Other considerations by the community include being able to address multiple hazards, urgency, community and LGU priorities, and past experiences.

As to Autonomous Household Adaptation Strategies against flooding/ typhoons, households were found to adopt both proactive and reactive measures. Most tend to resort to reactive adaptations particularly for Region 10, the exception being those in Region 8. The reactive strategies include reinforcement of houses, evacuation and borrowing, and even the reduction of number of meals of households particularly in Region 8. These proved to be more costly than proactive measures. Against sea level rise or coastal erosion, adaptation consisted of installing semi-permanent structures while the defense against saltwater intrusion was buying of bottled water.

The quantitative analysis showed that the likelihood of adaptation is increased by: impact of the hazard; the household's location; early warning systems/relief operations; gender and age of the household head; and local social networks. Inhibiting factors are: presence of mangroves or natural barriers and external networks.

The study also looked at the relationship between the Vulnerability to Expected Poverty (VEP) measures and the estimated probability of adaptation. It was found that autonomous adaptation can lead to a reduction in the VEP but is not enough to be significant. Households in the regions in the study remain highly vulnerable even if adaptation strategies are made against multiple hazards.



#### **Policy Implications**

At the end-of-project workshop for the BAR funded project on 18 March 2013, the proponents, based on their completed report, articulated that coastal communities are among the most vulnerable sectors to CC. For one thing, these communities are among the poorest of the poor thus their condition constrains them to fully insure themselves against climate-induced hazards. Coastal areas have long felt the impacts of over-fishing and needless destruction of coastal ecosystems and the advent of climate-induced hazards adds a new dimension to these existing problems. At the local government level, current state of funds, expertise, and technical capability are already limited. These shall restrict the LGUs' ability to identify and prioritize effective adaptation strategies to climate change and implement public and planned adaptation measures that could otherwise protect and improve the resiliency of these coastal communities.

The study showed that coastal community households make rational decisions in terms of responding to climate-induced hazards and are not fatalistic and complacent as perceived by others. The results also show that public adaptation strategies can complement private adaptation and that public or planned strategies can be as simple as providing information to households. Improving/ strengthening the local or village social network is also a positive policy that promotes household resiliency. It was also noted that gender plays a role in adaptation especially against a looming hazard such as saltwater intrusion.

The workshop concluded that: 1) there is scope for complementation between public and private adaptation strategies; and 2) the nature of autonomous adaptation, which is reactive (for typhoons/flooding) and temporary (semi-permanent structures against salt water intrusion/ coastal erosion), was not enough to significantly improve the resiliency of households.

Five recommendations for developing new policies were made by the study. These are: 1) for policies that address poverty and environmental degradation and complement planned adaptation policies, 2) economic as well as non-economic values should be taken into account and used to justify or rationalize climate change-related interventions involving poor households, 3) that for policies aimed at motivating autonomous adaptation to be effective be designed with gender and geographical targets in mind, 4) organizing communities and enhancing trust and relationships within communities can also enhance resiliency against climate change induced hazards, and 5) public/ planned strategies can have consequences for private/ autonomous adaptation.

The threat of climate change is inevitable and must be confronted with measures that are backed up with relevant and specific information on the impacts of the phenomenon such as what the WorldFish project did. The data and figures gathered during project implementation can be used to support the study sites for a more profound understanding of the risks posed by CC. This information and how these were generated shall greatly aid decision makers, at both the local and national levels, in integrating adaptation strategies into their development plans and budgets.



#### Initiatives on Tilapia Super Strains

Tilapia (*Oreochromis sp.*) is a major aquaculture species in Asia especially in the Philippines. It is a suitable and affordable commodity for increasing protein production, profits and the quality of nutrition for poor fish farmers and consumers. Marginal rice farmers have improved their incomes and living conditions with the production of tilapia fingerlings. Landless peasants with access to inland waters raise tilapia in cages and pens as a major source of income. The steady expansion of markets experienced by the tilapia industry has benefitted small-scale hatchery operators, grow-out farms and cage operators, and merchants.

In the Philippines, several strains of Nile Tilapia were developed by local institutions. One strain was developed by CLSU-Freshwater Aquaculture Center (CLSU-FAC) and is known as FaST. The BFAR National Freshwater Fisheries Technology Center (BFAR-NFFTC) came up with an improved strain of tilapia, the Genetically Enhanced Tilapia Excellent Strain (GET-EXCEL) while the GIFT Foundation developed the GIFT Feedmix Fortified (GIFTff) strain. For its part, the WorldFish Center, an international research institution under the CGIAR umbrella which is based in Penang, Malaysia, reintroduced from Malaysia the Genetically-Improved Farmed Tilapia or GIFT (in its 13th generation), a super strain originally developed in the Philippines.

The WorldFish Center is the lead implementing agency for the project, "Evaluation of Nile tilapia strains for aquaculture in the Philippines", being done in collaboration with the Department of Agriculture—Bureau of Agricultural Research



(DA-BAR), Bureau of Fisheries and Aquatic Resources— National Freshwater Fisheries Technology Center (BFAR-NFFTC) in Muñoz, Nueva Ecija and the Freshwater Aquaculture Center—Central Luzon State University (FAC-CLSU). The GIFT Foundation, Inc. is also being tapped as a private sector implementation partner. Funding is being provided by DA-BAR. The project is in response to the need to identify which of the available super strains of tilapia is best for Philippine conditions.

The project is on-going at the facilities of the BFAR-NFFTC with scientific support from other partners. The project is being led by Dr. Maripaz L. Perez, regional director for Asia and country manager (Philippines) of WorldFish Center. Other proponents are Dr. Paul W. Ponzoni and Dr. Alex Safari, also of the Center.

Specifically, the project hopes to: 1) develop an experimental protocol for the performance evaluation of available Nile tilapia strains in the Philippines; 2) conduct an experiment to identify superior tilapia strains for aquaculture in the country; 3) further improve the genetic performance of the identified strains through breeding schemes that consider existing breeding resources; 4) disseminate the superior strains to farmers and producers throughout the country; and 5) enhance local personnel (hatchery) capacity in tilapia breeding and production.

Started in December 2011, the project makes use of the GIFT strain, the locally-recognized "gold standard" for tilapia, in comparing the available strains of tilapia.

#### **2013 Accomplishments**

The team used electrophoresis and other applicable and available molecular tools in the identification of the strains to be used in the experiments. The procedures set the distinctions among the various GIFT strains as to their respective biological identity prior to their comparisons. Physico-chemical measurements and other rearing data were generated at the experimental locations.

Fingerlings of GIFT strain from Malaysia were reared in ponds at BFAR-NFFTC.

Important data and information on the four super strains were generated on: 1) early growth and survival, 2) growth performance, 3) correlation of body weight to reproductive capacity, and 4) reproductive performance and hatchability rate.





### Global Environment Facility Supports Biodiversity Project

ndigenous plants and animals are a vital part of the world's biological diversity. Human pressure has led to the depletion of these resources. In recognition of the growing severity of threats to biological diversity, as well as the need to operationalize the principles of sustainable development in all countries around the globe, the nations of the world gathered to collectively map out a plan to address the twin goals of environmental preservation and economic development.

This historic event, the United Nations Conference for Environment and Development (UNCED) in June 1992, which has come to be known as The Earth Summit, produced a blueprint for a global agenda known as Agenda 21. It was also during the UNCED that the nations of the world adopted the Convention on Biological Diversity (CBD). The objectives of this Convention are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits derived from the utilization of genetic resources.

### The Partnership for Biodiversity Conservation Project (BPP) and the GEF



ince 2012, the DENR has been leading a biodiversity conservation project that includes a focus on the conservation of indigenous species of importance to agriculture in the Philippines. The project, "Partnerships for Biodiversity Conservation: Mainstreaming in Local Agricultural Landscapes Biodiversity Partnership Project (BPP)", is set to run until 2016.

The Parks and Wildlife Bureau of the DENR (DENR-PAWB) is the main implementing partner of the project while the DA, DILG, DTI, DOT, National Council for Indigenous Peoples, NCW, League of Provinces, Cities and Municipalities are the project's National Level implementing partners working on the different aspects of the BPP. Conservation NGOs figure prominently in the project such as Conservation International-Philippines, Haribon Foundation, and Flora and Fauna Inc (FFI). Funding for the project is being provided by the Global Environment Facility (GEF), a US-based international donor agency. Its mission is the protection of the global environment. It forges international cooperation and finances actions to address six critical threats to the global environment: biodiversity loss, climate change, degradation of international waters, ozone depletion, land degradation, and persistent organic pollutants (POPs).

The GEF is a unique partnership among 178 countries, international institutions, NGOs, and the private sector. As the financial mechanism of the United Nations Framework Convention on Climate Change (UNFCCC), it addresses global environmental issues while supporting national sustainable development initiatives. Its work began in 1991 and has since evolved into the largest funder of projects to improve the global environment.

#### **Project Goals and Thematic Areas**

The goal of the BPP is to ensure that activities in the production landscape conserve the assemblages of species and that ecosystem functions are maintained. It also aims to demonstrate how Local Government Units (LGUs), with enhanced capacities and working together with local and national partners, can plan and manage economic activities and growth in ways that meet landscape-level biodiversity conservation and sustainable use objectives in critical ecological regions.

The BPP's Thematic Areas/Components include: 1) Mainstreaming biodiversity impact assessment at the national and local levels, 2) National policy and program for biodiversity-friendly agricultural practices, 3) Strengthening the enforcement of wildlife trade regulations, 4) Encouraging biodiversity-friendly business, 5) Integrating biodiversity conservation in the local land use and development planning of LGUs, and 6) Development of a biodiversity knowledge management system.

#### 2013 Accomplishments

BAR participated in the conduct of stakeholders' consultations in the five KBAs identified for the DA's interventions with the following outcomes:

- Baseline information on: the current condition of the key biogeographic areas or KBAs in terms of biodiversity conservation issues, problems, needs and threats; current policy/capacity development/other initiatives in biodiversity conservation; needed interventions; agricultural practices across the value chain; and the indigenous species and their utilization.
- As an integral output, BAR drafted the proceedings of the stakeholder consultations in the Quirino Protected Landscape

Draft protocols for the *in situ* conservation of indigenous crops, livestock and poultry and fish/aquatic species found in the target sites was developed in coordination with BPI, BAI and BFAR.



BAR provided inputs to the national policy being drafted by the DA under the the three sections on: 1) Conservation of indigenous species; 2) Protocol for *in situ* and on-farm conservation of indigenous species; and 3) Upland agriculture research.

BAR also participated in the "Seminar-Training on Biodiversity Basics" that was held on 24-26 April 2013 in Tagaytay City along with representatives from selected DA-TWG members and other partner agencies (DENR and National Government Agencies).

### ICRISAT Initiatives on Sustainable Rainfed Agriculture Development



f the 10 million hectares farmland in the Philippines about threefourths is dependent on rainfall to produce crops and this makes rainfed agriculture an important sector. Crucial as it is for long-term sustainability of agriculture, rainfed agriculture has been a neglected sector with little support in terms of investments and policy even if it provides 40 percent of the total agricultural produce in the country. If this resource is developed to its full potential, a further contribution of 30 percent for a total of 70 percent of the country's food requirement is possible while improving the lives of millions of poor farmers.

Making farming less dependent on rainfall is not feasible as putting up irrigation facilities is expensive and many of the rainfed areas are to be found in mountainous regions. Nevertheless, increasing the productivity of rainfed agriculture in a sustainable manner is a must given the ominous signs of climate change and the everincreasing population. Doing this calls for extraordinary but doable measures, one of which is the implementation of R&D that focuses on rainfed agriculture.

It was in 2012 that the Philippine Rainfed

Agriculture Research, Development and Extension Program (PhiRARDEP) was created out of the initiatives of BAR, the DA High Value Crops Development Program (HVCDP) and the International Center for Research in the Semi-Arid Tropics (ICRISAT). Since then, efforts have continued to enhance program implementation.

The program aims to "develop, coordinate, monitor and evaluate the implementation of a vigorous agriculture RDE program to enhance food, nutrition and energy security, improve livelihoods, and empower communities in the country's rainfed areas."

From various consultations done with stakeholders, including the DA's national and regional bureaus and agencies, state universities and colleges (SUCs), and non-government organizations (NGOs), a unified RDE action agenda and framework for rainfed agriculture as a basis for prioritizing and funding specific projects was formulated. The action agenda of PhiRARDEP focuses on four areas which are: 1) rainfed farming systems innovation; 2) participatory watershed management; 3) strategic social science and policy research, and; 4) capacity building, communication and social mobilization.

#### India's Bhoochetana Concept



A key component of the PhiRARDEP is the Yamang Lupa Program. Its origins can be traced to Karnataka, the second largest rainfed state in India, where, in 2009, ICRISAT and the state government introduced the Bhoochetana concept of using only the crop and land management options that are appropriate to dryland agriculture which shares similarities to rainfed agriculture, being also dependent on rainfall to a great extent.

The term boochetana means "reviving the soils". In his book, Feeding the Forgotten Poor: Perspectives of an Agriculturist, ICRISAT Director General William D. Dar talked about a system for sustainable agriculture that requires "context-sensitive management". The Bhoochetana Program of the Government of Karnataka and ICRISAT aims to assist the dryland farmers in Karnataka through a science-led management approach that features this principle. Basically, the Bhoochetana program works towards improving dryland agriculture through the use of "context-appropriate" scientific technologies while promoting the sustainable use of natural resources at the same time. It is a reaction to the use of unsustainable farm practices and technologies that are ill-suited to a marginal environment which is typified by the Green Revolution that works only in the better-endowed farms. The program focuses on improved management practices, capacity-building activities, and good adaptation strategies that are specifically designed to maximize the potentials of dryland agriculture and equip it with coping mechanisms for climatic disturbances.

In order to reach the target of an increase in average productivity of 20 percent in four years of selected crops, the program specifically aims to identify and scale-up the best bet options (soil, crop and water management) including the use of improved cultivars that are adapted to local conditions, and train government agricultural workers on stratified soil sampling at village-level, on analysis of macro- and micro-nutrients, and on the preparation of GIS-based soil maps. At the same time, the program seeks to capacitate stakeholders (farmers and program partners) on sustainable management of natural resources and on the enhancement of productivity in the dryland areas.

The program has since met great success, improving the lives of some 2.2 million smallhold farmers in the process. With technical support and the use of the program's scientific approach, the 30 districts of Karnataka have attained an average increase of 30 percent in productivity in staple crops under the agroclimatic conditions obtaining in the production areas, thus, exceeding the expectations of the program implementers.



Due to massive success and recognition received by the Bhoochetana program in India, the DA, through BAR, sought to adopt the Indian Bhoochetana concept for the Philippines' rainfed areas. On 21 February 2013, BAR conducted a consultation meeting with partners that included ICRISAT, DA-HVCDP, DA-National Rice Program and representatives from regional institutions to develop a Bhoochetana type program to be piloted in selected regions and to prepare zonal pre-implementation plans.

This effort, originally titled as "Soil Rejuvenation and Natural Resources Management Program: Piloting of the Bhoochetana Concept in the Philippines" (now the Yamang Lupa Program: Adoption of Bhoochetana Principles and Approaches for Natural Resources Management towards Sustainable Philippine Agriculture), aims to pilot and gradually scale-out the application of the concept in strategic rainfed areas in the country to enable them to increase average productivity in selected crops by 10-20 percent in five years while improving/preserving the overall soil health condition.

Patterned after the ICRISAT-developed mission program implemented by the State of Karnataka State in India, the Yamang Lupa Program, was launched on October 2013. The same principles, processes, approaches, and strategies that were successfully used in the original Bhoochetana program will be employed under the Yamang Lupa Program.

Responding to the four components of the

PhiRARDEP, the Yamang Lupa Program is the local embodiment of the Bhoochetana concept. The program aims to "improve rural livelihoods by developing a resilient rainfed agriculture sector for sustainable rural growth and inclusive development through the adoption of the Bhoochetana principles and approach in strategic rainfed areas for increased productivity in selected crops by 20 percent in three years while improving/preserving the overall soil health condition". Specifically, it aims to: 1) determine the health of the soil, including its micro- and macro-nutrient status, of agricultural areas in representative sites in Luzon, Visayas, and Mindanao; 2) identify best-bet options (soil, crop and water management) including improved cultivars to enhance the productivity of selected crops in the representative sites by 20 percent; 3) build the capacity of stakeholders (farmers and other partners) in the sustainable management of natural resources and in enhancing productivity in the rainfed areas; and 4) develop a model for scaling up the benefits through an innovative platform with enabled policies and supply chains needed for achieving the impact.

In YLP, the Bureau of Soils and Water Management serves as the lead implementing agency as the Philippine program gives a closer look at the soil and its health condition. ICRISAT is providing technical assistance, with BAR as the coordinating agency and HVCDP providing the funding. Other collaborating agencies are the Bureau of Plant Industry (BPI) and the Agricultural Training Institute (ATI), together with selected DA-Regional Field Units and state

#### **2013 Accomplishments**



For the initial conduct of program activities, three pilot sites and their project implementers were identified representing Luzon, Visayas, and Mindanao. These are: Quezon (Region IV-A), to be implemented by the Southern Tagalog Integrated Agricultural Research Center (STIARC) and the Southern Luzon State University (SLSU); Samar and Leyte (Region VIII) by Eastern Visayas Integrated Agricultural Research Center (EVIARC) and Visayas State University; and Zamboanga Sibugay (Region IX) with the Zamboanga Peninsula Integrated Agricultural Research Center and Western Mindanao State University (WMSU) in the lead. In August 12-14, 2013, a National Strategic Planning cum PRA Workshop in Southern Luzon State University – Lucban Campus was organized for all stakeholders to have a uniform understanding of the project. Present during the said activity were the project implementers from the DA family and State Universities in Regions 4A, 8 and 9.

The implementers look forward to duplicating the success of the Boochetana Program in India in enabling the country's rainfed agricultural areas improve their productivity through sustainable means. Once the program attains its goals, the rainfed areas can claim to be the major contributor to Philippine food production.



n conjunction to its function of funding R&D projects being implemented throughout the country, BAR also renders support and gives priority to basic and strategic researches as well as research policies and advocacies concerning the agriculture and fisheries sector.

The bureau also gives importance to the value of human resources and facilities development, information and communication technology, and knowledge management as contributory factors towards achieving growth and development in agriculture and fisheries.

#### **Basic and Strategic Researches**

In support to the continuous improvement of agriculture and fisheries, BAR has been prioritizing studies and researches that will lead to more production and productivity among the country's farmers and fisherfolk.

Under the Project Evaluation Section (PES) of PPDD, proposals submitted to BAR are screened and evaluated. In 2013, funding support was allotted to 7 basic research of which there are 3 new and 4 on-going projects. These projects aim to help increase scientific knowledge and understanding on certain phenomenon or behavior. These researches become important bases for applications in the field of science.

Bulk of the support was dispensed to the 45 new and on-going projects under Applied Research which are on crops, livestock/poultry, fisheries, and others. It was followed by 38 new and ongoing projects under Biotechnology (Table 4).

PAPs	CY 2013 Physical Accomplishments	
	New	Ongoing
Basic Research	3	4
Applied Research	19	26
Crops	14	19
Livestock/Poultry	1	2
Fisheries	0	2
Others	4	3
Biotechnology (ABR, IEC, ICE, Program Overhead)	11	27
CPAR (under Regular Funds)	0	16
Policy Research	0	2

#### Table 4. New and on-going projects funded by BAR in 2013

Recognizing the importance of research policy and advocacy, BAR monitors and evaluates the latest trends and events in relation to agriculture and fisheries research and development. From the latest relevant empirical data and statistics from the sector, BAR provides inputs and policy recommendations and pertinent documents that address emerging issues and concerns in agriculture and fisheries R&D.

BAR coordinates the conduct of impact assessment studies and socio-economic researches on agriculture and fisheries R&D programs. The outputs of these studies assist in the prioritization of public expenditure for agricultural research and in the modification of development program implementation processes to achieve targets and objectives.

Research policy and advocacy focus on three major areas of concern: 1) impact assessment, 2) policy research and analysis, 3) R&D governance and quality of science, and 4) results-based planning and evaluation.



#### Impact assessment

In partnership with PMED, PPDD through its Policy and Planning Section (PoliPS) coordinated the project, "Results-Oriented Project Evaluation of the Community-Based Participatory Action Research: On-Farm Research (OFR) in Selected Regions in the Philippines." Implemented by the International Society for Southeast Asian Agricultural Sciences (ISSAAS), the project is aimed at creating a results-oriented evaluation of the CPAR projects in selected regions in the country, vis-à-vis, the effectiveness and impact of the CPAR program the communities involved. As of writing, the terminal report and other pertinent documents were due for submission to BAR.

PMED and PPDD are also facilitating the University of the Philippines Public Administration and Extension Services Foundation Inc.(UPPAF)-implemented project on "Process Documentation of Community-Based Participatory Action Research Projects" which seeks to review the information systems being used in CPAR and determine their impacts on target beneficiaries. A terminal review for the project was conducted in February of this year.

To integrate impact assessment of the projects being funded by BAR, PPDD organized an activity for the finalization of forms for impact assessment of BAR projects. One output is a merged and consolidated IA template for all BAR-funded projects that will form part of the detailed proposal. PPDD drafted a checklist/ questionnaire which will be used by PES for evaluating the proposals submitted to BAR.

#### **Policy Research and Analysis**

To foster linkages with other government agencies involved in policy research, the section attended the 1st Department of Labor and Employment–Inter-Agency Committee-Research Matters (DOLE-IAC-RM) Stakeholders Consultation. One of the agriculture-related projects of the DOLE-IAC is the "Assessment of Working Conditions of Crop Agriculture Workers Aged 15 to 17 years (Phase III)". Being implemented by the Technical Education and Skills Development Authority (TESDA), the project aims to provide a quantitative assessment of the occupational safety and health conditions of agriculture workers through work environment measurements of health hazards.

In February, the International Fund for Agricultural Development Governing Council meeting was held. The section prepared the paper titled, "The Power of Partnerships: Forging Alliances for Sustainable Smallholder Agriculture", discussing the DA's efforts on empowering people through the implementation of national programs that address concerns of farmers and fisherfolk.

To aid in the crafting of legislations concerning the agriculture and fisheries sector, the PoliPS provided inputs for consolidated SB No. 3338/HB No. 6548 titled, "An Act Promoting Agricultural and Fisheries Mechanization Development in the Country". It was presented by Congress in May and the bill was signed into law in June by His Excellency Benigno S. Aquino III. The section also participated in the "DA Orientation on the ASEAN Economic Community (AEC) 2015" to keep abreast of the latest developments concerning the agriculture and fisheries sector in the ASEAN region.

In support to the restriction of smuggling of particular agriculture commodities in the country, the section facilitated the project, "An Assessment of Smuggling on Selected Agricultural Commodities in the Philippines (Informal International Agriculture Trade in the Philippines)". It was approved for budget realignment and extension until July 2013 for the publication of a policy brief on the project's significant findings. The document will be published upon approval of Undersecretary Segfredo Serrano, chair of the project steering committee. Pertinent documents were already submitted for liquidation, but the proponent requested for another extension until December 2014.

The section also facilitated the release of the remaining balance of the project "Productivity Growth in the Philippine Agriculture–Phase III" being implemented by SEAMEO SEARCA which was completed in December 2013. However, the proponent asked for a budget realignment and extension until June 2014.

"The Power of Partnerships" paper discusses the DA's efforts on empowering people through the implementation of national programs that address concerns of farmers and fisherfolk.

#### **R&D Governance and Quality of Science**

An inventory of the data and information of BAR and other DA Operating Units serves as decisionaid tool for BAR, DA, and other oversight agencies in making plans, policies, and programs.

Part of this is the DA-RFUs regional allocation for monitoring and planning activities which will allow BAR to gain an overview of the utilization of the RFU's R&D allocation. It also provides BAR with information on the DA R&D investment level, and the types of researches funded and supported in the previous years. There is also the climate change adaptation tool, technologies and practices consolidated from the different R&D projects for easier transfer and adoption of existing and available technologies to farming and fishing communities.

The section also coordinated with the various divisions and units of the bureau to consolidate accomplishments in compliance with the provisions in the Implementing Rules and Regulations of AFMA. Relevant information on policy and policy-related researches were also provided to assess if the project details that were submitted follow the format set by the bureau.



#### **Results-based Planning and Evaluation**



Through the section, BAR complied with the periodic submissions of plans, accomplishments and other related documents to the offices and agencies under the DA. It also accomplished reportorial requirements as requested by oversight agencies such as the Department of Budget and Management (DBM), National Economic Development Authority (NEDA), Office of the President (OP), and legislative offices.

As the central coordinating agency for agriculture and fisheries R&D, BAR has been undertaking initiatives on the DA's R&D investment and budget utilization since 2007. This prompted BAR to continuously conduct followup activities with concerned regions to ensure that core functions and delivery of services and interventions will be in sync with R&D activities. This will enable BAR to facilitate a smoother coordination and implementation of R&D projects and programs.

Necessary in the conduct of operational activities and setting the directions for

BAR, the CY 2013 Annual and Mid-Year Review and Planning Workshop was spearheaded by PPDD. It has been serving as basis for the bureau's management to adjust and refine its policies, reorganize institutional arrangement, and redeploy resources if the need arises.

When the bureau adopted the "byprogram approach" in coordinating R&D projects this year, PPDD facilitated a meeting with the RIARCs to present the new functional set-up together with the focal persons assigned for each commodity/thematic programs. In addition, the division also spearheaded different briefings and orientations for the RIARCs, COA, and NAFC Sectoral Committees regarding the major R&D programs coordinated by DA-BAR. In view of the need for consistency and regularity of information as required by oversight agencies, a standardized project matrix to be used by technical divisions was created that emphasizes the information and technologies generated from R&D, and their benefits to the A&F sector.

#### Human Resource Development Program

BAR recognizes the importance of human resources in organizations. Through the National Research and Development Systems for Agriculture and Fishery (NaRDSAF), the BAR-Institutional Development Division (IDD) provides scholarship grants and assistance to qualified and deserving people by helping strengthen their capacities and become catalysts in further enhancing the agriculture and fisheries sector.



#### **Degree Scholarship Program**

The Degree Scholarship Program is for employees of the NaRDSAF member institutions who want to pursue their Master's and Doctorate degree in agriculture, fisheries or other related fields. For 2013, 6 were awarded with the degree scholarship (Table 5).

Name	Agency/Institution	Course/School
1. Efren Regpala	PhilMech	MS Food Science/UP Diliman
2. Marlon Garrigues	Upi Agricultural School	MS Agronomy/USM
3. Romiel John Basan	USM	MS Agricultural Economics/UPLB
4. Glenn llar	PhilRice	PhD Development Studies/UPLB
5. Ailyn Adante	DA RFU V	MS Entomology/UPLB
6. Mary Joy Canolas	USM	PhD Animal Science/UPLB

Table 5. The grantees of the degree scholarship program for 2013



In 2012, the DA-BAR-UPLB Undergraduate Scholarship Program was launched as the latest addition to the Degree Scholarship Program. It targets to help deserving UPLB students taking up agriculture-related courses who want to pursue their studies but cannot afford the fees.

In September 2013, the second batch of the DA-BAR-UPLB Undergraduate Scholarship Program was awarded. This included 12 UPLB undergraduate students composed of 7 BS Agriculture and 5 BS Agricultural Biotechnology students (Table 6).

Table 6. Grantees of the	undergraduate s	scholarship program for 2013.

Name	Course	Address
1. Roselle Madayag	BS Agriculture	Nueva Vizcaya
2. John Paul Magboo	BS Agriculture	Bauan, Batangas
3. Paulo Miguel B. Rico	BS Agriculture	Silang, Cavite
4. Ruiza Saavedra	BS Agriculture	Los Baños, Laguna
5. Edelyn Joy Vicencio	BS Agriculture	Cabuyao, Laguna
6. Jerrimae Vicente	BS Agriculture	Bulacan
7. Shaun Adrian Villadiego	BS Agriculture	Nagcarlan, Laguna
8. Dominic P. Agudera	BS Agricultural Biotechnology	Carigara, Leyte
9. Rey Miguel Del Mundo	BS Agricultural Biotechnology	Dasmariñas, Cavite
10. Adrian Fernandico	BS Agricultural Biotechnology	Cagayan de Oro City
11. Cris Ann Lim	BS Agricultural Biotechnology	General Trias, Cavite
12. Joshua David Valdez	BS Agricultural Biotechnology	Bulacan

#### Non-Degree Scholarship Program

The Non-Degree Assistance Program supports the conduct of thesis/ dissertation studies which will aid in addressing issues on agriculture and fisheries. It also provides assistance to researchers and scientists in representing the country in various trainings, presentations, and other R&D undertakings held locally and internationally, as well as those who are conducting short-term basic research through postdoctoral or fellowship awards.

In 2013, the IDD facilitated the processing of 73 approved grants for financial assistance on local and international trainings, conferences, meetings, and symposia. Four grants which include one from DA and three from non-DA agencies were also approved for thesis/ dissertation assistance.



#### **Productivity Enhancement Program**

Through the program, IDD facilitated the initial evaluation and endorsement for conferment of Dr. Peregrino Duran and Dr. Danilda Duran of PCC, and Dr. Alexander Gibe of PhilMech as Scientist I under the DOST Scientific Career System. It also facilitated the evaluation of Dr. Arnel del Barrio and Ms. Rosalinda Lapitan of PCC at UPLB, and Dr. Edwin Atabay and Dr. Eufrocina Atabay of PCC for possible endorsement of scientist ranks in the DOST-SCS. IDD also handled the evaluation process of the 14 nominees for the Gawad Saka Search for Outstanding Agricultural Scientist and the 4 nominees for the Outstanding Agricultural Researcher. After a thorough screening and extensive deliberation, Dr. Cayetano Pomares of USM was chosen as the Outstanding Agricultural Scientist while Dr. Jovita M. Datuin of Regional Field Unit I was the Outstanding Agricultural Researcher for Gawad Saka 2013.

#### **R&D** Facilities









Upgraded and modernized R&D equipment and facilities are needed to improve the quality of research outputs, thereby providing better services to the stakeholders in the agriculture and fisheries sector. Through the Institutional Development Grant (IDG), the bureau supports the acquisition of equipment and establishment/ upgrading of laboratories and other facilities of the NaRDSAF member institutions.

In 2013, 84 IDG project proposals evaluated. Out of these, 33 projects from the DA-staff bureaus, RIARCs, SUCs, and LGUs were given funding support. 17 projects were allotted funds for the establishment of facilities while 16 were given asistance for rehabilitation and upgrading of laboratories and facilities (Table 7).

#### Table 7. List of IDG projects for 2013

Agency	IDG Project
DA-RFO-II	Repair of Mushroom Laboratory and Acquisition of Various
	Equipment in Mushroom Production
DA-RFO-IV A	Repair of Mushroom House Building/Laboratory
CLSUFI	Institutional Development Support for the Effective Validation of
	IDG Projects
CLSUFI	Upgrading of RDMIC Premises and Construction of Garage
	Facility Service Area Phase II
BPI-Manila	Upgrading of the Mushroom Culture Laboratory at BPI-Manila
BPI-Manila	Preparation of Master Development Plan of BPI-Manila
DA-CLIARC	Establishment of Mushroom Technology Center in Support to
	Organic Agriculture Program
DA-CVIARC	Establishment of Multi-Purpose Facility for Batanes Rootcrops
	R & D Center
DA-CVIARC	Construction/Rehabilitation of Infrastructure Projects, Road
	Networks and Perimeter Fence of Rice Seed Production Area
	of DA-CVLMROS-Abulug Seed Farm
DAF-ARMMIARC	Establishment of Technology Commercialization and Development Center at ARMMIARC
DA-CEMIARC	•
DA-CEINIARC	Upgrading of the Mushroom Laboratory and Mushroom House of DA-CEMIARC
DA-EVIARC	Institutional Development Support for the Conservation of
	Research and Production Areas and Areas with Existing
	Facilities Through Rechanneling of the Existing Waterway of
	Layog River in RIARC Abuyog, Leyte
ISU	Development of R & D Facility for Quality Organic Fertilizer
Caraga State	Integrated Organically-Grown Crops and Livestock (A Techno
University	Demo) and Establishment of Organic Agriculture Training Center Phase 2
PAC	Upgrading and Expansion of the PAC Microbiology Room into
	Biotechnology Laboratory in Support to Organic Agriculture

Table 7. List of IDG projects for 2013 (cont.)

Agency	IDG Project
DA-CEMIARC	Rehabilitation of DA-CEMIARC Facilities in Support to Research and Development
DA-QAES	Institutional Development Support for the Construction of Warehouse/Shed in Support to the Establishment of Village- Type Dryer at DA-QAES
UPLBFI	Rehabilitation of the Annex Building and Upgrading of Laboratory Facilities of the Postharvest Horticulture Training and Research Center
DA-ZAMPIARC	Preparation of Master Development Plan of DA-ZAMPIARC
RMTU	Upgrading of RMTU Research and Development (R & D) Center and Training Facilities
DOST-PNRI	Upgrading of the Entomology Research Laboratory of the Philippine Nuclear Research Institute
City Government of Butuan	Establishment of Vermicomposting Facility in Butuan City
DA-5 Sorsogon Dairy Farm	Establishment of a Training and Information Facility and Dormitory in Sorsogon Research Outreach Station Phase 2
DA-NOMIARC	Construction of -DA-NOMIARC Gate and Entrance Road
MINSCAT	Establishment of R & D Laboratory for Mushroom Culture and Production Laboratory: Towards a Trade Option in Facing Climate Change
CLSUFI	Institutional Development Support for the Effective Validation of IDG Projects Phase 2
CLSUFI	Establishment of CLSU S & T Centrum Phase II
USM	Enhancement of a Village Level Food Processing Center for Marang and Other Agricultural Products
DA-STIARC	Establishment of Research and Development Center for Agriculture in CALABARZON
DA-EVIARC	Establishment of Research and Development Center for Agriculture in Region 8
DA-ZAMPIARC	Establishment of Research and Development Center for Agriculture in Zamboanga Peninsula
DA-ILIARC	Establishment of Research and Development Center for Agriculture in Region 1
SLSU	Establishment of Apiculture Processing Center in support to Organic Agriculture

#### Information and Communication Technology

Tasked to manage all ICT related activities of BAR, the IMU undertook network administration, and web and system development and maintenance for a more effective working environment and more efficient delivery of services to the stakeholders.



#### **Network Administration**

IMU is responsible for monitoring and maintaining the Local Area Network which enables staff members of the bureau to access resources such as the internet, intranet, information systems, file and printer sharing, among others. Connected to it are the 155 workstations being maintained by IMU, wherein 42 accounts have been added and updated in the Active Directory for network resource access. The unit also configured 60 internet and intranet access, and activated 18 Microsoft Windows for better working performance.

In terms of IT support services, IMU provided technical support to the different divisions and units that ranges from deployment and relocation of equipment, reformatting, troubleshooting, and others.

For system development and maintenance, the IMU facilitated the deployment of a biometric machine for faster and more convenient registration of employees' daily time record.

#### Web Development and Maintenance

One of the most important tasks of IMU is the maintenance of the BAR Website. As of December 2013, IMU was maintaining a total of 4, 763 webpages.

In terms of monitoring website usage, IMU has been using Google Analytics since 2009. Majority of the indicators showed significant increase as compared to the website usage in 2012 (Table 8).



BAR staff log in at the office through the biometric machine.





Table 8. Comparison of website usage between 2012 and 2013.

Indicator	Jan-Dec 2012	Jan-Dec 2013	Difference	% change
Visits	75,064	209,493	134,429	179.09 🛧
Unique Visitors	54,574	160,292	105,718	193.71 🛧
Pageviews	157,901	462,482	304,931	193.12 🛧
Unique Pageviews	119,595	360,613	241,018	201.53 🛧
No. of Downloads	4,472	4,701	229	5.12 🛧
Ave. Visit Duration	0:02:51	0:02:51	0:00:00	0.00
Pages per Visit	2.10	2.21	0.11	5.24 🛧
Ave. Time on Page	0:02:34	0:02:21	- 0:00:13	-2.60
New Visits	71.01%	75.82%	5%	6.77 🛧

The BAR website was accessed by users in 216 countries and dependent territories, which include the United States, India, Malaysia, Saudi Arabia, Australia, Canada, United Kingdom, and Singapore, among others. In terms of downloads, a 5% increase in the total number of downloads was also registered which reached 4, 701 as compared to last year which is only 4, 472. The top 3 with the highest percentage of downloads are the R&D Grant Forms, IDG Grant Forms, and the BAR Digest 2013.

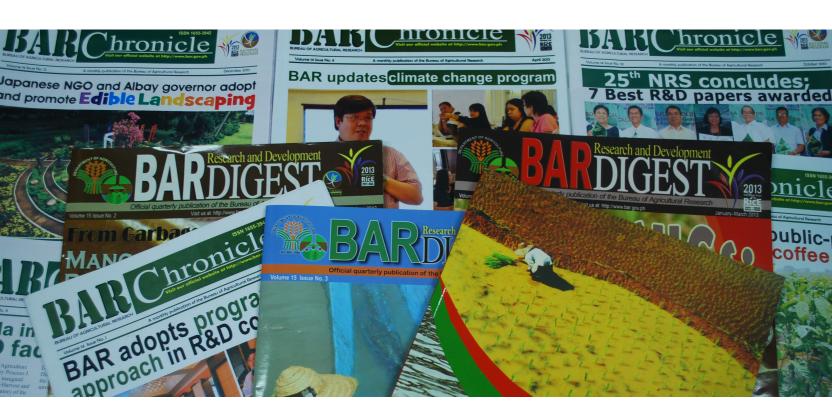




#### **Project Coordination**

Coordination of ICT projects are also part of IMU's tasks. This includes the Asian Food and Agriculture Cooperation Initiative–Agricultural Technology Information Network (AFACI-ATIN) project which aims to establish a standard web-based system for gathering agricultural data and to share agricultural literatures among its 10 member countries including the Philippines. Under the project, 3 agricultural books were printed in coordination with ACD.

Also included are three Congressional Commission on Science and Technology and Engineering (COMSTE) projects, namely: 1) Farmer Empowerment and Social Enterprise Development Institutionalizing a Decision Support System on Technology Transfer and Commercialization Initiatives using Cloud Computing; 2) Increasing Agricultural Productivity Through Sustainable Soil and Water Health Management: The Pilot Implementation; and 3) Establishing a Knowledge Management System to Institutionalize at the Central and Local Government Level–A Monitoring and Evaluation System.



Knowledge Management

Information and knowledge management is an integral part of the R&D system and has become a fundamental tool to adequately manage, properly package, and disseminate the information and knowledge generated from R&D projects. BAR, through the Applied Communication Division, manages the production and packaging of various Information Education Communication (IEC) materials that will cater to the needs of the farmers, researchers, extension workers, policymakers, and other concerned players in the sector.

#### **Publications**

This year, under its Publication Section, 44 articles were prepared for press release and 37 were published in major dailies and magazines (Greenfields, Marid Agriculture, AgriLife), newsletters, and online wires. The section packaged 26 information, education, and communication materials in the form of books, brochures, tarpaulin, flyers, manuals, and video clips. It also prepared 20 speeches, talking points, and messages for the key officials of the DA and BAR top management. Along with these, it also disseminated 126 articles that focused on R&D breakthroughs, with 69 significant R&D activities documented for agriculture and fisheries.

In cooperation with the IMU, the division also uploaded and posted 142 news articles and 819 photo releases in the BAR website.

BAR also partnered with the media to reach a wider scope of audience. Together with PTV 4's Mag-Agri Tayo, 2 high-impact Climate Change R&D projects were documented. One project assessed the impacts, vulnerabilities, and adaptation strategies on climate change in the traditional rice terraces in the Cordillera Administrative Region, while the other focused on the climate change adaptation strategies for agriculture in community watersheds of Cagayan River basin being implemented by the Isabela State University. Meanwhile, PTV 4's Ating Alamin was also tapped through Mr. Gerry Geronimo which featured 12 segments related to the agriculture and fisheries R&D projects being supported by BAR.

The section also facilitates the awarding of Scientific Publication Grant to institutions, organizations, and scientific/professional societies to cover the cost of their respective publications as well as other relevant R&D undertakings.

This year, 18 local and international events that include scientific conferences, conventions, forum, and workshops, and 5 publications were supported through the SPG. The publications were: 1) Competitive Research and Development Grants Manual (CRGM) Revised Edition to guide researchers and stakeholders in the preparation of proposals for monitoring R&D projects; 2) Philippine Rainfed Agriculture Research, Development and Extension Program (PhiRARDEP): The Updated Framework and Action Agenda 2013 and Beyond that contains updates on the action plan and framework of the program; 3) SSNM Quick Guide for Yellow Corn Production designed to guide farmers on the principles of site-specific nutrient management (SSNM); 4) Healthy Cooking with Soybeans, a recipe book containing various soybean-based dishes; and 5) Tilapia Fiesta, a cook book showcasing 89 tilapia dishes such as soups, appetizers, and main courses.







#### **Educational Communication**





To further enhance information and knowledge sharing which will help in agricultural and fisheries research and development, BAR regularly conducts a seminar series in cooperation with scientists, researchers, and experts to share the significant findings and results of their studies and researches.

This year, ACD facilitated and coordinated 24 inhouse seminars that were attended by more than 2,500 attendees from both the public and private sectors. BAR also collaborated with ATI and SOAP for the conduct of seminars on organic agriculture such as beekeeping and cosmetic production, consumer appreciation and organic ingredients utilization, and raw food preparation.

To upscale the dissemination of relevant and useful information that will cater to more audiences, the seminar series was brought to the regions. This led to the conduct of the 1st Regional Seminar Series which kicked off in March at the DA-NOMIARC in Dalwangan, Malaybalay City, Bukidnon. Dr. Fernando C. Sanchez, Jr., vice chancellor for Planning and Development of UPLB, together with the UPLB-EL team, discussed the basic principles of Edible Landscaping (EL). The seminar series featuring EL was replicated in other areas including Cagayan de Oro, Bicol, Leyte, and Bohol with the inclusion of the SNAP hydroponics technology.

BAR also participated in 4 international and 7 local exhibitions wherein the bureau's CPAR and NTCP banner programs were featured. During the exhibits, technologies generated from R&D projects were promoted through the dissemination of eight types of IEC materials of which 75,255 copies were distributed to various recepients, while 52, 76 were given to non-DA participants and visitors.

Other relevant and significant R&D information were also disseminated through 16 radio plugs, 119 TV coverages, and 40 ads/souvenir programs.





n February, BAR and SEARCA staged the first-ever "National Conference on Agriculture and Fisheries Information and Knowledge Management (KM)," a culminating activity of the BAR-SEARCA project titled, "Capacity Development on Knowledge Management."

The event convened managers, information officers and technical staff from the national and regional offices of the DA. The goal of the conference is to capacitate the participants on how to manage, utilize, and share knowledge resources that will promote a learning culture towards agricultural and rural development.

The conference included hands-

on workshops to level off on the information bandwagon on IKM guided by the World Café process. The World Café is a conversational design process used to develop deeper network patterns in a particular system. In the case of IKM, World Café is the methodology deployed to gather collective intelligence in the basic understanding of KM and its roles at regional and local levels. Used during the second day of the conference, the groups were able to come up with the responsibilities of KM officers in all levels.

Results of the benchmarking studies and those who attended international conferences abroad were presented and re-echoed during the last day of the conference. During the duration of the KM project, participants learned good practices of KM from among some of the best KM institutions and organizations who shared their experiences on the breadth and depth of KM and its broad influence in the agriculture and fisheries sector.

By the end of the three-day conference, the participants gained a clear understanding of the concept of IKM; the contributions that each individual provides; and the importance of KM officers in storing, handling, and disseminating information in ensuring a better life for Filipinos through excellence in agriculture and fisheries R&D.

### Channels of Progress

Channels of Progress: Bringing Innovations Closer to People is a compilation of success stories that will show us how the R&D efforts of the Department of Agriculture (DA) and the technologies resulting from them have helped farmers and fisherfolk produce more, with less resources.

The book shows the positive changes that were brought about by the collaborative efforts between DA and other research institutions. Cooperation and sharing of resources bring about greater results, as we utilize each other's strengths and complement each other's efforts.

- Agriculture Secretary Proceso J. Alcala



Uring the 9th Agriculture and Fisheries National Technology Forum and Product Exhibition held in August, BAR launched a coffee table book titled, "Channels of Progress: Bringing Innovations Closer to People". Authored by Director Eleazar, the book is a compilation of 54 successful stories from the bureau's funded projects under its CPAR and NTCP banner programs.

The book hopes to inspire its readers to invest and explore opportunities in the agriculture and fisheries industries. It also seeks to encourage researchers and scientists in the country to embark on more researches and projects that will generate more technologies and innovations for the benefit of the sector's stakeholders.

Divided into crops, livestock and poultry, and fisheries subsectors, the book offers motivational stories of how success came into the life of the project beneficiaries and adopters through the technologies and services introduced by the DA and its partner R&D institutions. It recounts their experiences and how the projects made a positive impact on their lives in terms of enhanced productivity and increased income. It also reflects how they made actions for their own development– that include stories on women empowerment, agribusiness enterprise development, cooperative strengthening, and reinforced partnership and linkages among the stakeholders.

## **Client-centered Services**

side from coordinating and providing fund support to various agriculture and fisheries R&D, BAR provides facilities and services for disseminating R&D besides information to ensure that relevant research results reach a wider audience. These facilities and services are client-centered ensuring that inquiries are immediately facilitated and/or given attention.

The *R&D Tech Com Center* is a facility that showcases products and technologies from BAR-funded research which also serves as a one-stopinformation shop on the latest R&D initiatives for walk-in visitors. The *Scientific Literature Services* addresses the information needs of the clients using various retrieval platforms and easy access of information on scientific studies. The bureau also provides *Intellectual Property Assistance* particularly to researchers who want their research results to be protected and be compensated for their efforts. It also provides assistance from the business sector especially those who want their enterprise to gain edge and identity. IP services include application for patent, utility model, and trademark.

#### R&D Technology Commercialization Center

Since 2009, the R&D Technology

Commercialization Center has been a one-stop information shop of walk-in visitors from various institutions. The facility has been the home of more than a hundred products and technologies produced by BAR's two major banner programs namely the National Technology Commercialization Program (NTCP) and Community- Based Participatory Action Research (CPAR).

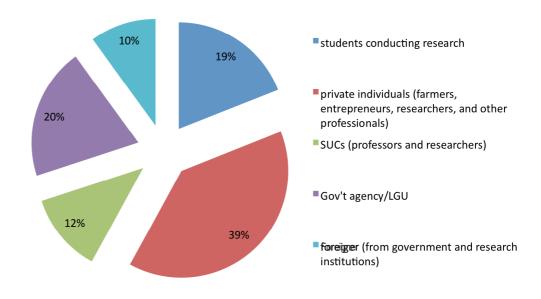
In 2013, additional products were included for display such as adlai breakfast cereal, adlai chocolate drink, adlai coffee mix, adlai kropek and soybean cookies from DA-Northern Mindanao Integrated Agricultural Research Center (NOMIARC), Peanut Magic from the Rural Improvement Club Federation in Cagayan, Formosa Manos products from Labo Multi-Purpose Cooperative such as *Barong Tagalog* and paper made from queen pineapple fiber, seaweed noodles from BFAR Region 5, Mama Ching's mango marmalade from Pangasinan Tropical, macapuno strings from DA-Quezon Agricultural Experiment Station (DA-QAES) and banana peduncle fiber board and paper from National Institute of Molecular Biology and Biotechnology (BIOTECH).



Through the years, the Tech Com Center has also served as a venue for information dissemination and knowledge exchange between the bureau and its clients. In 2013, the center received a total of 628 visitors with 132 visitors in the first quarter, 145 in the second quarter, 197 in the third quarter, and 154 in the fourth quarter. The visitors were diverse and included staffs and heads from the LGUs and other government agencies, foreign government ministry heads, researchers from local and international institutions, students, professors, farmers, and entrepreneurs. The biggest percentage of visitors came from private individuals, which is a good indication that the bureau is already known for more accessible and reliable source of various information related to agriculture and fisheries research and development (Figure 6).

Their purposes in visiting the center varied but were mainly to conduct research, to update

Figure 6. R&D Tech Com Visitors, 2013



#### Breakdown of showroom visitors for AY 2013



themselves on the latest technologies supported and generated by the bureau, to get brochures, flyers, and other IEC materials, took for potential products for agribusiness venture, and simply to view the different product displays. The telephone lines also received a total of 506 inquiries on BAR's R & D projects specifically on different agricultural commodities and upcoming BAR activities like Seminar Series, National Technology Forum and other events that will be sponsored or participated in by the bureau.

Frequently asked topics were valueadding products and information on soybean, adlai, fruit wines, asha peanut, sweet sorghum, moringa, sapinit and oregano. New information on agricultural practices particularly on organic farming, Edible Landscaping, integrated farming system, planting procedure, pesticide management, and agri-commodity processingwere also some of the visitors' inquiries. Basic information about particular products, specifically the availability, producer/manufacturer, contact details as well as the products' market potentials were also asked by the visitors specifically by both veteran and aspiring businessmen.

In response to the inquiries, a product database is consistently updated that can be readily accessed by the visitors. Procedures on how to submit a project proposal were also asked by walk-in guests who are planning to conduct R&D projects in collaboration with the bureau. If in case the needed information by walk-in visitors and callers are not available, the bureau will not allow them to leave the place or hang their phones empty-handed. The Tech Com Center attendants provide necessary referrals and contact numbers of technology developers or their home agency/ institution and to ensure that their inquiries and other concerns will be attended to by the right technical staff.

The center also serves as the bureau's information gateway providing IEC materials (brochures,

flyers, technology guides, and information sheets) to the guests and visitors. The Tech Com Center facilitated the distribution of IEC materials produced by BARfunded projects as well as special publications supported by BAR.

One of the promotional strategies facilitated by the Tech Com Center is the distribution of NTCP products that have been displayed during BAR activities like fairs and exhibits, research and development briefing, seminar series, and technology forums. The center also provided sample products to walk-in visitors like sweet sorghum vinegar and syrup from **BAPAMIN** Enterprises. Through this marketing strategy, less-known commodities and products get to be explored by the visitors with the Center functioning as an alternative source of information about nonconventional products.

Through the Center, less-known commodities and products get to be explored by the visitors and served as alternative source of information about non-conventional products. With aim of improving further the means and ways to address the information needs of the clients, BAR has developed a more accessible, efficient and innovative library and information system through the Scientific Literature Services (SLS). It has been one of BAR's clientcentered services which aims to organize and present needed research outputs to their respective clients in order to promote wider utilization and application of various R&D information and technologies.

In response to the needs of the researchers particularly students, farmers, researchers, and employees from different public and private institutions, the Philippine Agricultural and Information Network (PhilAgrinet) was created. In 2013, the PhilAgrinet site was restructured where a message board was added as a new feature which can be accessed by both PhilAgrinet members and guests. Researchers nowadays determine the availability of materials they need such as articles, monographs, serials, thesis and dissertations with just one click. Further, research materials can be viewed depending on the researcher's preference on certain categories: communities and collection, issue and date, author, title, and subject. Also, the basic information about research theses and dissertation such as author, description and even abstract can also be viewed by online guests.

One of the accomplishments of SLS in 2013 is the digitization of thesis and dissertation abstracts. Through this initiative, the researchers can now conveniently check for thesis and dissertation abstracts in the database without the hassle of going directly to the library. However, some of the detailed proposals can also be downloaded depending on the level of accessibility provided by the author or contributor.



#### Intellectual Property Management

The Intellectual Property Rights section of BAR provides assistance, not only to its clients who are implementing BAR-funded projects, but also to other public and private individuals who seek technical assistance. IP assistance includes consultation, evaluation and improvement of various IP applications such as trademark, patent and utility model.

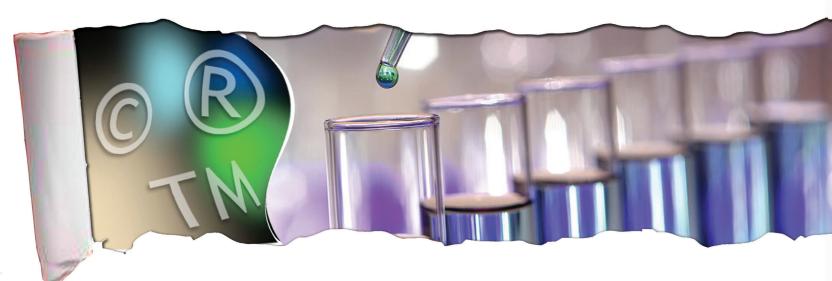
In 2013, BAR had already determined patentable interventions, processes and products from the on-going and completed projects handled and reviewed by Technology Commercialization Division (TCD) and Project Monitoring and Evaluation Division (PMED).

From the 61 projects reviewed, a number were identified for their potential IP. (Table 8).

The agency also accommodated non-BAR funded projects that needed IPR assistance particularly in the application of trademark, patent, and utility model (Table 9).

#### Table 8. Potential IPs from completed BAR-funded Projects

	Titles	Potential IPs
1.	Enhancement of Tamarind Industry in Lobo, Batangas/RFU IV-A/Digna Narvacan	Trademark
2.	Productivity Enhancement and Development of Makapuno by- Products/ RFU IV-A/Digna Narvacan	Trademark
3.	Intensifying the Commercialization of the 1 <sup>st</sup> Philippine Sweet Tamarind/ Pampanga Agricultural College/ Norman de Jesus	Trademark
4.	Lowland Mushroom Products Development and Production for Commercialization/ RFU II/ Emily Soriano	Trademark
5.	Commercialization and Promotion of Production and PosthrvestTechnologies for Quality Mango Fruits in Luzon/ Ramon Magsaysay Technological University/ Feliciano Rosete and Elizabeth Farin	Trademark, Patent
6.	Technology Demonstration of Malunggay Propagation through Bio-culture technique/ Tereso Rasco/ AANI	Trademark
7.	Sustainable Utilization of Indigenous Philippine Orchids as Source of Anti-Microbials and Antioxidants for Health and Wellness/ Eufrocinio C. Marfori/ Biotech-UPLB	Patent, Utility Model



One of the clients assisted was St. Ambrose Industries Ltd. (SAIL) in Taguig City, which successfully released their trademark in April 2013. SAIL is a newly established private company which aims to promote biodiversity and sustainability advocacies on environment, livelihood and education by initiating an integrated green farming system and production, and teaching the communities to produce organic products with high nutritional value and health benefits such as jams, juice, wine, jam, and jelly.

One of the BAR's IP advocacies is to create awareness among various stakeholders, hence an "IP Awareness Seminar" was held for all BAR staff in July 2013. Also, a half-day seminar on brands and trademarks was also conducted in the Southern Tagalog Integrated Agricultural Research Center (STIARC) in August 2013. To facilitate learning, actual discussions on STIARC's specific brand problems were discussed.

#### Table 9. Potential IPs from completed non-BAR funded projects

Titles	Potential IPR
<ol> <li>Nanoencapsulation of quercetin by phospholipids from rice bran/ UPLB/ Evelyn Rodriguez</li> </ol>	Patent, UM
2. Mr. Eder Chua Cruz/ Navotas	Trademark
3. Dr. Eddie Chua Cruz/ Pangasinan	Trademark
4. Okey Na Okoy/ Enrique B. Busog/ Baliwag, Bulacan	Trademark
<ol> <li>Structural Characterization of Bioactive Compounds from Philippine Microorganisms: Part 1 Antimicrobial compounds from locally isolated Streptomyces sp./ Teofila O. Zulaybar et. Al./ Biotech, UPLB</li> </ol>	Patent, Utility Model

## Major Activities and Institutional Updates

n an effort to ensure that research results and technologies reach their intended beneficiaries, BAR annually conducts two of its major events, the Agriculture and Fisheries National Technology Forum and Product Exhibition (NTF) every August, and the National Research Symposium (NRS) every October.

The NTF is an annual showcase of viable technologies developed by SUCs, the DA national and regional offices, and other R&D partner-institutions which also serves as opportunity to strengthen linkages between public and private sectors. Meanwhile, the NRS is a yearly competition featuring R&D paper entries from researchers and scientists from different R&D institutions throughout the country which is also a means to recognize the vital role of researchers as catalysts for developing R&D that matters to the sector.

#### 9th Agriculture & Fisheries National Technology Forum and Product Exhibition





Dr. Nicomedes P. Eleazar

Rep. Evelina G. Escudero

Dr. William D. Dar



Dr. Segfredo R. Serrano

Continuously upholding its mandate to disseminate and to promote the mature technologies developed by the DA national and regional offices, the academe, and other R&D partner institutions, BAR held the 9th Agriculture and Fisheries National Technology Forum and Product Exhibition (NTF) on 11-14 August 2013 at the SM Megatrade Hall 2, SM Megamall, Mandaluyong City.

This yearly event gathered researchers, producers, and consumers, and other agribusiness stakeholders from all walks of life.

With the theme, *Pagpapalaganap ng Teknolohiya para sa Mataas na Antas ng Pagnenegosyong Pangsakahan at Pangisdaan*, BAR Director Nicomedes P. Eleazar emphasized in his message the various Public-Private Partnership (PPP) endeavors in R&D that enabled various commodities to reach the market including adlai, sweet sorghum, soybean, seaweed, and tuna.

Dr. Segfredo R. Serrano, undersecretary for Policy, Planning, Project Development, Research and Regulations of DA, attended the event as keynote speaker. In his message, he emphasized the importance of Filipinos supporting, promoting, and buying the local products. As the Philippine market is continually on its growth, strengthening the initiatives on product development and packaging are the key pieces for a globally competitive Philippine market.

Also present was Dr. William D. Dar, director general of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). He underscored the importance of technology upscaling in helping the smallholder farmers and fishers in the country. He emphasized the need to increase government R&D investments in areas that include rainfed, applied research human resource, public-private partnership, and modern genomics.

The last speaker was Hon. Evelina G. Escudero of first district of Sorsogon who talked about the need for the local producers to step up their game if they want their products to be globally known.

Exhibited during the four-day event were various products, services, and technologies on high value crops, livestock, fisheries, natural products and ingredients for health and wellness, organic agriculture, and climate change. The UPLB Edible Landscaping team led by Dr. Fernando C. Sanchez, Jr, beautified the venue with its design

The 2013 NTF focused on various Public-Private Partnership (PPP) endeavors in R&D that enabled for various commodities to reach the market including adlai, sweet sorghum, soybean, seaweed, and tuna. of the central setting display which showcased fresh produce, fruit wines, agri-machineries, rice varieties, and various products from bangus, tuna, chevon/mutton, goat, etc.

Highlight of the event was the launching of the publication, "Channels of Progress: Bringing Innovations Closer to People." It is a coffeetable book featuring success stories from the BARfunded projects under its two banner programs – CPAR and NTCP. NTF also featured free seminars for the public consisting of seven popular and seven technical seminar topics (Table 10).

During the culmination day, winners were announced for the best booth, best new product, and first-ever, Regional Got Talent (a presentation of talents and creativity of the representatives from DA-RFUs.

For the Best Booth, DA-RFU 4A bagged the first place, followed by DA-RFU 8 and DAF-ARMM, respectively. The adlai breakfast cereal of DA-RFU 10 won the first place for the Best New Product followed by jackfruit products of DA-RFU 8 (second place), and breadfruit ice cream of DA-RFU 5 (third place). Finally, the Luzon A Cluster (Region 1, 2, 3, and CAR) got the top prize for regional presentation.

The event drew in more than 6,000 guests and walk-in attendees and was participated in by 107 exhibitors from different DA offices, SUCs, and private sector. The event was led by TCD. Table 10. Popular and Technical Seminar Topics during the 9th NTF

Popular Seminars	Technical Seminar
<b>Healthy Cooking with Soybeans</b> <i>Ms. Ma. Lourdes Lesaca Blissful Family Development Cooperative Dr. Thelma Estera Central Luzon State University</i>	<b>Quick Test to Detect Adulterated Honey</b> <i>Prof. Jose Rene Micor</i> <i>University of the Philippines Los Baños</i>
Important Medicinal Plants in Southern Tagalog Region, Development of Natural Products and Mass Production for Commercialization Dr. Estella Taño DA-Quezon Agricultural Experiment Station	Innovation, Technology and Intellectual Property: 3 Pillars of Growth Ms. Carmen Peralta Intellectual Property Philippines
Improvement of Processing Technologies for Meat and Skin from Selected Strain of Native Pig Ms. Nenita Estante Bureau of Animal Industry	Marketing Strategies for Organic Rice Mr. Bernie Berondo Global Organic and Wellness Corporation
Fish Innovation: Showcasing a New Dessert Type the Tilapia Ice Cream Ms. Dana Vera Cruz Central Luzon State University	Agri-Aqua Livelihood: Vitamin D Bio-fortification in Mushroom and Catfish Using Ultra Violet Light Dr. Bonifacio Comandante Scientist/Inventor
Different Module in a Vermiculite-based Soilless Growing Medium for the Promotion of Urban Landscape Gardening Ms. Miladie Penarubia TreeCare Management Services, Inc.	Vermiculture and Vermicomposting Production and Utilization Mr. Joel Adorada BPI-LBNCRDC
Agricultural Photography: Life and Landscape Mr. Ferdinand Decena Freelance Photographer	Legumes (Mungbean and Peanut): Situation and Outlook Mr. Elmer Enicola Institute of Plant Breeding - UPLB
Sweet Sorghum: Wellness and Wealth Engr. Antonio Arcangel BAPAMIN	Growth and Reproductive Performance of Four Genetically Improved Strains of Nile Tilapia Dr. Tereso Abella Freshwater Aquaculture Center – CLSU

#### 25th National Research Symposium



With the year's theme, "NRS@25: Pananaliksik Tungo sa Mataas na Ani at Kita sa Pagsasakahan at Pangisdaan," the 25th National Research Symposium (NRS) was once again staged to give recognition to the works of individuals who made their contributions in the field of agriculture and fisheries R&D.

The NRS is an annual R&D paper competition joined by researchers and scientists from different R&D institutions throughout the country. This year, a total of 130 paper entries were received to compete under the following categories: 1) Basic research, 2) Applied research – technology/information generation (Agriculture), 3) Applied research – technology/ information generation (Fisheries), 4) Applied research – technology adaptation/verification (Agriculture), 5) Applied research – technology adaptation/verification (Fisheries), 6) Socio-economics research, 7) Development research (Agriculture), and 8) Development research (Fisheries).

Out of these 130 paper entries, 59 entries qualified and 7 bagged the top prize for AFMA R&D Paper Awards (Table 11). The finalists were also asked to submit a poster for presentation in an exhibit which also had its corresponding award (Table 12).

	TITLE	AUTHORS	AGENCY	
A. BASIC	RESEARCH			
GOLD	Molecular Analysis of Somaclonal Variation in Tissue Culture Derived Bananas Using MSAP and SSR Markers	Emma Sales Nilda Butardo	USM	
SILVER	Biological Studies on Cecid Fly <i>Procontarinia frugivora</i> Gagne ( <i>Diptera: Cecidomyiidae</i> ): A New Serious Pest of Mango in the Philippines	Celia Medina Marie Joy Beltran Raol Pamiloza	UPLB	
BRONZE	Quantitative Expression of TNF, MHC CLASS Iα IgM Genes in Nile Tilapia ( <i>Oreochromis niloticus</i> ) Infected with <i>Aeromonas hydrophila</i>	Apolinario Yambot Divina Claus Rodolfo Medrano Yasser Cabansag	CLSU	
<b>B. APPLIED F</b>	RESEARCH TG/IG – AGRICULTURE			
GOLD	Development of ELISA-Based Technique for Detection of Antibiotic Residues in Meat and Meat Products	Edgardo Tulin Cynthia Godoy Edgardo Barsalote	VSU	
SILVER	Radiation-induced Mutant of NSIC Rc 144 with Broad-Spectrum Resistance to Bacterial Blight	Antonio Alfonso Eleanor Avellanoza Ronalyn Miranda Emilie Espejo Nelson Garcia	PhilRice Rutgers University	
BRONZE	Predicting Rice Yield from Multi- Temporal Satellite Data Using Artificial Neural Network	Nathaniel Alibuyog Juanito Maloom Dionisio Bucao	MMSU PhilRice	
C. APPLIED	RESEARCH TG/IG – FISHERIES			
GOLD	Indicators of an Approaching and On-going Lake Overturn with Sulfur Upwelling in Taal Lake	Macrina Zafaralla John Michael Aguilar Yves Christian Lagasca Marieanne GR Itol	UPLB	
SILVER	Heavy Metal (Pb, Hg, Cd) Contamination in Sarangani Bay and its Uptake on Fishes, Shellfishes and Seaweeds: Benchmark for Policy Formulation and Environmental Management	Edna Oconer Maria Amelia Punla Christine Dawn Obemio Tres Tinna Martin	MSU-GSC	
BRONZE	Spawning Behavior of <i>Sardinella</i> <i>gibbosa</i> (Bleeker, 1849) caught in Western Visayan Sea, Philippines	Esther Drusila Bayate Sheryll Mesa May Guanco Salvacion Cordero	BFAR- RFO VI	
D. APPLIED RESEARCH TA/TV – AGRICULTURE				
GOLD	Considering Farmers' Preferences in Breeding and Dissemination of White Corn Varieties as Staple Food	Romeo Labios Proceso Manguiat Jocelyn Labios Donna Bae Malayang Leonardo Tamisin Avelita Rosales Severino Tumamang Teresita Mangaya-ay Jessie Lumbao	UPLB STIARC CVIARC CENVIARC CEMIARC	

	TITLE	AUTHORS	AGENCY
SILVER	Evaluation of Crude Plant Extract Against Insect Pests and Diseases in Organically-Grown Stringbeans	Pio Javier Evangeline Punzalan Carlos Padilla	UPLB
BRONZE	Improving the Profitability, Sustainability and Productivity of Vegetables Grown in Marginal Uplands in the Southern Philippines through Site-Specific Nutrient Management	Anabella Tulin Marciana Galambao Agustin Mercado, Jr. Carmelito Lapoot Juanita Salvani Valeriana Justo Chris Dorahy	VSU WAC MOSCAT DA-RFU X UPLB Ableblue Ltd. Pty.
	CONOMICS RESEARCH		
GOLD	Analysis of Investment Needs for Banana ( <i>Musa balbisiana</i> ) Using Value Chain Approach: A Pilot Study in Selected Municipalities in the Province of Leyte	Antonio Abamo Raul Repulda Mark Ratilla	VSU DA-RFU VIII
SILVER	Impact Assessment of the Farmer Field School – Palay Check in the Irrigated Rice Areas in the Philippines	Alice Briones-Mataia Resi Olivares Rowena Malasa Aileen Litonjua	PhilRice
BRONZE	Cost-effectiveness Analysis of Farmers' Rice Straw Management Practices considering CH <sup>4</sup> and N <sup>2</sup> O Emissions	Cheryll Launio Constancio Asis, Jr. Rowena Manalili Evelyn Javier	PhilRice
F. DEVELO	PMENT RESEARCH – AGRICULTURE		
GOLD	Development of Open Pollinated Corn Varieties in Region 02	Severino Tumamang Orlando Lorenzana Virgilio Adriatico Roynic Aquino Robert Atalin Remar Gulatera Lorna Malenab	DA-CVIARC
SILVER	Community-based Participatory Action Research in Enhancing Productivity and Income in the Coastal and Upland Areas of Batanes	Lovelyn Gaspar Cesar Doroteo Hostallero Bernadette Galoso Lalaine Estamo Priscilla Nanud Orlando Lorenzana	DA-RFU II PLGU – Batanes
BRONZE	Establishment of Agricultural Tramlines for Upland Agriculture in the Philippines	Bartolome Tesorero, Jr. Raul Paz	PhilMech
	PMENT RESEARCH – FISHERIES		
GOLD	Community-based Participatory Action Research: Blue Crab ( <i>Portunus pelagicus</i> , Linnaeus, 1758) Fishing Using Gillnets for Marginal Fisherfolk in Bataan	Lilian Garcia Gladys Resubal Gaudelia Calinao	BFAR-RFO III OPA-Bataan OMA-Balanga City

#### Table 12. Winners of Best Poster

	TITLE	AUTHORS	AGENCY
GOLD	Development of ELISA- Based Technique for Detection of Antibiotic Residues in Meat and Meat Products	Edgardo Tulin Cynthia Godoy Edgardo Barsalote	VSU
SILVER	Participatory Varietal Selection of Rice Tolerance to Submergence Condition in Northern Mindanao	Berly Tatoy April Hope Espital Duran Guillermo Jocelyn Yagong Ramshurab Landiza Margarita Magallones Carmelito Lapoot Juanita Salvani	DA-RFU X BAPC Gingoog City
BRONZE	Analysis of Investment Needs for Banana ( <i>Musa</i> <i>balbisiana</i> ) Using Value Chain Approach: A Pilot Study in Selected Municipalities in the Province of Leyte	Antonio Abamo Raul Repulda Mark Ratilla	VSU DA-RFU VIII

The winners received a cash prize and plaque. The Gold awardees received Php100, 000 while the Silver and Bronze awardees received Php75, 000 and Php50, 000, respectively.

The awarding ceremony was held on 17 October 2013 at Fernando Lopez Hall, BSWM and was attended by Agriculture Secretary Proceso J. Alcala and International Rice Research Institute (IRRI) Deputy Director General for Communications and Partnerships Bruce J. Tolentino. In his message, Secretary Alcala recognized the significance of the researches conducted to address the current issues faced by the agriculture and fisheries sector. Dr. Tolentino, on the other hand, applauded the initiatives of the current administration to put larger investments on R&D.

Highlight of the event was the launching of four BAR-supported publications through its Scientific Publication Grant (SPG). These were: 1) Competitive Research and Development Grants Manual (CRGM), 2) Philippine Rainfed Agriculture Research, Development and Extension Program (PhiRARDEP), 3) Healthy Cooking with Soybeans, and 4) SSNM-based Fertilizer Recommendation Quick Guide for Yellow Corn.

#### Awards and Recognitions

The bureau values the awards and recognitions that it has received throughout the year as they affirm what true work excellence means. Whether, the recognition is for BAR or for its partners (organization or individual), BAR puts everything into account to serve as inspiration for the whole R&D community.



#### LPMPC wins TOFARM Agriculture Cooperative Award



The Labo Progressive Multi-purpose Cooperative (LPMPC) based in Labo, Camarines Norte was recognized as 2012 Outstanding Farmers of the Philippines (TOFARM 2012) under the Agriculture Cooperative category. TOFARM is a search and award program anchored on promoting farming in the youth sector of all classes. It gives recognition to the resiliency, ingenuity, and strength of hardworking Filipino farmers.

LPMPC started in 1987 as a cooperative and venture in agribusiness in 2002. Currently, the cooperative focused on pineapple production and its by-product utilization including pineapple juice, dried pineapple handwoven piña cloth, handmade paper, and decorticated pineapple fiber.

As support to their initiative, the Bureau of Agricultural Research (BAR) through its National Technology Commercialization Program provided institutional, infrastructural, and technical support under the project titled "Enhancing Competitiveness of the Queen Pineapple in the Bicol Region," which been implemented by the DA-RFU V- Bicol Integrated Agricultural Research Center (BIARC).

LPMPC has completed its accreditation by passing the requirements for both Good Agricultural Practices (GAP) and Good Manufacturing Practice (GMP). It is now a certified fruit processing plant upon completing the requirements set by the Food and Drug Administration (FDA) under the BAR-funded project, "Pineapple Production and By-product Utilization."

# Eleazar receives PSAS commendation

The Philippine Society of Animal Science (PSAS), in its 50th Scientific Seminar and Annual Convention, gave honor and recognition to the Bureau of Agricultural Research (BAR) as one of the institutions which have supported the society through the years. Held during the convention's dinner/fellowship night at Tagaytay International Convention Center, Tagaytay City on 23 October 2013, the awarding ceremony specifically recognized the bureau's support to the printing of the Philippine Journal of Veterinary and Animal Sciences (PJVAS), the official journal of PSAS.

Dr. Nicomedes P. Eleazar, director of BAR received the award. In a statement, he recognized the award as a "testament that we (BAR and PSAS) are heading towards the right direction. It is a reminder that we should not be complacent on what we are doing. It is a challenge that we have to personally take upon ourselves to do better in our field."

The convention carried the theme: "PSAS Golden Years: Quo Vadis?," which reflected on what PSAS has done for the Philippine animal industry and the direction it will pursue in the coming years, particularly on addressing the needs of the sector that it is serving.







#### THAT MADE IT TO MAJOR DAILIES.

#### First Quarter (January-March 2013)

Technology tools for crops developed (Jan. 1, 2013), Manila Bulletin Soil degradation to hurt Philippine farming sector (Jan. 4, 2013), Manila Times Soil fertility mapping seen to hike productivity (Jan. 4, 2013), Manila Bulletin Rice production (Jan. 5, 2013), Manila Bulletin DA, ICRISAT to undertake soil program to increase crop yield (Jan 6, 2013), Philippine Star DA urged to start soil rejuvenation program (Jan 10, 2013), Philippine Daily Inquirer Boosting Bicol's upland rice farming (Jan 15, 2013), Manila Bulletin Boosting Bicol's upland rice farming (Jan 15, 2013), Balita Viability of local chickpea evaluated (Jan 23, 2013), Manila Bulletin BAR pushes domestic production of chickpea (Jan 23, 2013), Manila Times Agriculture bureau gives P1.7B for chickpea production in Benguet (Jan 23, 2013), Business Mirror Government exploring Palawan's fruit species (Jan 30, 2013), Manila Bulletin Palawan's endemic fruits eved for export (Feb 3, 2013), Philippine Star DA readies P36 million roadmap for 'rimas' (March 10, 2013), Philippine Star 20 MT of yellow onions exported to Japan (March 20, 2013), Business Mirror Zambales produces sweetest carabao mango-experts (March 28, 2013), Philippine Star

#### Second Quarter (April-June 2013)

Big potential for Surigao oysters (April 1, 2013), Malaya
Butuan farmers get more assistance (April 1, 2013), Manila Bulletin
WorldFish-Philippines launches action research program for aquatic systems (April 6, 2013), Business Mirror
SEARCA backs progam boosting agriculture, fisheries knowledge-management system (April 10, 2013), Business Mirror
Revival of RP garlic production underway (April 15, 2013), Manila Bulletin
Tablet to bridge farm extension work (May 6, 2013), Manila Bulletin
Bill Gates grant benefiting RP's tropical legumes (June 4, 2013), Manila Bulletin
DA embarks on ginger production for export (June 24, 2014), Manila Bulletin
Quezon researcher develops organic products (June 30, 2013), Philippine Star

#### Third Quarter (July-September 2013)

R&D results at Agrilink 2013 (July 18, 2013), Manila Bulletin
Bureau of Agricultural Research showcases R&D tehnology in Agrilink 2013 (July 21, 2013), Philippine Daily Inquirer
Anti-diabetic sweet sorghum sweetener developed (July 24, 2013), Manila Bulletin
Sweet sorghum feeds eyed as cheap alternative to corn feed (July 28, 2013), Philippine Star
4,000 hectares eyed for soybeans, (August 14, 2013) Manila Bulletin
P2.4M to boost goat farming (Sept 3, 2013), Manila Bulletin



#### Fourth Quarter (October-December 2013)

Soybean planting set to start in Cagayan (October 1, 2013), Manila Bulletin Soybean coffee maker sets exports to Malaysia (October 6, 2013), Philippine Star Rainfed agricultural lands to get boost (October 9, 2013), Manila Standard New variety increases jackfruit production (November 1, 2013), Manila Standard DA project raises jackfruit yield (November 10, 2013), Philippine Star DA interventions spawn PPP projects (November 18, 2013), Manila Bulletin Edible landscaping helps reduce imports and raises food security (December 8, 2013), Philippine Star Salceda pushes vegetable gardens (December 10, 2013), Manila Standard DA eyes abaca project in Visayas (December 27, 2013), Manila Times DA unit urging Leyte, Samar farmers to plant abaca (December 27, 2013), Philippine Star



ver the last two decades, the Bureau of Agricultural Research (BAR), as the country's national coordinating agency for agriculture and fisheries Research and Development (R&D), has been at the forefront bringing relevant research results that the Filipino people could use and benefit from. More than funding and coordinating R&D in agriculture and fisheries, BAR provides better opportunities through increased production and incomes.

Given the various challenges, including globalization, new international trade environment, and climate change which greatly affect production, BAR supports the generation of information and technologies that will lead to a highly-competitive agriculture and fisheries sector.

BAR is a staff bureau of the Department of Agriculture (DA) established to lead and coordinate the agriculture and fisheries R&D in the country. Specifically, the bureau is tasked to consolidate, strengthen, and develop the R&D system to improve its effectiveness and efficiency by ensuring customer satisfaction and continuous improvement through work excellence, teamwork and networking, accountability and innovation.

#### Vision

A better life for Filipinos through excellence in agriculture and fisheries research and development.

#### **Mission**

To attain food security and reduce poverty through technology-based agriculture and fisheries sector.

#### **R&D** Thrusts

- 1. Food security
- 2. Increased productivity and profitability
- 3. Poverty eradication and people empowerment
- 4. Sustainable agricultural development
- 5. Global competitiveness

#### **Strategic Approaches**

- 1. Relevant and innovative technology and information generation
- 2. Community-based technology development and validation
- 3. Responsive technology commercialization
- 4. Agribusiness development
- 5. Public-private partnership
- 6. Institutional development
- 7. Local and international linkaging
- 8. Information communication technology management
- 9. Knowledge management
- 10. Provision of favorable research policy environment



# BAR as a top-perfo

eaping the fruits of its labor and hard work, the Bureau of Agricultural Research (BAR) emerged as the best-performing agency in 2013. As a staff bureau of the Department of Agriculture (DA) that is tasked to coordinate the national agriculture and fisheries R&D of the country, BAR was ranked first among the other 31 agencies under the

purview of the Department based on the year-end evaluation and assessment conducted by the Department of Budget and Management (DBM). This was officially confirmed and announced through a Memorandum issued by the Office of the Secretary of Agriculture.

The good performance of the agency was attributed to the outstanding accomplishments of the bureau in support to the Agri-Pinoy Framework for Sustainable Agricultural Development which is being implemented by DA under the leadership of Secretary Proceso J. Alcala. The AgriPinoy framework is the DA's response to the need for food security, the attainment of sustainable agriculture, and the mainstreaming of climate change in all the Department's programs in which BAR has significantly institutionalized R&D as one important pillar for rapid and inclusive economic growth.

As reported by the DA-Planning Service (PS), BAR received a rating of 90 percent based on its performance targets and the delivery of its Major Final Outputs (MFOs). Also joining the rank was the Bureau of Soils and Water Management (BSWM).

As the central R&D coordinating arm of the Department, BAR is dedicated to continuously develop and to mainstream new and innovative R&D strategies, plans and programs that will not only increase production but,

# rming agency for **2013**



more importantly, empower the farmers and fisherfolk as important players in rural economic growth. The bureau hopes to achieve these through the implementation of its two flagship programs, the Community-based Participatory Action Research (CPAR), and the National Technology Commercialization Program (NTCP).

BAR, under the leadership of Dr. Nicomedes P. Eleazar, further strengthens its commitment to being the best and to continuously strive for work excellence.



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