



2012 Annual Report



Department of Agriculture
Bureau of Agricultural Research







About BAR

Over 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 of 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 affects production, BAR supports the generation of information and technologies that will lead to highly-competitive agriculture and fisheries sectors.

BAR, a staff bureau of the Department of Agriculture (DA), was established to lead and coordinate the agriculture and fisheries research and development (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.”

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MESSAGE of the Director

Celebrating 25 years of R&D Excellence in Agriculture and Fisheries

The year 2012 marks a milestone for the Bureau of Agricultural Research (BAR) as it celebrated its silver anniversary as the lead coordinating arm of agriculture and fisheries research and development (R&D) of the Department of Agriculture (DA). In keeping its mission to attain food security and reduce poverty, the bureau reinforces its commitment in ensuring that technologies generated from R&D are used by the farming and fishing communities to improve their lives, both production- and profit-wise.

For the past 25 years, BAR has been working to meet the challenges that confront the Philippine R&D system with new strategies and approaches. Through these strategies, the management of R&D funds has become more effective and efficient, and the strategic areas where resources should be allocated to achieve the greatest impacts have been identified. An effective R&D system is pivotal in modernizing agriculture and to become effective, it must respond to the needs of the sector.

For more than two decades, BAR has been at the forefront of walking through the paths of development, bringing R&D innovations closer to humanity. Given the various challenges of the day, BAR is supporting the generation of information and technologies that will enable the agriculture sector to become robust and highly-competitive.

BAR's response to global competitiveness, poverty alleviation, and people empowerment is anchored on its dynamic and responsive banner programs. These are the Community-based Participatory Action Research (CPAR) and the National Technology Commercialization Program (NTCP). The accomplishments of these two programs are highlighted in this Annual Report, putting emphasis on the various success stories that resulted from the various interventions introduced in the farmers' fields. With the implementation of its banner programs, BAR promotes entrepreneurship among rural communities wherein farmers and fishers have a ready market for their produce.

Conscious of its obligation to harness the full potentials of R&D for the benefit of people and society, BAR has intensified its funding support to programs that will create great impact for the farming and fishing communities. Currently, BAR serves as the national focal agency of various DA RDE programs including organic agriculture, climate change, biotechnology, indigenous plants for health and wellness, biofuels, rainfed agriculture, adlai, rubber, soybean, apiculture, and breadfruit.

Along with the programs which are in harmony with the direction and leadership of DA, the bureau continues to support the R&D sector through the continuous implementation of basic, applied, and policy and advocacy researches. Consequently, BAR strengthens the R&D sector by investing in its human resource and facilities development programs as well as supporting its ICT and KM programs.

Part of making an institution indispensable is making sure that people are aware of its existence. For the bureau, existence is manifested through the services that it provides to its clients including the R&D Tech Com

Center, Library Services and assistance to Intellectual Property Rights Support. Another defining moment for the bureau last year was the conduct of its two major activities, the Agriculture and Fisheries Technology Forum & Product Exhibition (NTF) and the National Research Symposium (NRS), which have become signature events for BAR.

While much was accomplished in the year that passed, more remain to be realized. What the bureau has accomplished in more than a decade are the results of various collaborations and partnerships. BAR would not have been effective in its work without the wholehearted cooperation of numerous key players, stakeholders and other allies in the bureau's quest.

With encouragement from the DA administration and from our clients, BAR seeks to continue what it started and set the platform for success in the next decade!



DR. NICOMEDES ELEAZAR, CESO IV
Director

INSTITUTIONAL UPDATES



Celebrating



BAR @25: Unveiling the **SILVER ANNIVERSARY** BAR logo

The 25th BAR Anniversary celebration kicked-off on 18 February 2012 with the unveiling of the bureau's silver anniversary logo. It was led by Bureau of Agricultural Research (BAR) Director Nicomedes P. Eleazar and Asst. Dir. Teodoro S. Solsoloy.

The silver anniversary logo reflects how far the bureau has gone in its quest to be an effective and efficient player in the agriculture and fisheries research and development (R&D). The three dominant colors as reflected in the logo, represent the three major sectors that contribute to the total production of the Philippine agriculture. **Green** represents the crops sector, the largest sector comprising rice, corn and high-value crops including our export champions. **Blue** represents the aquaculture and fisheries commodities and **brown** for the livestock and poultry industries. Like a growing plant, BAR, as the research funding facility of DA, continues to nurture the growth of these commodity groups as it continues to strive for a food-sufficient Philippines.

Part of the text engraved in the logo reads: *Celebrating R&D Excellence* which is not just the theme of the celebration but has become mantra of the bureau as it continues to strive to be a cut above the rest and outdo itself year after year. The in script, "25 years" tells the extent of time that the bureau has gone in reaching its accomplishments so far, laying emphasis on the number "2" to highlight the two fruitful decades that have since passed.



Inaugurating the **BAR ANNEX BUILDING**



*P*ushing forward not only its R&D initiatives but also infrastructure development, BAR led by its key officials, Director Nicomedes P. Eleazar and Assistant Director Teodoro S. Solsoloy, inaugurated the two-level BAR Annex Building on 8 August 2012. This activity is part of the year-long celebration of the 25th year of the bureau.

The new Annex Building is located behind the RDMIC building inside the Bureau of Plant Industry (BPI) Compound. The new building will provide the space for the expansion of BAR's offices and parking of its

vehicles. It will also house additional conference facilities and accommodations for the bureau's guests.

The first and second floors were also blessed to ensure that the structure is dedicated not only to support BAR's mandate, but also to recognize that divine interventions is at work and gives meaning to the efforts of the bureau. The ribbon-cutting ceremony was also one of the activities headed by Dr. Solsoloy and Dr. Eleazar.

Culminating the day's activity was the unveiling of the BAR Annex Building marker.



AFACI Cooperation in PGR Management and Conservation

Twelve 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, and in contributing to sustainable agriculture and food security in Asia. These member

countries include Bangladesh, Cambodia, Indonesia, Korea, 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.

A major on-going Philippine initiative that is being implemented by BAR, along with another effort on the publication and distribution of agricultural technology books directly to local farmers, is the project, “Strengthening PGR Management System: Conserving the Diversity of Priority Vegetables (Solanaceous Crops) Germplasm of the Philippines”. This project aims to promote sustainable use of plant genetic resources (PGR) and capacitate DA partners on the exploration, collection, regeneration, characterization, evaluation, and conservation of traditional tomato, eggplant and pepper germplasm of the country. The National Plant Genetic Resources Laboratory of the Institute of Plant Breeding, Crop Science Cluster, and the Institute of Plant Breeding, both of which are based at the University of the Philippines Los Baños (UPLB), are assisting BAR in this effort. In line with this, a consultation meeting *cum* training on “Collecting, Conservation and Characterization of Plant Genetic Resources (PGR) Germplasm of Solanaceous Crops” was held at BAR on 15-16 October 2012.



The WorldFish AQUATECH Project

BAR and The WorldFish Center have agreed to implement the “Aquaculture Technology Commercialization and Awareness Program (AQUATECH) in the Philippines Capacity Building Project”. The project details were presented during a Pre-Implementation Meeting on 12 January 2012 at the BAR. The DA has allotted a budget for facilities development to set-up income-generating and technology-developing agriculture and fisheries research stations in the country under the project.

The AQUATECH project is aimed at strengthening the capacity of BAR staff and Filipino researchers in understanding the critical requirements for the development of an aquaculture that is sustainable, market-oriented and responsive. The project will provide opportunities for Filipino researchers and BAR staff to participate in technical discussions and forums on sustainable agriculture development, market, and climate change. Among the key activities under the project included the conduct of Ecosystem Approach to Fisheries (EAF) / Ecosystem Approach to Agriculture (EAA) Workshops (in conjunction with the Small-Scale Fisheries (SSF) Governance Project).



The project will provide opportunities for Filipino researchers and BAR staff to participate in technical discussions and forums on sustainable agriculture development, market, and climate change.

Biodiversity on two banana projects



A Memorandum of Agreement (MOA) was signed between BAR and Biodiversity International for the implementation of 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 Small-scale Cavendish Banana Sector. Signing the agreement were Dr. Nicomedes P. Eleazar, director of BAR and Dr. Agustin B. Molina, senior scientist of Biodiversity International and project leader on 28 March 2012, at the Office of the Director, BAR, Diliman, Quezon City.

The project on mitigating damage from banana *Fusarium wilt* aims to provide smallholder farmers with an urgent solution to the spread of *Fusarium oxysporum* f. sp. *cubense* (*Foc*) TR4, the causal organism, through the formulation of strategic disease management protocols. The project will conduct a farmer-participatory selection of improved GCTCV (*Candevish* banana variant) genotype(s) with improved yield and agronomic traits, disease tolerance, fruit quality and marketability. Through this effort, devastated plantations can be rehabilitated through replanting with *Foc*-

disease resistant banana varieties.

Meanwhile, the project on capacity-building for the effective management of *Foc* in smallscale *Candevish* banana farms aims to develop and promote various capacity building methodologies that would boost capabilities on participatory varietal selection, disease management, and appropriate eradication techniques. The main beneficiaries of the project will be the farmer-cooperators but it will also train local researchers and extension agents to enhance their technical capacities in doing RDE on *Foc* TR4 management. To efficiently facilitate and enhance the skills of the stakeholders, effective information, education and communication (IEC) materials will be produced and disseminated for information awareness.

The overall goal of the two projects is to reduce risks to food security and the livelihood of smallscale 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* wilt incidences. Both projects will be conducted in Davao and Los Baños, Laguna from 2012 to 2015.

Special Projects with IRRI funded through the DFA

1 *Improved Nutrient Management Options for Unfavorable Rainfed Lowlands in the Philippines.*

This project aims to better understand farmers' actual crop and natural resource management (CNRM) practices, to develop and test improved nutrient management practices for existing germplasm and the most promising new germplasm, and to distill the results into information materials for extension staff and farmers. It is being conducted at key sites in major rainfed rice areas. Initial evaluation of the results indicate that there is considerable potential to increase rice yields in rainfed lowland rice and that the trials provide sufficient knowledge to develop a nutrient management tool for site-specific nutrient management (SSNM) in rainfed lowlands.



2 *Cyber Village Project*



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 is being pilot-tested in seven pilot municipalities throughout the Philippines. A three-year work plan for each pilot municipality is currently being implemented.

3 *Improving and sustaining local capacity in rice research and development through URGENT Project*



The project aims to provide opportunities and support in training a 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 visits by IRRI scientists and rice experts to participating academic and local government institutions; and to produce quality seeds of high-yielding and newly released varieties for rapid dissemination of these varieties to

many locations in the Philippines.

The project has three main components: 1) Capacity building: by providing training scholarships for Filipino collaborators at IRRI; 2) Technical assistance: to enable IRRI scientists and experts to promptly visit local government units during occurrences of major rice problems that require experts' advice; and 3) Seed production: seeds of currently released high-yielding varieties, including those varieties for unfavorable areas (submergence, drought, saline), are produced, packed, and distributed to requesting visiting farmers throughout the year. The project started in October 2010 as a three-year collaboration.

BAR-supported project wins best paper in 42nd CSSP scientific conference

A BAR-supported project titled, "Participatory Varietal Selection of White Corn as Alternative Staple Food," received the award for Best Paper under the downstream research category.

Presenting the project was Dr. Romeo V. Labios of the Agricultural Systems Cluster-University of the Philippines Los Baños (ASC-UPLB) during the 42nd Crop Science Society of the Philippines (CSSP) Scientific Conference held on 16-21 April 2012 in Puerto Princesa City, Palawan. This research, which was supported and funded by BAR, aimed to address food security and nutrition issues by providing farmers in selected municipalities in the provinces of Bohol, Quezon, and North Cotabato with suitable white corn varieties.

Another awardee, Dr. Heraldo L. Layaoen, Mariano Marcos State University (MMSU) vice president for administration, planning and external linkages, was presented the "2012 CSSP Honorary Fellow Award" for his valuable contributions as national program leader on sweet sorghum research, development, and extension (RDE) spanning a period of seven years.

Dr. Layaoen expressed his deep gratitude to CSSP, MMSU, and all the institutions that continue to support his RDE endeavors. Most of the RDE activities on sweet sorghum undertaken by Dr. Layaoen were supported by BAR. The technologies and practices he helped develop focused on sweet sorghum production and processing as food, feedstock, fuel, and fertilizer.



The 42nd CSSP Scientific Conference with the theme, "Linking Crop Science Technology and Farmers toward Sustainable Agricultural Productivity" was co-sponsored by BAR.

The event was participated in by CSSP officials and members, evaluators, participants, sponsors, and honored guests from various agencies and institutions, including BAR, Philippine Rice Research Institute (PhilRice), International Rice Research Institute (IRRI), ICRISAT, Palawan State University (PSU), Western Philippines University (WPU), Puerto Princesa City Local Government, Palawan Provincial Government, and Monsanto Philippines.

CSSP is an agro-based educational association that aims to advance crop productivity in the Philippines through research and development. BAR has been providing support to CSSP knowing that it is a platform for knowledge sharing on new technologies which can enhance crop productivity in the country.

Awards and Recognitions

BAR leaders and employees awarded



Twenty-one BAR employees were awarded the “2012 BAR Outstanding Employees” for their unparalleled dedication and professionalism in carrying out their duties and responsibilities during the 8th Agriculture and Fisheries National Technology Forum and Product Exhibition held on 9 August 2012 at the SM Megatrade Hall, Megamall, Mandaluyong City.

The award is annually given to outstanding employees in recognition of their valuable contributions and efforts behind the success of the bureau. The awardees were: Jojit V. Velasquez (*permanent support service staff*); Gladys B. Gammad Jovencio G. Lim, Jennifer T. Alianza, and Erwin B. Lacambra (*project administrative staff*); Ma. Elena M. Garces, Jose Ira Archimedes D. Borromeo, Amavel A. Velasco, Raymond Patrick L. Cabrera, Maylen D. Villareal, Apolonia A. Mendoza, Patrick Raymund A. Lesaca, and Ma. Eloisa H. Aquino (*project technical staff*); Judith A. Maghanoy, Erlinda M. Agustin and Ma. Louella S. Dejello (*permanent administrative staff*); Jude Ray P. Laguna and Lalaine A. Perlawan (*permanent technical staff*); Anthony B. Obligado, Joell H. Lales, and Digna L. Sandoval (*supervisory staff*).

On hand to give out the plaques to the awardees were Department of Agriculture (DA) Secretary Proceso J. Alcala, International Crops Research Institute for Semi Arid Tropics (ICRISAT) Director General William D. Dar, BAR Director Nicomedes P. Eleazar, and BAR Asst. Director Teodoro S. Solsoloy.

Dir. Eleazar and Asst. Dir. Solsoloy were also honored with a Plaque of Appreciation from the BAR staff for their exemplary leadership and momentous contributions in setting the directions and standards in agriculture and fisheries R&D during the same event.

“ **...for their unparalleled dedication and professionalism in carrying out their duties and responsibilities** ”



R&D Programs

In keeping with its mission to attain food security and reduce poverty through technology-based agriculture and fisheries sector, BAR is at the forefront of bringing research results that are not only relevant but will also benefit majority of the Filipino people.

To do this, the bureau funds and supports R&D initiatives through its two banner programs: Community-based Participatory Action Research (CPAR) and National Technology Commercialization Program (NTCP), both of which seek to uplift the lives of the marginalized farmers and fisherfolk through improved production and increased income generation.



BANNER Programs

CPAR: Empowering farmers/fisherfolk through effective interventions

One of the bureau's banner programs that continue to impact the lives of the farmers and fisherfolk at the grassroot is the CPAR. It is a location-specific research cum extension activity that focuses on improving farming system technologies for specific micro agro-climatic environment within a province or municipality. It merges research initiatives and the involvement of farmer and fisherfolk cooperators in the various regions of the country.

The approach used in CPAR draws the active participation of cooperators in ensuring that the community is empowered with the value of information-based

decision-making. This allows for an uncomplicated technology verification and adaptation process where mature farming technologies resulting from R&D initiatives are tried and tested by the farmer/fisherfolk cooperators themselves with activities that encompass technology verification, adaptation, demonstration and dissemination. Extension activities based on the needs identified by the community are also part of the CPAR project.

CPAR seeks to: 1) enhance the role of RD&E through technology transfer to improve production management systems as business; 2) develop strategies for effective integration of support services for enterprise and agribusiness development; and 3) institutionalize active community participation in the overall management of farm and coastal resources to enterprise and agribusiness development.



Since its inception in 1999, the BAR's Project Monitoring and Evaluation Division (PMED) has been coordinating, monitoring, and evaluating CPAR projects implemented throughout the country. As of December 2012, PMED coordinated 230 CPAR projects covering 5,48 sites nationwide. Of these 230 CPAR projects (*Figure 1*), 199 projects focus on agriculture while 31 projects are on fisheries. In 2012, in collaboration with the RIARCs, RFRDCs, LGUs and the other BAR divisions, PMED undertook site visits to monitor 49 projects.

There are 10,704 farmer and fisherfolk cooperators who are currently benefitting from CPAR—a 6.23 percent increase compared to 2011 (*Figure 2*). Out of the 10,704 farmer beneficiaries, 5,786 are farmer cooperators, while another 4,918 are adopters. Adopters, who are among the many indirect beneficiaries of CPAR, are farmers who have seen firsthand the benefits and effectiveness of the project's initiatives with its implementation in their localities and would want to adopt the same technology in their own lands.

Farmer organizations are also active participants in the capacity building trainings under CPAR that include training and workshops. These training programs equip organizations with bookkeeping and fund-management schemes which are vital in intensifying the production competence of the farmer organization. In 2012, a total of 227 farmer organizations had been capacitated by the CPAR program.

To date, 88 LGU-led CPAR projects across the country have been completed while 15 RFU-led projects have been turned over to the LGUs.

Zonal orientation and leveling-off on CPAR concepts for the benefit of implementers in Luzon, Visayas, and Mindanao were accomplished in the first quarter of 2012.



BANNER Programs

Figure 1. CPAR Projects from 2007 to 2012

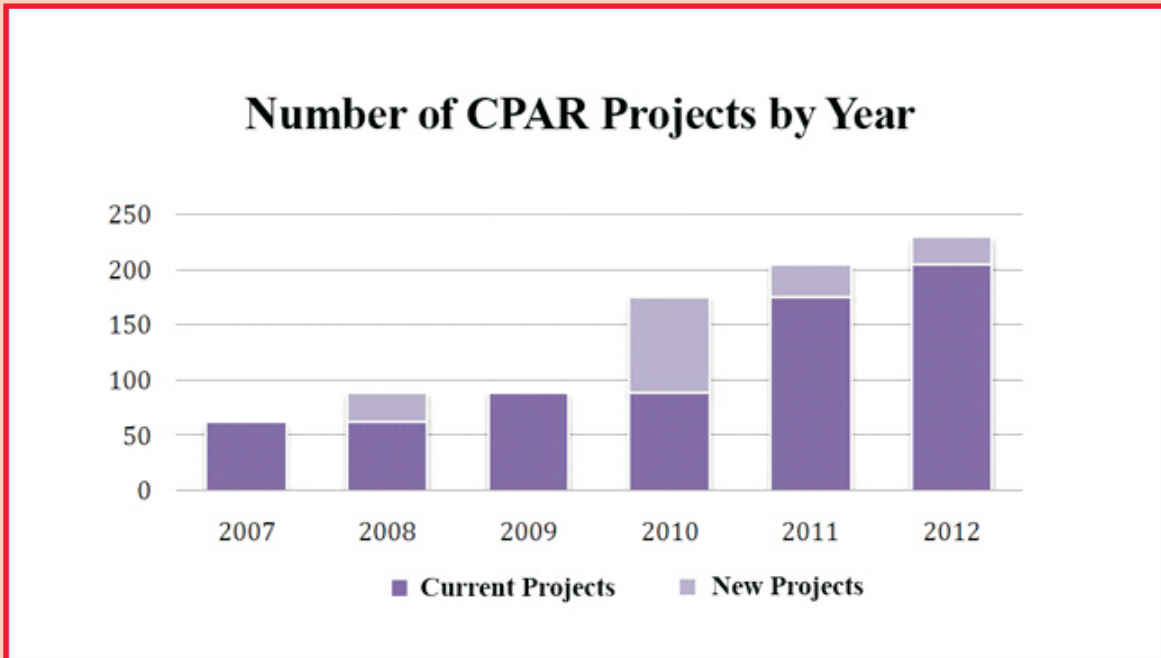
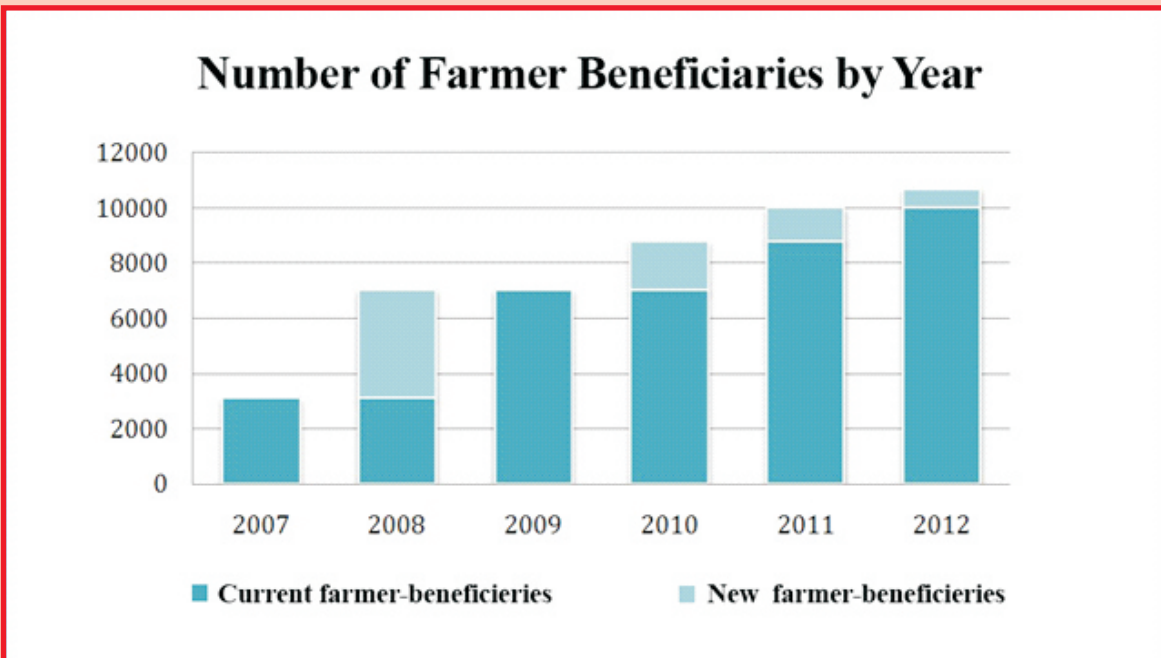


Figure 2. CPAR Farmer Beneficiaries from 2007 to 2012





Success stories:

Over time, CPAR has remained true to its mission. It has kept to its task of honing the practices of our farmers and fisherfolk to maximize profitability in their products and help improve their circumstances.

Projects throughout the country focus on the farmer/fisherfolk beneficiaries particularly on their production needs. Technologies introduced through R&D initiatives distributed among beneficiaries and adopters allow the local establishment of the farming systems approach. Production techniques of crops, livestock, and fisheries products are improved and sustainable livelihood is promoted.



agriculture



fisheries



C R O P S

1. Banana-based Farming System in Bansud, Mindoro Oriental MIMAROPA, Luzon

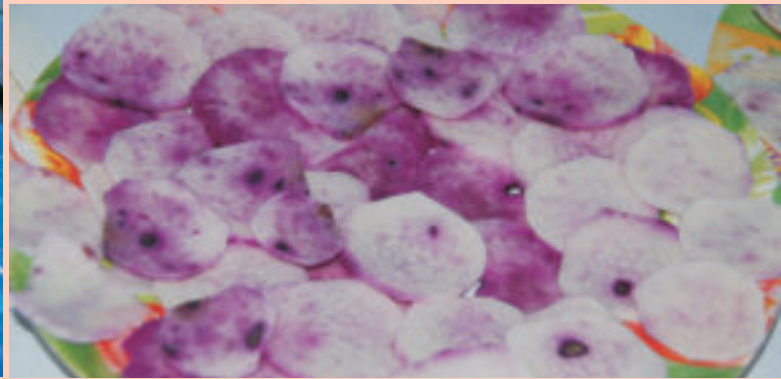
Implementing agency: DA-MIMAROPA

Technology packaging of rice, *Saba* variety and corn were introduced to the banana farmers of Bansud, Mindoro Oriental. In a little over two years of implementation, they experienced a 43 percent increase in banana production. Beginning with 4.28 tons/ha with income at Php 23,234.62/ha, the project was able to achieve a 67 percent increase with 12.90 tons/ha with income at Php 54,213.60/ha. An additional 40 farmers were encouraged to adopt the technology after seeing the results in their community. Notably, the cooperators' land areas expanded after project implementation.

2. Animal Integration and Crop Diversification for Coconut Farmers in Zamboanga, Mindanao

Implementing agency: DA-ZAMPIARC

ZAMPIARC increased the profitability of coconut farming by introducing animal integration and crop diversification in coconut-producing areas of the region. The animal and crop integration in coconut farming increased the copra yield by 31 percent (on a per kg/ha of copra basis) while the addition of livestock growing in the coconut farm increased farmers' income to Php 47,027/ha/yr. Value-adding was also a positive factor in raising farmers' income with their production of jams, vinegar, virgin coconut oil, and sugar from coconut.



C R O P S

3. Intensifying Ubi Production, Bohol, Visayas

Implementing agencies: DA-RFU7, CVSCAFT, and Bohol Ubi Convergence Group

Worth noting is the significant increase in the production of *ubi*, or purple yam. Due to increasing demand for *ubi* as a main ingredient in flavoring, as well as in processed *ubi* products, the supply of *ubi* needs to expand. The CPAR project on *ubi* proved to be a runaway success as expansion was not only achieved but this paved the way for the *ubi* effort to eventually graduate to an Agribusiness Development Project geared towards value-adding. The number of *ubi* producers also increased as more farmers, encouraged by the evident increase in household incomes, planted *ubi*. Project success is indicated by the increase in number of those producing *ubi*—from seven cooperators, an additional 17 were adopters of *ubi* production technology.

4. Increasing Rice Profitability in Biliran Island

Implementing agencies: LGU of Biliran (PLGU) and DA- EVIARC

Boosting rice profitability through hybrid rice production is one sure remedy in the relentless battle against poverty. Prior to the implementation of the project, rice harvest ranged from 70 to 90 cavans/ha/cropping only. Three years into the project, farmers are now able to collect between 120 and 140 cavans/ha/cropping—an average 42 percent increase. Encouraged with the excellent results, a 74 percent increase in the number of cooperators and adopters ensued.



5. Growing Goat Production in Zambales, Luzon

Implementing agencies: DA-CLIARC and DA-CLIARC-ROS Hillyhand

In order to increase goat production to meet the demands of the growing market, farmer cooperators who were trained under the CPAR project adopted new technology brought in by BAR. Among the many adjustments made by the cooperators, the focus was those on improving the health of goats (deworming, improved feed) and modifying the environment (proper housing, planting shrubs and trees). Cooperators encouraged other members of the community to adopt the innovations introduced by the project and this led to the raising of more goats with the CPAR technology and a 69 percent increase in goat sales.

6. CPAR on Hog Fattening in San Isidro, Davao, Mindanao

Implementing agency: DA-RFU 11, SMIARC

There was significant increase in the raising of live hogs and selling of pork in the market by the farmer cooperators of the CPAR project engaged in hog fattening. After training on hog health and surroundings, they were able to increase their profit as their livestock grew healthier and bigger come weighing time. Apart from raising breeding hogs, the cooperators can now supply pork in their respective local markets which makes for secure and hefty returns for the hog farmers. The project showed that with cooperation and, teamwork among the cooperators, a more profitable yet less input-requiring way of earning income can be had.



7. Processing of Dairy Cow Feeds in Davao, Mindanao

Implementing agencies: DA-SMIARC and Tacunan Dairy Farmers Cooperative (TADAFCO)

A project for increasing carabao milk production was developed to assist carabao farmers in Davao City, specifically by providing them with the knowledge and skills needed in producing feeds that are suited to a lactating herd. The feeds contain raw materials that can easily be found in farms or the locality that would not entail undue expense for the farmer such as fish meal, soya powder, salt, corn bran, and copra meal. An increase in average production from 90 l/month of milk to almost 700–800 l/month of milk was realized by those utilizing the feeds recommended by CPAR.



8. Boosting Tilapia Raising in Lamut, Ifugao, Luzon

Implementing agency: PAENRO-Ifugao

Outdated farming practices in raising tilapia were corrected after the CPAR was launched in Lamut, Ifugao to increase tilapia production. Proper stocking of fingerlings and feeding as well as sustainable aquaculture technologies and postharvest technologies and even value-adding were incorporated into the program. To date, partners continue to utilize and benefit from the technologies shared through the CPAR project. Fishponds and once stagnant waters are now swarming with tilapia and are contributing to the profits of the farmer cooperators, adding to the daily income of their respective families.



9. CPAR on Crab Production Technology in Balanga, Bataan, Luzon

Implementing agency: RFRDC III, DA-BFAR 3

Results show that the CPAR project on catching *alimasag* or blue crabs increased the fisherfolk's profitability in selling live crabs and crab meat. Without an elaborate and expensive technique used to catch the crabs and nothing but a simple gill net, the cooperators have been enabled to maximize their profits with very minimal capital. From the average catch of 3–4 kg of crabs per day, the fishermen are now able to capture at least 10 kg of crabs/day because of the CPAR initiative. The beneficiaries include up to 60 fisherfolk.

10. Tilapia Pond-based Hatchery in Dinagat Island, Mindanao

Implementing agency: DA-BFAR 13, CFRDC

Aside from harvesting tilapia from the sea surrounding their island, the fisherfolk are now able to invest in grow-out pens in their own land where tilapia-growing is more predictable and safer from perilous weather. In the CPAR initiative, farmer beneficiaries received fingerlings for their own pens and were enabled to produce marketable tilapia. To date, beneficiaries are reaping profits in terms of both abundant harvest and much improved earnings.

BANNER Programs

NTCP: Enhancing value of agri produce through viable technologies

For the ordinary farmer, tilling one's land is a dream but his sight should not end there. Farming is a way of life and production of farm produce is important. However, putting more value to the farmer's harvest is the way towards improved livelihood and increased farm productivity and the means are being developed through dedicated researches throughout the country. This makes the bureau's NTCP an integral program of DA, not just of BAR.

In operation, NTCP complements CPAR. The CPAR program serves as the entry point for the NTCP in terms of on-farm technology demonstration and assessment of suitable and viable technologies for the agriculture and fisheries communities.

The NTCP highlights the utilization of R&D breakthroughs and mature technologies that are deemed ready for adoption and commercialization. These appropriate technologies aim to improve and develop agriculture and fisheries-related industries for the benefit of all stakeholders in agriculture. The program ensures the proper transfer of mature technologies for adoption and utilization by target farmers and fisherfolk, thereby, increasing the contribution of R&D to productivity and profitability of producers through transformation of agriculture and fisheries.

In 2012, a total of 77 new projects were funded (Table 1 and Figure 3). While this is a bit less, compared to the 88 new projects in 2011, this still reflects the determination of the government to intensify and strengthen technology-driven initiatives in the country. This is more evident in comparison, for 2010 and 2009, when we only had



13 and 47 projects, respectively (Figure 4). Along with 31 on-going projects, BAR, through its Technology Commercialization Division (TCD), managed 108 projects in 2012.

Also in 2012, BAR strengthened its public-private partnership which is manifested in its supported projects. Projects included interventions on Arabica coffee, sweet sorghum, soybean, rubber, cacao, among others.

Over the years, TCD has worked in partnership with BAR's other divisions and units and externally, it coordinates with other DA agencies, units, and research centers as well as with other government agencies, SUCs, LGUs, NGOs, private sector, and a number of international research organizations. This partnership approach is demonstrated in many ways including consultations, monitoring and evaluation, and implementation of projects funded (Figure 5 and Table 2).

BAR, through TCD, continuously supports and provides technical assistance in the planning, finalization and implementation of the various activities of different commodity/industry-focused roadmaps developed by the DA and the subsequent funding of projects under these priority areas (Table 3).



BANNER Programs

Table 1. NTCP projects by fund source

Fund Source	No. of projects
Rice Agri-Pinoy Program	1
Corn Agri-Pinoy Program	1
HVCDP	34
National Organic Agriculture Program	4
AFMA	37
TOTAL	77

Figure 3. NTCP Projects by fund source

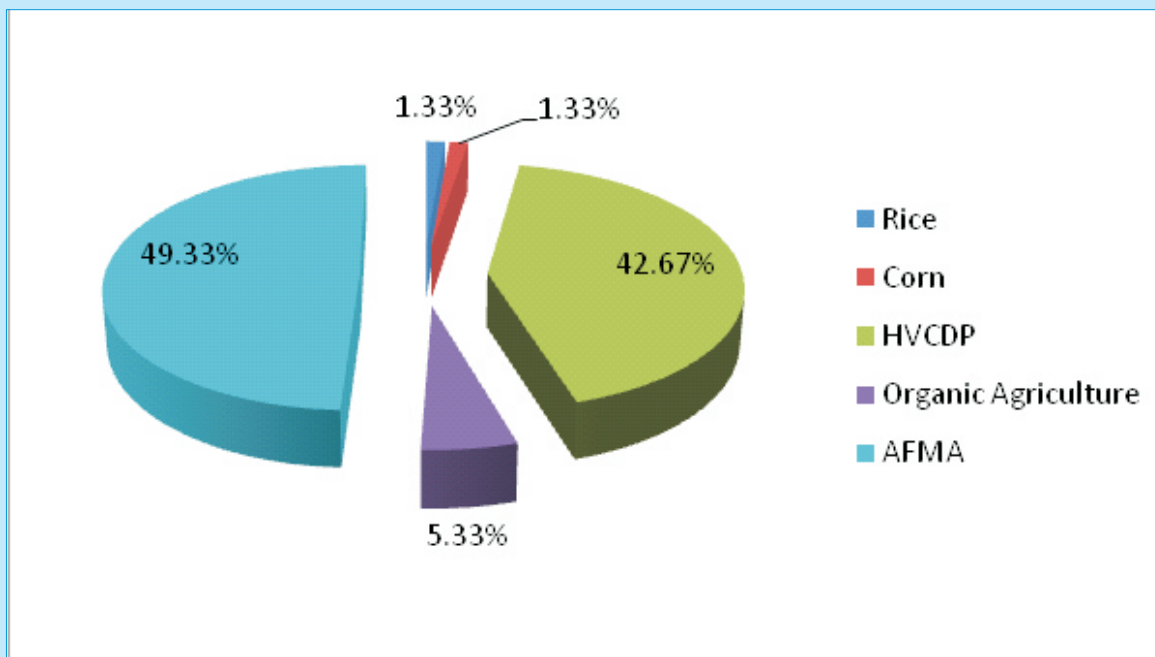


Figure 4. NTCP projects from 2009 to 2012

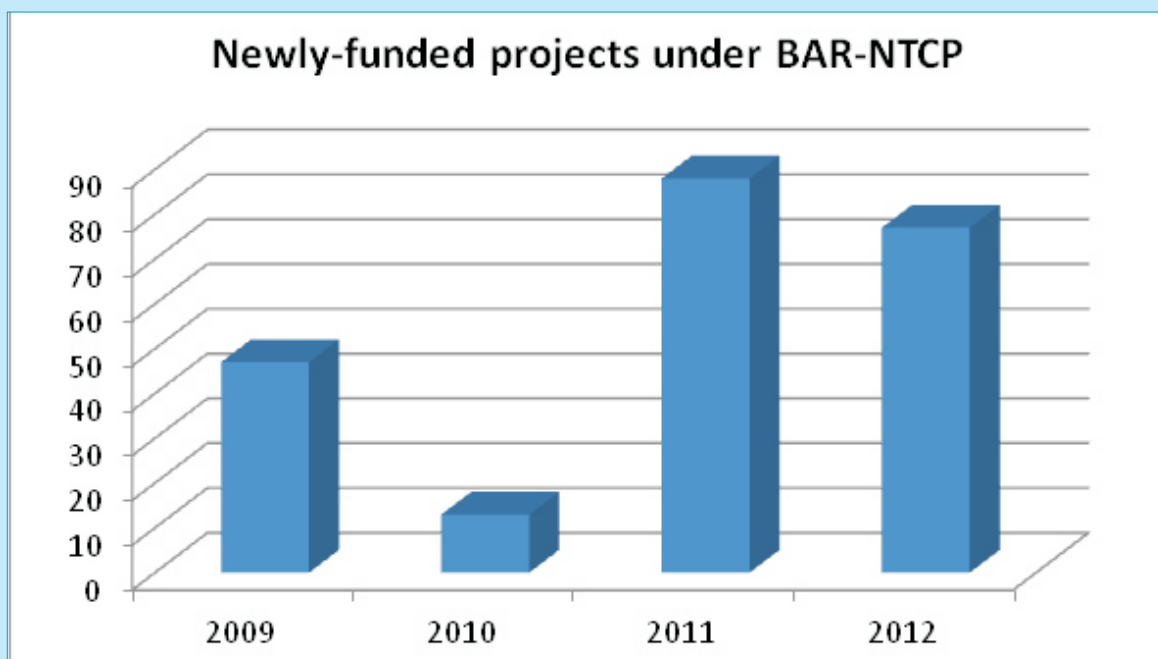


Table 2. AFMA-funded NTCP projects by program

Program	No. of projects
Crops	20
Livestock	6
Fisheries	7
Biofuels	3
Agroforestry	1

BANNER Programs

Figure 5. AFMA-funded NTCP projects by program

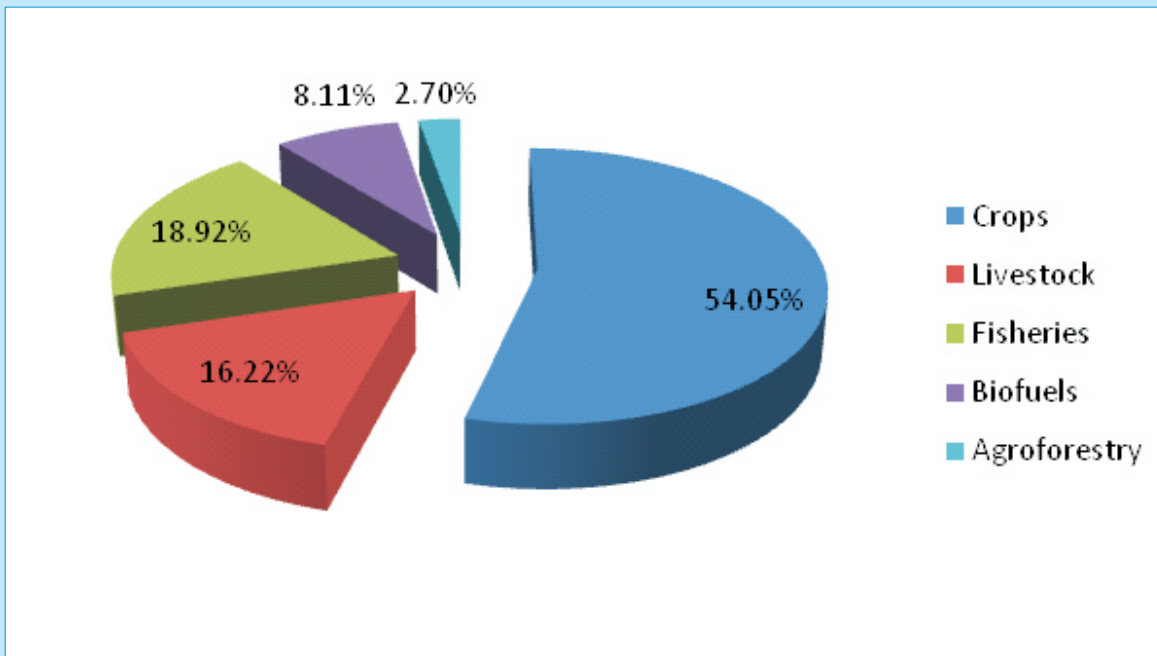


Table 3. HVCDP-funded NTCP projects by program

Program	No. of projects
Soybean	19
Apiculture	2
Peanut	1
MLAT	7
Continuing	5
TOTAL	34



Success stories:

Since its implementation in 2005, NTCP has generated technologies that created impacts both in the agriculture and fisheries sectors. By working in close collaboration with SUCs, LGUs and public and private R&D institutions, the program is able to reach its intended beneficiaries.

One of the aims of NTCP is to provide business opportunities and encourage farmers to go into agribusiness ventures by adopting the modern production and processing technologies. Through this, NTCP also hopes to expand markets for agriculture and fisheries products.



production



product development

sweet sorghum

1. Commercial-scale sweet sorghum plantation and bioethanol processing in collaboration with San Carlos Bioenergy and local government units of Northern Negros

Implementing Agency: UPLB-FI

After the successful conduct of sweet sorghum trials in Negros Occidental, the commercial level production of sweet sorghum is now a reality and, with the entry of industrial partners, the country was able to produce its first ever anhydrous ethanol from sweet sorghum. A sugarcane-producing region, Negros Occidental opened its doors to commercial scale production of sweet sorghum, devoting an area of 30 hectares in Sagay City, Negros Occidental to the crop.

The project introduced a harvesting system that is based on sugarcane practices and complements sugarcane harvesting in order to make sweet sorghum easily adoptable to the farmers. Convinced with the promising future of sweet sorghum, the Local Government Unit of Sagay and some sugarcane growers have ventured into planting of sweet sorghum. Sweet sorghum requires less input (fertilizer, water, etc.) and provides three croppings compared to one cropping for sugarcane, as it takes 11 months for



the sugarcane plant to reach sufficient maturity for harvesting, resulting to a faster rate of return.

After harvesting about 480 tons of sweet sorghum cane, OPTION Muscovado Plant Cooperative (MPC) facilitated the milling to produce sweet sorghum syrup. The syrup was sent to San Carlos Bioenergy Inc. (SCBI) which was able to produce 14,231 liters of bioethanol.



beekeeping

2. Commercialization of Beekeeping Technologies: Product Processing and Bee Production in Select Communities in Luzon

Implementing Agency: UPLB-FI



Not only does the presence of bees aid in the pollination of crops which results to increased yield, but their honey and brood can contribute to the dietary needs of people. In terms of livelihood, beekeeping is sure to provide stable income because of its good product niche in the market. Many communities consume honey and combs as food supplements. Honey and propolis are also widely used in creating cosmetic products of well-known brands.

Honey cider is popularly sold as home remedy for various sicknesses while the bee venom is procured by many pharmaceutical and medicinal companies all over the world because of its anti-rheumatic properties.

The project aims to maximize the utilization of other bee products aside from honey, like propolis, beeswax, and pollen. Management of native bee culture is also among other objectives of the collaboration in order to strengthen the use of the species, rather than introduced species, in commercial production. Value-added bee products include candles, varnishes, ointments, liqueurs, and even medicine.

edible landscaping

3. Technology Promotion and Commercialization of Edible Landscaping

Implementing Agency: UPLB-FI

Edible landscaping is the term coined to define the use of vegetables and fruits, including herbs and medicinal plants, instead of the usual ornamental plants seen in typical garden shows and settings, in landscaping applications.

It is considered very useful and practical in terms of its dual use as the utilization of inputs such as space and water, is rationalized and the need for synthetically prepared commercial fertilizers is minimized.

Edible landscaping is now gaining popularity among farmers, hobbyists, students, local government units, government employees, and other individuals. The simple and practical technology is now encouraging them to put up their own edible landscaped garden.



oregano

4. Development of Special product Lines from Philippine Oregano

Implementing Agency: DA-QAES

Beneficiary: Green Rescue Organic Association, Inc.



More than its medicinal uses, oregano is now being popularized and commercialized as wine, juice for human, juice for poultry, tea, vinegar, capsules and soap by the Green Rescue Organic Association, Inc. (GRO), an organization composed mainly of rural-based women from Tiaong and Candelaria, Quezon. In addition to oregano, the group also sells other herb-based nutraceutical products with some products reaching as far as Europe, Canada and the Middle East.

For a 1,000 sq. meter area, the farmer can realize as much as P15,000 income over a period of one year, from the sale of oregano leaves at P10/kg. This is with the assumption that he has good weather conditions all throughout the growing period. The association hires unemployed women from the community, farmers and students (on a part-time basis) to provide additional income for them.

sapinit

5. Sapinit (*Rubus rosifolius*) Production and Utilization Project

Implementing Agency: DA-QAES

Beneficiary: Rural Improvement Club of Bangkong Kahoy



After seeing the potential of sapinit or wild raspberry, an underutilized crop discovered thriving and growing in the wild in Bangkong Kahoy Valley on Mount Banahaw, the 19 members of the Rural Improvement Club of Bangkong Kahoy reaped a successful harvest in the ninth month of project implementation.

Using the developed POT, the fruiting period of sapinit can be extended from three months to six months. Depending on the level of organic fertilizer applied, yield may increase to 1,000 kilos to 6,000 kilos per hectare, compared to the conventional method that yields only 800 kilos per hectare.

For the fruiting season (November - March), an estimated gross income of Php120,000 can be earned from the established 1,300 sq. meter sapinit area. Three products were developed from the berries — jam, juice and wine.

mushroom

6. Product Development and Commercialization of Lowland Mushroom for Village Level Production

Implementing Agency: DA-CLIARC

An edible fungi characterized by its nature to grow and obtain food from decomposing organic matter, mushrooms are rich in vitamins and minerals that are beneficial to human health.

If local production of mushrooms will be optimized, the need to import mushroom will not be an issue anymore. More mushroom producers and processors would mean an additional income opportunity for farmers and a more affordable and sufficient supply of mushrooms for local consumers.

Some of the mushroom product technologies that have been developed and can become part of our healthy diet are mushroom fresh noodles, fried noodles, pasta, cookies, crackers, jam, marmalade, pulvoron, barquillos, wine, juice, banana-mushroom muffin, pickled mushroom, and adobo mushroom.



soybean

7. Organic Soybean Production Development Program in Region-2/CAR cluster

Implementing Agency: DA-RFU II

Beneficiary: Tubongan Women's Association

In 2012, a total of 1,685 hectares were planted to soybean, producing 99,808.5 kilograms and 61,955.3 kilograms of seeds for distribution to farmers.

One of the major partners in the project is the Tubongan Women's Association, which has 27 members in Tubongan, Kayapa, Nueva Vizcaya. Because of the members' active involvement in organic soybean production and processing, it was provided by the DA with additional assistance such as sprayers and irrigation services.

In 2012, a notable partnership among the departments of agriculture, education, social work and health and the local government units implemented an actual soybean feeding program to about 600 pupils in kindergarten and daycare.

The soybean program has gone far in reaching its goals. This can be seen in the growing interest and commitment of the private sector/stakeholders in the food and feed business aspect of soybean which has led to the establishment of a local public-private partnership.

8. Processed Soybeans Product Lines Development in Bayombong Nueva Vizcaya

Implementing Agency: Makabagong Gabay sa Kalusugan (MGSK) Health Products Company

With a minimal capital of Php 5,000, MGSK works on soybean processing, producing taho, tokwa (tofu), soymilk, soy sauce, soy coffee, polvoron, and vegetable noodles. It started producing just three kilos of soybean products a day but MGSK now processes 530 kilos in a day.

Through dedication and sustained faith, products of MGSK have gained social acceptance. These include vegetable noodles and vegetable kropeck in nine variants—*malunggay*, *ampalaya*, squash, soybeans, carrot, pechay, *saluyot*, spinach, and *yacon*.

The beneficiaries have noted improvements in their lives. With increases in their income, they are now able to sustain the needs of their families, send their children to school, and purchase appliances, among others.



Queen pineapple

9. Enhancing Competitiveness of the Queen Pineapple in the Bicol Region

Implementing Agency: DA-RFU V-BIARC

Beneficiary: Labo Market Vendors Multi-Purpose Service Cooperative Inc.

Established in 33 hectares pineapple farms in grow-out farm and by-product utilization, the project involves fruit processing, fiber production, pineapple cloth and other novelties

Started as *Paluwagan* in 1987, the cooperative was renamed Labo Market Vendors Multi-Purpose Service Cooperative Inc. with a lending capital of just Php 5,000.00.

From an initial 15 incorporators composed of market vendors and farmers who sell their produce during market days in the Labo Public Market, the cooperative now has 6,912 (regular

and associate) members in its three Branches located in the Municipality of Labo, Jose Panganiban and Capalonga.

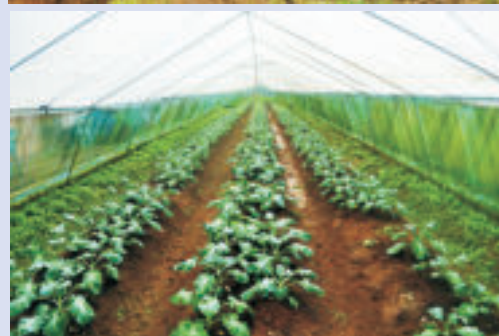
At present, the cooperative is focused on pineapple production and product utilization and development (pineapple juice, dried pineapple, handwoven piña cloth, handmade paper, and decorticated pineapple fiber). It also includes virgin coconut oil production among its Agribusiness projects. These livelihood projects have resulted to employment generation, and the products have started penetrating local and international markets.



Other R&D Programs

R&D plays a crucial role in bringing about innovation and improved productivity in the agriculture sector. For 2012, BAR further strengthened its R&D programs as well as the R&D components of the DA's priority programs and commodities.

Organic Agriculture



OA RDE Agenda and Programs 2012-2016 as embodied in the NOAP. It also became a venue for the crafting of strategies to fill the identified gaps in RDE activities. Subsequently, a two-day roundtable consultation meeting was held for the “Refinement of Organic Agriculture Agenda and Action Plan and Validation of Available Technologies, Tools and Practices on Organic Agriculture” held on 28-29 November 2012 at BAR.

In pursuit of the NOAP R&D thrusts and priorities, BAR approved and facilitated the funding of 25 new and 12 on-going

applied researches in different commodity categories crops, livestock, poultry, and fisheries.

Venturing into organic agriculture encourages the adoption of safe and sustainable ways of producing food. The enactment of the Organic Agriculture Act of 2010, otherwise known as RA 10068, led to the establishment of the National Organic Agriculture Program (NOAP) that aims to promote organic farming practices in the country.

Tasked to lead the RDE component of NOAP, BAR has the responsibility of coordinating among key government agencies and private institutions on the implementation of unified and integrated RDE plans and programs on organic agriculture. In view of this, the bureau organized a “National Review and Assessment of Organic Agriculture RDE Projects and Programs” on 24-26 October 2012 in Clark, Pampanga. Members from the NOAB, focal persons of regional clusters, and a pool of experts from BAR convened to review and assess BAR-funded organic agriculture projects in line with the

BAR actively participated in the “Organic Agriculture National Technical Working Group on Project Proposal Evaluation” in which selected proposals from LGUs, NGOs, SUCs and Farmers' Associations are assessed for possible funding under the NOAP. BAR also helped draft the guidelines for the “Organic Agriculture Local Government Unit Award 2013” that will give recognition to LGUs with outstanding contribution to organic agriculture.

Additionally, the bureau attended various organic agriculture-related activities such as the “Visayas Regional Awareness Seminar for Local Chief Executives on the Implementation of RA10068,” the “9th National Organic Agriculture Congress,” and the “National Organic Agriculture Program Year-end Assessment and Planning Workshop.”



Climate Change

Climate change continues to be a challenge for the agriculture and fisheries sector. BAR's Climate Change RDE Program is focused on short- and long-term adaptation and mitigation strategies for addressing the most pressing issues related to climate change. In this regard, BAR funded four climate change-related R&D projects that include the assessment of the effects of climate change on local dairy production, management of small-scale fisheries towards sustainability, and assessment of risks and vulnerabilities of selected areas in Quezon Province and selected coastal areas in the Philippines.

For 2012, the bureau monitored the implementation of 32 climate change-related BAR-funded projects carried out by different institutions nationwide which are mostly from SUCs. Out of the 32 projects, 19 went through a technical reviewed.

Aside from the bureau's attendance and participation in various international and local conferences, seminars, meetings and consultation workshops for mainstreaming climate change in the national consciousness, BAR collaborated with SEARCA for the Phase 2 of the "Capacity Building on Responding to Climate Change through Research and Development in Agriculture". The project aims to strengthen the capacities of BAR and its partners with knowledge, skills and tools for addressing issues and problems related to climate change.

In 2012 BAR facilitated the inventory of climate change adaptation innovations by consolidating and updating available tools, technologies and existing practices for climate change adaptation and mitigation that can help the farming and fishing communities in their respective endeavors. Likewise, the bureau continued to provide updates to the Climate Change Program Portfolio which contains pertinent and significant information on climate change for the benefit of various stakeholders. Other institutions including ACIAR, the South Australian Research and Development Institute, World Bank's Institutional Investments on Climate Change, and a civic society organization called *Aksyon Klima* have already benefitted from this facility.

BAR contributed technical writers for the DA-Adaptation and Mitigation Initiatives in Agriculture (AMIA) which seeks to mainstream and institutionalize climate change adaptation and mitigation measures in the fields of research and development, extension, and regulations. In view of AMIA, BAR planned a "National Climate Change R&D Review and Planning Workshop" that will involve various stakeholders and oversight agencies on climate change for the purpose of assessing accomplishments done so far and to set the directions for various climate change-related activities.

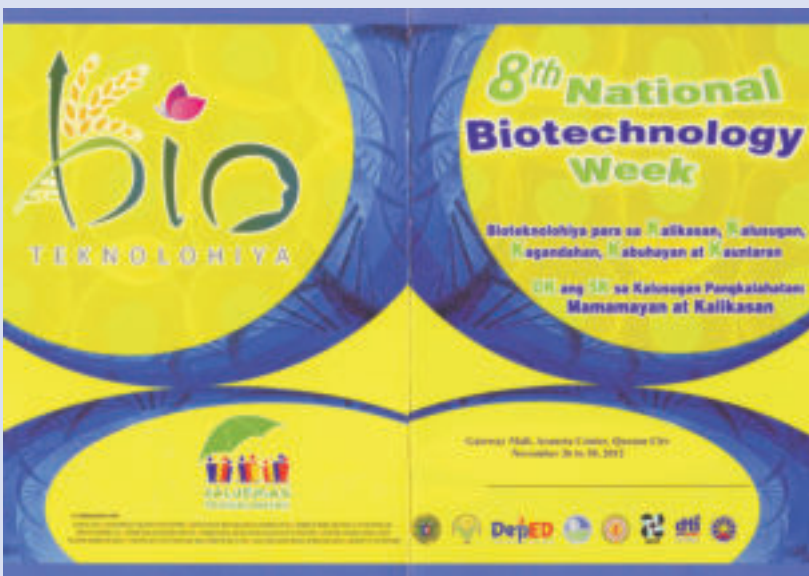


Biotechnology

Believing in its potential to address the current limitations in food production, biotechnology is perceived as a source of solutions for addressing food security and reducing poverty. It provides farmers with options for increasing production and improving their productivity in more efficient and effective ways.

In support to the Agriculture and Fisheries Biotechnology R&D Program, the bureau, through the DA-Biotechnology Program Implementation Unit, facilitated the funding of 51 new and on-going R&D projects under applied biotechnology research, regulatory research, capacity building, program administration and IEC/policy advocacy being implemented by different R&D institutions.

BAR also joined the different activities in celebration of the “2012 National Biotechnology Week.” On 8-10 November 2012, the bureau participated in an information seminar on agricultural biotechnology held in Iloilo City where experts in their respective fields talked on the different aspects of biotechnology that benefit crops, livestock and fisheries. BAR also attended a biotechnology overview seminar held in Quezon City which served as a knowledge-sharing venue for various stakeholders on the contributions of biotechnology to the improvement of the agriculture, health, and environmental sectors. Furthermore, it joined in the “Stakeholders Workshop on Biotechnology R&D Roadmap” held at Traders Hotel, Manila.



BAR also joined the different activities in celebration of the 2012 National Biotechnology Week.



Biofuels

Utilizing biofuels is a way to reduce the country's dependence on imported fossil fuels while considering the health of the people and the environment. As a proactive member agency of DA's National Biofuel Feedstock Program, BAR consistently supported projects that will enable the development of viable and quality feedstock through research and development.

In May 2012, another BAR milestone was achieved with the production of the first ever anhydrous bioethanol from sweet sorghum in the Philippines. An estimated 479 tons of sweet sorghum cane were used to produce 61.78 tons of sweet sorghum syrup, which was subsequently used in the production of 15,231 liters of bioethanol. This project was made possible through the collaboration of BAR, UPLBFI, SCBI, and OPTION MPC.

Another major activity carried out under the program was the "2nd Sweet Sorghum Business Summit," an offshoot activity of the 1st Business Summit held in Bacolod in 2011 to benefit researchers, private partners

and individuals interested in business matching opportunities. It was organized by BAR and UPLB on 30-31 August 2012 at the Pampanga Agricultural College (PAC).

BAR also took part in other biofuel-related activities such as the "1st Philippine International Bioenergy Conference" held in January, which drew together key industry players of the bioenergy sector to discuss relevant information as well as opportunities for the bioenergy market, the meeting of the DA Biofuels Feedstock Technical Working Group in May, and the BOI Biodiesel Workshop in June.

As of end 2012, there are 18 on-going projects under the program. Three new projects were funded for the technology utilization and promotion of handmade paper and vinegar from sweet sorghum, value-adding techniques for sweet sorghum syrup, and supplementary research for the large-scale production of quality sweet sorghum syrup.

With endorsement from the National Biofuels Board, BAR is now looking into the potential of palm oil as a new feedstock for biofuel.





Rainfed Agriculture

Rainfed agriculture relies on rainfall for water used in farming activities. Seeing its potential in increasing productivity in a sustainable manner, the Philippine Rainfed Agriculture Research, Development and Extension Program (PhiRARDEP) was created. With its launching in 2011, BAR pushed to further enhance the program's implementation. This was substantiated through trainings and workshops undertaken under the program's four components, namely: 1) rainfed farming systems innovation, 2) participatory watershed management, 3) strategic social science and policy research, and 4) capacity building, communication and social mobilization.

BAR and ICRISAT spearheaded a series of in-country training courses on strengthening rainfed agriculture research, development and extension in the Philippines. There were five batches of trainees from the provinces of Ifugao, Bohol, Ilocos Norte, Davao City, and Cagayan Valley with 228 participants from different R&D institutions. As a major output of the activity, 26 RDE proposals on rainfed agriculture were packaged.

Under the program, 29 DA-RIARC and SUC scientists and researchers participated in the "Scientists Exchange Visit to ICRISAT" to enhance their capabilities on rainfed agriculture R&D and climate change adaptability with support from BAR.

On 19-23 November 2012, the bureau led the conduct of the "Capacity Strengthening, Review and Planning Workshop for the Philippine Rainfed Agriculture Research, Development & Extension Program" to refine and update the program's framework and

action agenda. The activity was able to capacitate 20 researchers and project implementers from different partner R&D agencies on impact assessment and subjected six selected rainfed agriculture-related projects to a review.

In cooperation with DA-STIARC and SLSU, BAR also conducted an inception meeting for the piloting of the Bhoochetana concept in the country. This ICRISAT-led innovation on soil rejuvenation was recognized for its valuable contributions in increasing India's agricultural productivity. BAR, the DA-National Rice Program, HVCDP, and ICRISAT are now looking into the possibility of implementing a project that will introduce the Bhoochetana program in the Philippines.

As of 2012, BAR was handling 31 on-going rainfed agriculture-related projects, and 5 new projects that were approved for the year. Together with R&D initiatives on the development of mushroom, rainfed agriculture is planned to be included as one of the priorities under HVCDP.





Breadfruit

The country has a rich biodiversity yet some indigenous fruits and vegetables with promising future remain underutilized. With initiatives from the DA, through BAR, a carbohydrate- and energy-rich crop is being subjected to further research and development.

Breadfruit, more known locally as *rimas*, is endorsed as one of the alternative staples to rice under the HVCDP. Held at BAR in 2011, a consultation workshop was conducted for the crafting of the Rimas Development

Program/Roadmap. Activity outputs include benchmark database setting, R&D interventions identification, and action plans that would promote awareness and utilization of the crop.

This undertaking also resulted in the conduct of studies that would further explore the potentials of the said commodity. Among them are crop production and management; biodiversity research; and conservation, propagation and utilization. Hence, in 2012, BAR funded three *rimas* projects (Table 4).

Table 4. BAR-funded projects on rimas for 2012

	Project Title	Agency	Approved Duration
1	Determination of the Incidence Field and Postharvest Pests and Diseases of Rimas or Breadfruit and Documentation of its Crop Production and Management Practices Adopted by Farmers	USM	2 years
2	Rimas (Breadfruit) Biodiversity Research, Conservation, Propagation and Utilization in the Bicol Region	DA RFU – V (BIARC)	3 years
3	Survey, Characterization, Evaluation and Maintenance of Breadfruit from Nursery to Bearing Stage in Region XI	DA RFU – XI (SMIARC)	4 years



Indigenous Plants

The need to explore the untapped potentials of the country's indigenous plants led to the launching of the Indigenous Plants for Health and Wellness Program. Through the program, thriving indigenous plants in the Philippines are planned to be utilized, promoted and developed as food and/or sources of materials for the nutraceutical, pharmaceutical and cosmeceutical industries.

A project titled, “Processing Technology Development and Utilization for Organically-Grown Arius Fruits in Batanes”, was funded by BAR that will enable the development of technologies for the processing of organically-grown Arius fruits in Batanes. It also targets value-adding activities for product development and the marketing of Arius by-products such as wine, pastillas, tart, jams, preserved fruits, and teas. With its commercialization, the growing of Arius will generate income opportunities in the communities, as well as promote province-wide growing of Arius trees in Batanes. The project was initiated by Dr. Roger G. Baltazar of the Batanes State College (BaSCo).

Through the program, thriving indigenous plants in the Philippines are being utilized, promoted, and developed as various sources of food products and other purposes.



A project being implemented by DA-MIMAROPA with support from BAR is the “Identification and Collection of Indigenous Fruits in Palawan”. The project seeks to promote and conserve the diversity of indigenous tropical fruit species found in Palawan, as well as to further utilize them. Through the project, appropriate strategies and technologies that promote the conservation of the said fruits and maintain seed supply are being identified. Out of the 11 tropical fruits collected, seven have been characterized and seedlings are now being raised and maintained in a plant nursery in Western Philippines University located in Aborlan, Palawan.



Soybean

Known to be an excellent source of protein and edible oil, soybean is a leguminous crop grown for food and feed. Recognizing its valuable contribution to food security and human nutrition, the Philippine Soybean Roadmap for 2010-2014 titled, “Building Sustainable Soybean Industry in the Philippines”, was crafted to promote a community-based and sustainable soybean production in the country.

Tasked as the responsible agency to lead the R&D component of the soybean program, BAR has been organizing the conduct of activities and supporting numerous projects on soybean in coordination with its partner R&D implementing agencies to further improve the development of the country's soybean production.

For 2012, two trainings were conducted on soybean by-products, processing technologies and utilization including a Luzon-wide Training of Trainers which involved farmers and different stakeholders. Three farmers' field days were also conducted in Betinan Research Station located in Zamboanga del Sur and in the towns of Kayapa and Villaverde in Nueva Vizcaya. Three Festival and Investment Fora were held in Cagayan, Agusan del Norte, and Davao Oriental.

During the third quarter of the year, a soybean feeding program was launched in Villaverde, Nueva Vizcaya through the collaboration of DA, DepEd, DSWD, DoH, and the PLGU-Nueva Vizcaya. Six hundred participants composed mostly of school children and women were able to sample different food products developed out of soybean like *taho*, *soymilk*, *soy bola-bola*, *soybean siomai* and *soy lumpia*.

BAR also organized the “National Review of Soybean R&D Projects and Planning Workshop” held on 27-29 February 2012 wherein projects funded under the program were assessed and evaluated for further improvement.

In 2012, 1,685 hectares of land were planted to soybean. A total of 100,000 kg of soybean seeds were produced of which 62,000 kg were distributed to farmers.





Rubber

The National Rubber Development Program of DA is aimed at making the Philippines become the fourth biggest player in the global natural rubber industry by 2016 with increased rubber plantation and increased yield per hectare. Leading the RDE component of the program, BAR has been supporting and organizing different rubber-related RDE endeavors in the country.

Together with IRRDB, UPLB-IAF, and PAFERN, BAR spearheaded the “International Conference on Smallholder Rubber-based Agroforestry” held on 5-7 December 2012 in Bayleaf Intramuros Hotel in Manila. In the conference, 23 papers presented recent research and developments on rubber-based agroforestry systems in Southeast Asian countries. It brought together various stakeholders in the industry to facilitate knowledge sharing and discuss issues that will further improve the rubber industry. One hundred fifty rubber and rubber-based practitioners and experts from Malaysia, Vietnam, Thailand, India, Indonesia, Cambodia, and the Philippines participated in the event.

Considering that rubber is one of the promising agro-industrial crops in Southeast Asia, BAR has supported projects on performance trials of recommended rubber clones in the country as well as rubber production, technology adoption and commercialization, and processing technologies nationwide.

To date, there are 19 on-going BAR-funded projects on rubber implemented in cooperation with other research arms of the department and partners in the academe.





Adlai

The promising potentials of adlai as a complementary crop to rice and corn pave the way for its inclusion as one of the priority commodities under HVCDP. With the creation of the Adlai R&D Program, various initiatives have been undertaken that will push the development, promotion, and utilization of adlai as a crop that will complement major staples such as rice and corn. With the addition of three new adlai AYT sites in Regions 9, 11 and WMSU, the program is now being implemented in 14 sites nationwide.

In order to assess the implementation of the program in different regions of the country, BAR, in cooperation with HVCDP, organized a

“National Adlai Review and Planning Workshop” held on 29-31 May 2012 in Clark, Pampanga. It was attended by 75 participants composed of regional HVCDP coordinators, regional adlai AYT focal persons, TWG, and BAR staff. This resulted in the strengthening of the adlai roadmap, identifying the target seed production area and seed production of the old AYT sites (Table 5).

With the addition of three new adlai AYT sites in Regions 9, 11 and WMSU, the program is now being implemented in 14 sites nationwide.

Table 5. Seed Production Target (kg) and Production Area (ha) of Old AYT Sites

Seed Production Target	Year				Total
	2012	2013	2014	2015-2016	
Production Area (ha)	122	239	360	479	1,200
Seed Production (kg)					
• Seeds for planting	2,390	3,600	4,790	5,980	16,760
• Reserved seeds for promotion	2,390	3,600	4,790	5,980	16,760
• Seeds for product development	3,000	3,000	3,000	3,000	12,000
Total	7,780	10,200	12,580	14,960	45,520



Adlai

In a consultation meeting with the Adlai Technical Working Group held on 3 September 2012, BAR and HVCDP finalized the Adlai Roadmap 2012-2016. After the successful conduct of location-specific adaptability yield trials, old AYT sites in Regions 2, 4A, 5, 9, 10, and MASIPAG progressed to Phase 2 that would further develop and promote adlai projects including establishment of on-station seed systems for production, intensification of product development and promotion, and market development. New AYT sites in Regions 6, 7, 8, 12, 13 and ARMM were also established.

As of May 2012, 52.7 hectares were planted with adlai. A total of 43.6 tons of seeds were produced, of which 15 tons were distributed to 1,229 farmers. Several

adlai by-products have also been developed such as *sinukmani*, *chamorado*, *maja blanca*, *polvoron*, energy bar, and *adlai* drink from STIARC, *kutsinta* from QAES, *puto* from CMU, and *adlai* wine, sushi, and *suman sa lihiya* from NOMIARC, among others.

BAR and HVCDP will pursue the expansion of adlai on-farm trials in Regions 3, 4B, CAR, and various SUCs in anticipation that all regions will be planted with adlai. Further studies on pest and crop nutrient management strategies, as well as development of postharvest systems and mechanization facilities in cooperation with PhilMech, will be conducted.



BAR and HVCDP will pursue the expansion of adlai on-farm trials in Regions 3, 4B, CAR, and various SUCs in anticipation that all regions will be planted with adlai.



Apiculture

Beekeeping or apiculture, is one of the emerging industries in the country seen to have the ability to help address food security and provide income-generating opportunities. As one of the priority commodities under HVCDP, beekeeping R&D interventions were done to contribute to the development of this prospective industry.

BAR and HVCDP headed the conduct of two workshops for the crafting of the bee roadmap that aims to strengthen and further promote beekeeping in the Philippines. It was participated in by concerned government agencies, research institutions, academe, non-

government organizations, beekeepers, and other key players in the industry. The said roadmap will be developed in conjunction with the bee roadmap of the National Apiculture Research Training and Development Institute (NARTDI) which is based at Don Mariano Marcos Memorial State University (DMMMSU).

For 2012, six projects were funded under HVCDP (Table 6).

Plans to be undertaken next year include the standardization of various bee products and increasing the participation of SUCs and farmers' organizations on beekeeping-related activities.

Table 6. Bee-related R&D projects funded under HVCDP in 2012

	Project Title	Agency	Approved Duration
1	Apitherapy in Animals: I. Clinical Testing and Therapeutic Application of Formulated Bee Products as Anti Microbial and Wound Healing Enhancing Agent using Animal Models	UPLBFI	1 year
2	Genetic Variation in Natural Populations of <i>Trigona spp.</i> from Selected Areas in Mainland Luzon based on Mitochondrial DNA Analysis	IBS, UPLBFI	1 year
3	Production and Management of Multi-Bee Species for Livelihood and Pollination of HVCC	LGU - Batac	2 years
4	Packaging of Apiculture Food-based and Non food-based Products	DMMMSU	1 year
5	Integration of Beekeeping to Coconut Farming System	CSU-SM	15 months
6	Diversity of Native Species of Bees in Mt. Banahaw-San Cristobal Protected Landscape, Philippines	SLSU	2 years



R&D Priorities

*A*side from funding and supporting R&D initiatives that will bear significant research results that will generate improved production and increased income of farmers and fisherfolk, part of the continuing effort of BAR as the national coordinating body for agriculture and fisheries R&D, is the funding of basic and strategic research and supporting its research policy and advocacy. Also, implementation of R&D programs and projects would not be possible without investing in its human resource, facilities, ICT, and production IEC as support to BAR's programs.



BASIC, APPLIED, STRATEGIC RESEARCHES



For the past 25 years in the R&D arena, BAR has remained steadfast and committed to its mandate as the central coordinating agency for R & D in the Department of Agriculture. Conducting basic, applied, and strategic researches are the bureau's main responses to the national government's policy of attaining food security and sufficiency, leading to reduced poverty incidence, through the various means available for the agencies' disposal. These measures are being undertaken to benefit the present and future generations of Filipinos and the Filipino nation.



Basic Research

refers to study and research as pure science that is meant to increase scientific knowledge. This type of research is often purely theoretical with the intent of increasing one's understanding. It is also the investigation and analysis focused on acquiring a fuller understanding of a subject or phenomenon or on a specific practical application of the results.

Applied Research

refers to scientific study and research that seeks to solve practical problems. This kind of research is used in the search for solutions and in developing innovative technologies.

Strategic Research

is focused on comparing the results of potential innovations and promising technologies with farmers' and fisherfolk's practices.

The Policy Evaluation Section (PES) under the Planning and Project Development Division (PPDD) of BAR is primarily responsible for the screening, review and evaluation of national and regional research and development project proposals submitted by various R&D institutions and partner agencies within the NaRDSA network to the Bureau for technical and funding assistance. Basic and applied research proposals received by BAR include CPAR, PRA, and Biotechnology R&D proposals.

Research and development project proposals received by BAR are peer-reviewed and thoroughly evaluated by the bureau's in-house review committee composed of the technical advisory group and technical staff. The expertise of external evaluators a pool of experts commissioned by BAR is also engaged in the process.

Calls for project proposals resulted to the encouraging outcomes or submissions from DA bureaus and agencies, and from SUCs most of which cater to current major R&D programs including integrated farming system (CPAR), climate change

adaptation and mitigation strategies, rainfed farming systems and practices, improving productivity of the priority commodities (rice, corn, high value crops, fisheries, and livestock/poultry), organic agriculture, and indigenous plants.

Accomplishments in 2012 include the funding of 115 new projects under AFMA Regular Funds (basic, applied, CPAR, biotech, policy), Rice Program, Corn Program, HVCDP, and Organic Agriculture amounting to PhP 34.746 million. From the 115, 83 are on-going projects (Table 7).



Table 7. New and continuing projects funded in 2012

PAPs		CY 2012 Physical Accomplishments	
		New	On Going
AFMA Regular Funds	Basic	1	0
	Applied	14	8
	CPAR	11	4
	Biotech	19	32
	Policy	0	1
	Others	8	1
Biotech PL 480		1	3
Rice (ASA)		2	0
Corn		3	17
HVCDP	HVCDP 2012	32	5
	ASA (Benchmarking)	1	0
Organic Agriculture		25	12

The bulk of funding support for basic and applied R&D projects were approved and identified as within the priority research areas of their respective commodity and discipline at the national and regional levels.



POLICY RESEARCH and ANALYSIS

BAR, through its Policy and Planning Section, provides pertinent policy research and analysis in aid of legislation, particularly on agriculture and fisheries research and development.

In 2012, the section provided inputs to the office of Senator Francis N. Pangilinan, chair of the Senate Committee on Agriculture and Food, on the following subjects:

- 🔍 The investment levels and trends in agriculture and fisheries research
- 🔍 The organization and financing of agriculture research at the national level with specific focus on the national/regional allocation as per the annual General Appropriations Act.
- 🔍 Research Priorities of the Department of Agriculture



The bureau attended and served as a resource agency in the public hearings called by the Senate Committee on Environment and Natural Resources for Senate Bill Numbers (SBN) 267 and SBN 1120 principally authored by Senator Antonio Trillanes IV and Senator Manuel Villar, Jr., respectively, on the proposed creation of the “Philippine Bamboo and Rattan Center” (PBRC). Similarly, the agency also took part on the deliberation on SBN 640, “Act providing for a National Bamboo and Rattan Development Program harmonizing ecological balance, with industrial development and appropriating funds therefore”, sponsored by Sen. Ejercito-Estrada.

Comments and suggestions were also drafted particularly for House Bill 5292, “An Act to Spur Rural Development by Strengthening Philippine

Agriculture through a Balanced Farm, Food, Trade and Development Policies, and Appropriating Funds Thereof and For Other Purposes,” sponsored by Representatives Wilfrido Mark M. Enverga, Mark Llandro L. Mendoza and Lorenzo R. Tañada III.

In behalf of DA, BAR provided comments and insights on the Department of Foreign Affairs' requests for suggestions on: the International Atomic Energy Agency's Report, specifically on the implementation of General Conference resolutions on the development of the Sterile Insect Technique for control or eradication of malaria-transmitting mosquitoes; support to the African-Union's PAN African Tsetse and Trypanosomosis Eradication Campaign (AU-PATTEC); strengthening support to Member



States in food and agriculture; nuclear energy activities; nuclear knowledge management; and agency activities in the development of innovative nuclear technology. BAR submitted the requested comments and inputs directly to the DFA.

BAR re-drafted the proposed House Bill titled, “An Act Providing a Magna Carta for Scientists, Researchers, and other R&D Support Personnel in the Department of Agriculture”. Once completed and approved, the draft and proposed Bill was endorsed to the Office of the Secretary of Agriculture for consideration.

Albay Provincial Governor Joey Salceda sought the assistance of the bureau in evaluating a proposal on Disaster Risk Reduction and Climate Change Adaptation on Agriculture and Marine Fisheries in

Albay developed by the Governor's office. BAR submitted inputs covering the following sections as follows: 1) Vulnerability Assessment Risk Mapping, 2) Nursery Rehabilitation, 3) Coastal Rehabilitation and Risk Mitigation, 4) Education and Farm Demo on Diversified Multiple Cropping systems, and 5) Livestock and Poultry.

The House of Representatives' Committee on Food Security solicited the DA's inputs on proposed House Bill 4750, “An Act Promoting the Use of Urban Farming in the Country's Metropolitan Areas to Address Food Security Concerns and Regenerate Ecosystem Functions Appropriating Funds Therefore and for any Other Purposes”. The proposed legislation was referred to BAR by the Office of the Secretary.

HUMAN RESOURCE DEVELOPMENT



People remain the greatest asset of any organization. This is why BAR persists in looking for ways and avenues on how to continuously capacitate the staff of member institutions under the National Research and Development System for Agriculture and Fisheries (NaRDSAF). With its human resource development initiatives, BAR has been offering scholarship grants and non-degree assistance such as thesis/dissertation support, and sponsorship of attendance to training programs and conferences.



DA-BAR Degree Scholarship Program

This program gives financial support to Research and Development staff who want to pursue higher studies i.e., M.S or Ph. D degrees, in accredited universities.

In year 2012, seven applications from SUCs and a DA attached agency were approved (Table 8).



Table 8. Graduate Degree Scholarship Grantees in 2012

	NAME	AGENCY/INSTITUTION	COURSE/UNIVERSITY
1.	Nympha D. Sapan	Upi Agricultural School	MS Horticulture/USM
2.	Rozshien Agustin	USM	MM ABM/UPLB
3.	Mark Angelo Pagdato	USM	MS Plant Breeding/UPLB
4.	Daniel S. Gariño	CNSC	MS Biology/UPD
5.	Marychel Asther S. Rasco	CNSC	MS Statistics/UPD
6.	Adley Masnar	MSU, Marawi	MS CropProt/CLSU
7.	Efren R. Regpala	PhilMech	MS Food Science/CLSU

In collaboration with UPLB, BAR launched on June 5, 2012 the “DA-BAR Undergraduate Scholarship Program” for the undergraduate courses of agriculture and agricultural biotechnology. With an initial funding of PhP 5 M released to UPLB, the program was able to accommodate 12 students: 8 for BS Agriculture and 4 for BS Agricultural Biotechnology (see Table 9).

Table 9. Grantees of the DA-BAR Undergraduate Scholarship Program for 2012

	NAME	COURSE
1	Amorio, Dyanah Joy	BS Agriculture
2	Boten, Roy	BS Agriculture
3	De Venecia, Rejell Arjean	BS Agriculture
4	Jamilla, Glorianne Excelsis	BS Agriculture
5	Lizardo, Roden Carlo	BS Agriculture
6	Nadeem, Kiran	BS Agriculture
7	Paduit, Nerissa	BS Agriculture
8	Timple, Jillian	BS Agriculture
9	Jain, Llewelyn	BS Agricultural Biotechnology
10	Ora, Vicelle Joy	BS Agricultural Biotechnology
11	Panaga, Ian Jomari	BS Agricultural Biotechnology
12	Rivarez, Mark Paul	BS Agricultural Biotechnology

DA-BAR Non-Degree Program



The program aims to: 1) provide financial assistance to agriculture and fisheries researchers and scientists who need support to complete their thesis and dissertations; 2) provide assistance to participants in agriculture and fisheries-related seminars, workshops, and conferences held locally or internationally; and 3) give incentives to deserving researchers and scientists.

Thesis and dissertation assistance. Eleven requests from DA, LGU, and SUC R&D staff for grants were approved (see Table 10).

Table 10. Thesis/Dissertation Assistance Program, CY 2012

GRANTEES	AGENCY/ INSTITUTION	COURSE/SCHOOL	TITLE OF RESEARCH STUDY
Cherie C. Mangaoang	USM	MS Biology/USM	Phytoplankton of the North Buluan Lake
Virgilio D. Viernes, Jr.	CLSU	PhD Animal Science/CLSU	Gross Anatomy and Histology of the Uterine Tubes of Matured Philippine Water Buffalo (<i>Bubalus bubalis</i> Linn.)
Freddie Rick L. Ramos	PSU	MS Agricultural Engineering/ UPLB	Design, Development and Evaluation of a Stirling Engine, A Co-Generation System Involving Rice Hull and a Palay Dryer
Cedric Mantawil	LGU Kabacan	PhD Rural Development/USM	The Impact of Malitubog-Maridagao Irrigation Project (MMP) to the Quality of the Life of the Beneficiaries
Sunshine G. Paulin	LGU, Compostela Valley	MS Engineering/UseP	Soil Loss and Fertility Mapping of Selected Com Areas in Monkayo, Compostela Valley
Melba L. Raga-as	ASU	PhD in Forestry/UPLB	Evaluation of the Production Potentials of an Indigo-Based Forestry System in Banga, Aklan, Philippines
Judith R. Silapan	UP Cebu	PhD Marine Science/UP MSI	Supply, Settlement and Habitat Selection of Brachyuran (Crab) Megalopae
Ma Fe B. Cabullo	DA RFU IVA	MNSA/National Defense College of the Philippines	Safety, and Trade: An Assessment of the Veterinary Quarantine Services
Elma S. Mananes	DA RFU III	MS Extension Education/UPLB	Agricultural Innovation System in High and Low Income Class Municipalities in Nueva Ecija, Philippines
Lourdita A. Llanto	BU	PhD Animal Science/CLSU	Effectiveness of Artificial Insemination in the Bicol Region
Jeana S. Macalood	Initao National Comprehensive High School, Misamis Oriental	PhD Agronomy/ MSU-Naawan	Crude Latex from <i>Carica papaya</i> L. as Pesticide



International Training/Conference Support and Local Training Sponsorship

BAR sponsored the participation of researchers and technical staff to 133 foreign and two local travels including attendance to trainings, conferences, meetings, forums, and symposia. (Please refer to Appendix for the complete list)

Also under the program, the bureau sponsored five batches of trainees in the “PhiRARDEP In-Country Training Course on Strengthening Rainfed Agriculture, Development and Extension” and coordinated the “PhiRARDEP Scientist Exchange Visit,” a capability-building activity for DA and SUC scientists and researchers under the Rainfed Agriculture R&D and Climate Change Adaptability Facility, which were conducted in two batches in ICRISAT, Patancheru, India.



Productivity Enhancement

In 2012, IDD initiated the evaluation of three applicants for scientist rank under the DOST-SCS, namely: 1) Dr. Danilda H. Duran, senior agriculturist, PCC; 2) Dr. Peregrino G. Duran, supervising science research specialist, PCC; and 3) Dr. Alexander Joel Gibe, chief science research specialist, PhilMech. The evaluation will be finalized in 2013 by the DA-SCEC for possible endorsement to the DOST-SCC.

BAR, through IDD, coordinated and facilitated the applications for Gawad Saka Outstanding Agricultural Scientist (OAS) and Outstanding Agricultural Researcher (OAR). Twelve applications for OAS and seven applications for OAR were received and evaluated. The top two awardees, namely: Dr. Mudjekeewis D. Santos, a DOST-conferred Scientist I from NFRDI-BAR; and Mr. Raul R. Alifer, an entomology expert from PCA-Albay Research Center, were each given a citation award during the 24th National Research Symposium.



R&D FACILITIES DEVELOPMENT PROGRAM



In response to Agriculture Secretary Proceso J. Alcala's directive of increasing investments for the improvement of agriculture and fisheries institutional infrastructure and facilities, BAR intensified its program of providing grant funds for institutional development for NaRDSAF member institutions.

Institutional Development Grant



Covered by this grant scheme are the acquisition of laboratory, farm, IT/communication, and office equipment; rehabilitation, renovation and construction of research facilities; and other critical physical needs of an R&D center.



For year 2012, BAR approved 25 IDG projects benefitting various DA bureaus and RIARCs, and SUCs. Of the 25 IDG grantees, six R&D centers namely, DA-CVIARC, DA-STIARC, Central Luzon State University, Quirino State University, Nueva Vizcaya State University, and Caraga State University, were provided with funds for the establishment and improvement of their respective organic agriculture facilities (*Table 11*). The provided grants totaled to PhP 97,778,289.

Table 11. IDG Projects CY 2012

	RECIPIENT/AGENCY	PROJECT TITLE
1	BPI-DNCRDC	Institutional Development Support for the Perimeter Fencing of BPI-Davao Phase 2
2	DA-BIARC	Establishment of R & D and Technology Demonstration Center for Cacao
3	DA-CLIARC	Institutional Development Support for the Preparation of MDP
4	DA-CVIARC	Improvement of the Research and Development Building into Regional Integrated Agricultural Research Center
5	DA-EVIARC	Rehabilitation of R & D Grazing Paddocks Cut and Carry Areas and Forage Gemplasm/Plant Material Demo and Production
6	Sulu State College	Upgrading of Agricultural Equipment and Construction of Greenhouse
7	QSC	Integrated Solid Waste Management In Support to Organic Farming Program
8	DAF-ARMMIARC	Repair of DAF-ARMMIARC ROS for Marginal Areas Gemplasm Collection Conservation and Evaluation Center
9	SLSU	Establishment of Rubber Research Center in Eastern Visayas
10	MSU-Gen. Santos	Establishment of Agri-Service Diagnostic Laboratory for SOCCSKSARGEN Growth Area
11	MSU-Gen. Santos	Establishment of Fish Processing and Nutrition Analytical Laboratory at Gen. Santos
12	DA-CVIARC	Construction of the DA-CVIARC Integrated Agricultural Laboratory Phase IB and Finishing Works of Ground Floor Phases B4 & B5
13	NVSU	Upscaling the Regional Vermicomposting and Vermimeal Production Centers (RV2PC)
14	Caraga State University	Integrated Organically-Grown Crops and Livestock (A Techno Demo) and Establishment of Organic Agriculture Training Center
15	SLSU	Establishment of Abaca Disease Diagnostic Laboratory
16	DA-RFU IV-A LAES	Strengthening Capacity of Regional ROS-STIARC-LAES: Construction of Post Harvest Facility, Crop Protection Laboratory and Technology Commercialization Center Phase 1

Table 11. IDG Projects CY 2012 (...cont.)

	RECIPIENT/AGENCY	PROJECT TITLE
17	DA-RFU 5 Sorsogon Dairy Farm	Establishment of Technology Commercialization and Development Center in Cabid-An Sorsogon
18	SLSU-JGE Campus	Establishment of Food Processing Laboratory
19	DA-STIARC	Improvement of the STIARCs Vermicomposting Facility in Support to Organic Agriculture in CALABARZON
20	UPLBFI	Rehabilitation of the Annex Building and Upgrading of Laboratory Facilities of the Postharvest Horticulture Training and Research Center
21	CNSC	Strengthening R & D Capacity Phase I: Establishment of Seed System Facilities in CNSC
22	DA-CVIARC	Construction of the DA-CVIARC Integrated Agricultural Laboratory Phase IB and Finishing Works of Ground Floor Phases B6, B7 and B8
23	UPLBFI	Upgrading of Organic Vegetable Research Facilities
24	CLSU	Establishment of RM-CARES Organic Farming Training Center
25	DA-CEMIARC	Rehabilitation of DA-CEMIARC Facilities in Support to Research and Development

INFORMATION AND COMMUNICATIONS TECHNOLOGY



Through various platforms, information is effectively being disseminated. But these platforms need to continuously and constantly undergo updating and innovation in order to adopt the changing times. The challenge therefore is how to effectively channel this information to its intended end-users.

Information Systems, in general, are focused on processing information within the organization. The bureau's Information Management Unit (IMU) is at the forefront in managing the Information and Communications Technology (ICT) to improve its effectiveness and usefulness and ensure data integrity.

The IMU is one of the service-oriented units of the bureau that is specifically tasked to manage all ICT-related hardware infrastructures and software development endeavors. The hardware component includes the physical network, computers, laptops, printers, scanners and other peripheral devices. The software component is comprised of the bureau's operating systems, application software, information systems and electronic data management.

IMU extends its function to cover a wider scope of clientele that includes the DA family of agencies, and local and international scientific and research communities. To effectively carry out BAR's vital information services for its intended users, the bureau's website, which is a potent tool for information dissemination, is continuously updated and improved by the IMU. Figures for WebPages developed for 2012 on a per program basis showed that NTCP and CPAR topped the scorecard with 94 and 62 related WebPages produced, respectively. This is followed by HVCDP, 73; Climate Change, 50; Basic and Applied Researches, 49; Biofuel, 35; and Organic Agriculture, 27, among others.

In support to BAR operations, IMU provided technical support to users in terms of computer deployment, relocation of IT equipment and basic troubleshooting. Aside from the servers that are being maintained, IMU also maintains the workstations connected to the network. There are 134 workstations currently connected to the Local Area Network of BAR. With the influx of new BAR staff, IMU added 22 users to the Active Directory for them to have access to network resources. IMU also configured 30 internet and intranet access and activated 13 Microsoft Windows operating systems for effective and efficient performance of the users' desktops.



Through various platforms, information is effectively being disseminated.

In 2012, the IMU continued to maintain various systems that include 12 Agriculture and Fisheries R&D Support (List 1) and nine Administrative and Operations Support (List 2).

List 1

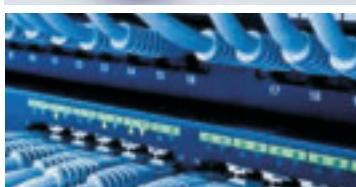
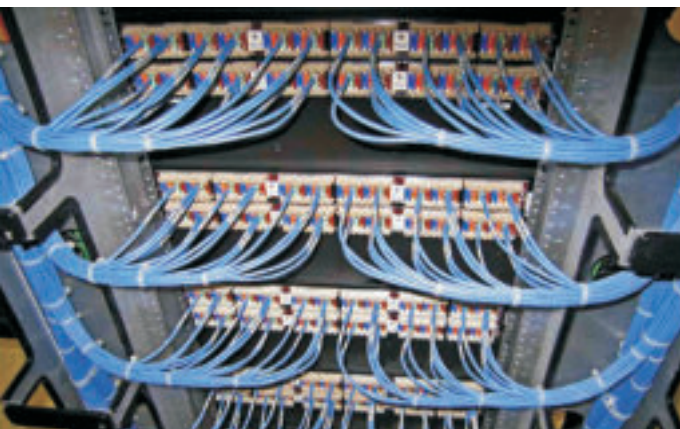
Information System, Agriculture and Fisheries R&D Support

1. PhilAgrinet System
2. Integrated Library System
3. Scholarship Evaluation & Monitoring System
4. E-Pinoy FARMS CPAR M&E System
5. Onion Production Resource Management System (OPREMS)
6. Infrastructure and Human Resource Monitoring Information System
7. Commodity Production Resource Management System (CPREMS)
8. Proposal & Projects Evaluation & Monitoring System
9. Document Tracking System
10. Budget Allocation and Monitoring System
11. Cashiering System
12. Accounting System

List 2

Information System, Administrative and Operations Support

1. Payroll System
2. Daily Time Recording System
3. Personnel Information System
4. Vehicle Dispatching and Trip Monitoring System
5. Supplies, Plant, Property and Equipment Monitoring System
6. Accounting System
7. Budget Allocation and Monitoring System*
8. Cashiering System
9. Document Tracking System



CABLING Network

Two significant web development accomplishments in 2012 were the migration from the current Internet Information Server (IIS) to the Joomla Platform and the redesigning of the website. The Joomla Platform is an open source content management system. The new system was launched during the 2012 National Technology Forum and Product Exhibition at the SM Mega Trade Hall.

The Unit also provided 258 GIS shape files upon the request of various institutions and coordinated the upgrading of three ICT projects, namely: 1) Technical Assistance for ICT Support of the Modernization of the Agriculture and Fisheries Sector, Phase I; 2) Upgrading and Capacity Building and Infrastructure Management; and 3) Asian Food & Agriculture Cooperation Initiative (AFACI).

Part of the AFACI Project mentioned is the Agricultural Technology Information Network in Asia (ATIN) wherein IMU participated as the official representative of the Philippines.

Other projects that were handled by IMU, in coordination with the Congressional Commission on Science and Technology and Engineering (COMSTE), include: 1) Farmer Empowerment and Social Enterprise Development: Institutionalizing a Decision Support System on Technology Transfer and Commercialization Initiatives Using Cloud Computing Phase I; 2) Increasing Agricultural Productivity through Sustainable Soil and Water Health Management: The Pilot Implementation of ICT-enabled Mobile Soil Clinics In Regions 2 and 10; 3) Establishing a Knowledge Management System to Institutionalize at the Central and Local Government Level a Monitoring and Evaluation System to Assess Program Implementation Activities; and 4) Conduct of Baseline Survey for Agriculture and Fisheries Market Information System.

Two significant web development in 2012 were the migration from the current IIS Format to Joomla and redesigning the BAR website.

The new website in **JOOMLA**



HOMEPAGE



NEWS&EVENTS



PHOTORELEASE



ABOUT US

KNOWLEDGE MANAGEMENT



Knowledge is a multi-disciplinary approach. It empowers the individual, organizations, communities and nations towards a brighter tomorrow. Through the years, effective knowledge management has led to the development of vibrant Communities of Practice leading to informed and well-thought decisions.

The Knowledge Management (KM) Program is one of the major strategic approaches of the bureau and is managed by its Applied Communications Division (ACD). The division is primarily responsible for gathering information, and packaging and disseminating R&D information and technologies through its regular and special publications and other multi-media means. The KM program of BAR encompasses

Knowledge Product and Knowledge Services and ACD carries the responsibilities of being knowledge managers within the organization's purview.

To make effective use of information gathered, the task of channeling this information into useful and effective knowledge has been the job of the division.

In 2012, ACD prepared, processed, packaged, published, and produced various publications intended, not only for the bureau's primary clientele, but likewise to individuals and organizations in need of valuable data or information within and outside the R&D network of the Agriculture and Fisheries sector. After all, knowledge is for everybody.



**KNOWLEDGE
is a multi-disciplinary
approach. It empowers
the individual,
organizations,
communities and
nations towards
a brighter tomorrow.**

Knowledge PRODUCTS

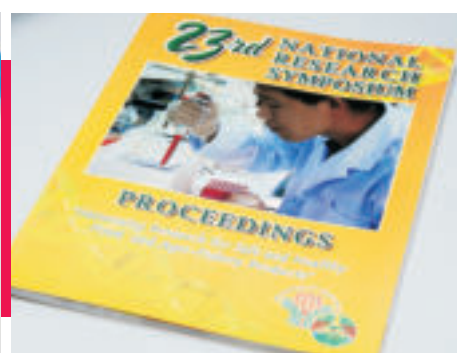
ACD produced 76,200 IEC materials in 2012 which served as reference materials to the bureau itself and the R&D community. The division also produced the 2011 BAR Annual Report (500 copies) and the 2011 NRS Proceedings (1,000 copies). ACD staff produced the 2012 NRS Posters and Souvenir Programs and distributed an estimated 2,500 copies of the 2013 BAR Technology Calendar.

It also responded to request including the production of the Paper Abstracts for the International Stakeholders' Rubber Conference (150 copies) held in Manila. ACD also drafted and prepared 68 speeches, messages, and talk points for BAR and DA officials.

Among the highlights of the Division's accomplishments in 2012 was the turnout of various knowledge products that include the following publications:

- BAR Chronicle (18,500 copies)**
- BAR Digest (2,000 copies)**
- 13 Technology Brochures on BAR's programs (32,500 copies)**
- CPAR Manual (85 copies)**
- BAR Info Kits (7,600 copies)**
- SPG-funded books (1,800 copies)**
- SPG info materials (350 copies)**
- Contributed articles to other publications (35 articles)**
- BAR advertisements (45 types)**

REGULAR PUBLICATIONS



Aside from the regular and in-house publications, ACD produced publications on rubber, namely: *Hevealogue: A Catalogue of Hevea germplasm in the Philippines*, and *Rubber Production and Management in the Philippines*. These publications were launched during the International Rubber Conference held in Manila in December 2012.

Additional books were packaged and launched. These were: *Control Guide for Common Pests of Sweet Sorghum* in collaboration with the Mariano Marcos State University (MMSU), and *Establishing a Coconut-based Processing Enterprise: A Practical Guide* with the Philippine Coconut Authority (PCA).

During the 24th National Research Symposium, BAR launched two kinds of publications: *CPAR Manual*, and the translated handbook, *Organikong Pamamaraan ng Pagtanim ng Gulay*, in Iloko, Bisaya, and Bikol which was published in coordination with UPLB.

Meanwhile, in celebration of the 50th anniversary celebration of South Korea's Rural Development Administration (RDA), ACD re-packaged, re-printed, distributed three publications: 1) *Mga Pamamaraan sa Organikong Gulayan* (Organic Vegetable Farming) with UPLB; 2) *Package of Technology of Different Vegetable Crops* with DA-RFU 4A; and 3) *Handbook on the Identification and Control of Pigeonpea Insect Pests and Diseases*, with MMSU. Publication was made possible through AFACI project which is being coordinated by IMU.

ACD produced backdrops, streamers, programs, plaques and certificates for 60 BAR-led and R&D-related events. The division also led the bureau's participation to nine exhibits (international and local) which highlighted its banner programs, services and activities, and success stories from its funded R&D projects.

SPECIAL PUBLICATIONS



Knowledge SERVICES

BAR intensified its service mandate by liaising with print and broadcast media. In 2012, ACD submitted 132 newspaper R&D press releases of which 53 articles were intended for news and events while 78 news photos were printed in major dailies (PhilStar, Manila Bulletin, Agri Magazine, Philippine Daily Inquirer, Business Mirror, Business World, Manila Times).

Regular article-contributions to publications like DA's Aggie Trends, Manila Bulletin's Agriculture Magazine, AgriLife Magazine, MARID Agribusiness Magazine, and Greenfields Magazine were also facilitated. As a gesture of support to media outfits, ACD likewise attended to their requests through the provision of briefing and info kits during media and press conferences.

The promotion of BAR funded projects and success stories were also executed through PTV 4's *Mag-Agri Tayo* television program. This partnership featured 84 BAR-funded projects including success stories of CPAR and NTCP projects and promoted 118 plugs for the promotion of major R&D activities in the said national TV program. In 2012, the new BAR Institutional Video was launched during the 8th Agriculture and Fisheries National Technology Commercialization Forum and Product Exhibition held on August 9-12 at the SM Megatrade Halls 1 and 2, SM Megamall in Mandaluyong City.

To strengthen service capability in the application, utilization, and effective and efficient information exchange among government agencies, private institutions, both local and international, and other partners of the bureau, the ACD facilitated the implementation of BAR's Scientific Publication Grant (SPG).

SPG is one of the services provided by BAR to cover the cost of publications including proceedings/symposia, journals, manuals, and books that can be availed of by members of NaRDSAF.

Among these included:

- **7 proposals funded for publication (books, journals, manuals, brochures, pamphlets, and briefing materials);**
- **19 proposals supported for the conduct of seminars, conferences, workshops in the form of sponsorships and advertisements (international and local);**
- **40 projects on knowledge management funded;**
- **34 success stories on CPAR and NTCP projects documented; and**
- **7 books launched with funding support from BAR through SPG**

PRESS RELEASE



TV COVERAGE

ACD facilitated and coordinated 32 R&D seminar series/trainings/workshops on topics relevant to the trends and directions of Philippine Agriculture plus a number of topics of international R&D interest.

Working closely with BAR's partner agencies, ACD coordinated various KM-related projects including the PhilAgriNet with UPLB; capacity development program in Knowledge Management with SEARCA; technology profiling, cultural management, and market studies of priority commodities with UPPAF/NCPAG; and documentation of R&D success stories with FARM Foundation.

CLIENT-ORIENTED SERVICES

Going beyond the task of coordinating, funding R&D initiatives, and ensuring that relevant results reach the intended users, BAR also sees to it that services are provided to its clients and stakeholder.

To do this, there is a need to strengthen and develop a system that will not only bring technologies closer to people but will also ensure that they are satisfied. This is particularly manifested in the three client-oriented services that the bureau continues to provide and to improve to suit the need of its intended beneficiaries.

The R&D Tech Com Center is a facility that showcases products and technologies from BAR-funded research which also serve as a one-stop-information shop on the latest R&D initiatives for walk-in visitors.

For information need, the bureau provides Scientific Literature Services using various retrieval platforms and easy access of information on scientific studies.

The bureau also provides IPR assistance to researchers who want their research results be protected and compensated as well as people from the business sector who want their enterprise to gain better edge and identity. IP services include application for patent, utility model, and trademark.

Tech Com Center



Scientific Lit Services



IPR Assistance



R&D Technology Commercialization Center



The showroom also serves as a venue for information and knowledge dissemination and exchange between the bureau and its guests.

Inaugurated on August 7, 2009, the R & D Technology Commercialization Center was built to showcase various products and technologies from projects supported by the Bureau of Agricultural Research under its National Technology Commercialization Program (NTCP) and Community Participatory Action Research (CPAR). The showroom also serves as a venue for information and knowledge dissemination and exchange between the bureau and its guests.

More than a hundred products are on display in the R & D Tech Com Center at any one time. The product displays in 2012 included chickpea flour, malunggay powder, soybean products such as noodles, coffee, spread and chips, pigeonpea noodles, and exfoliated vermiculite.

In year 2012, the Center received 647 visitors with 121 visitors in the first quarter, 189 in the second quarter, 208 in the third quarter, and 129 in the fourth quarter. The visitors were diverse and included staff and heads from the local government units, governors, congressmen, foreign government ministry heads, researchers from local and international institutions, students, farmers, and entrepreneurs. Their purposes in visiting the center varied but were mainly to conduct research, to update themselves on the latest technologies supported and generated by the bureau, and to look for potential products for agribusiness venture. The center's telephone line and business email were kept busy in 2012, receiving 524 phone-in and email inquiries, mostly about BAR's support to R&D projects.

R&D Technology Commercialization Center



Frequently asked questions were about the value-adding products and the commodity display in the showroom on soybean, adlai, fruit wines, sweet sorghum, moringa, sapinit and oregano. New information on agricultural practices particularly on organic farming, planting procedure, pesticide management and agri-commodity processing matters were also some of the visitor's inquiries. Funding matters were also asked by some individuals who were planning to submit their project proposals to BAR. Other guests were interested to know the people behind the technology promotion and product development activities.

IEC materials such as brochures, technology guides and information sheets were made available in the Tech Com Center as reference materials for the visitors on their individual concerns.

A Product Database was also developed in which basic information about the products on display, such as the product name, institutions involved in the technology utilization, promotion and value-adding, and their corresponding contact details, can be readily accessed.



Scientific Literature SERVICES



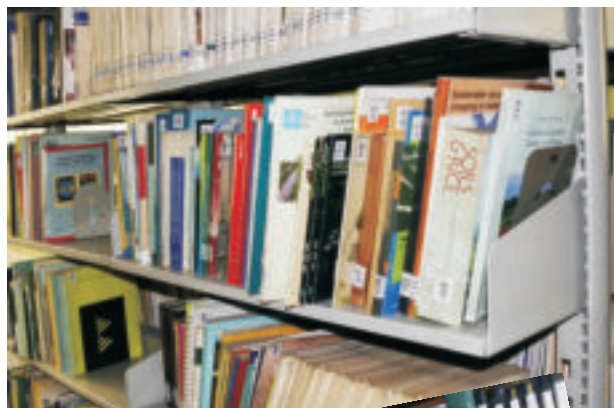
The Scientific Literature Services (SLS) is one of BAR's client-oriented services which was set up to develop a far more accessible and efficient library and information system. This service aimed at encouraging partners from regions, SUCs and other private partners in the field of R&D, as well as strengthening a wider utilization and application of different technologies.

The Philippine Agricultural and Information Network (PhilAgriNet) is the latest addition to BAR's Scientific Literature Services. It is a joint project of the University of the Philippines Los Baños (UPLB) and the Bureau of Agricultural Research (BAR) which aims to create a strong collaboration among public and private institutions in providing researchers with a more organized and accessible way of gathering research information in the internet, and a more efficient electronic database.

SLS was set up to develop a far more accessible and efficient library and information system.



Scientific Literature SERVICES



The guests who have visited and accessed the said network are mostly students, who are doing their thesis or dissertation work, farmers, researchers, and employees from public and private institutions.

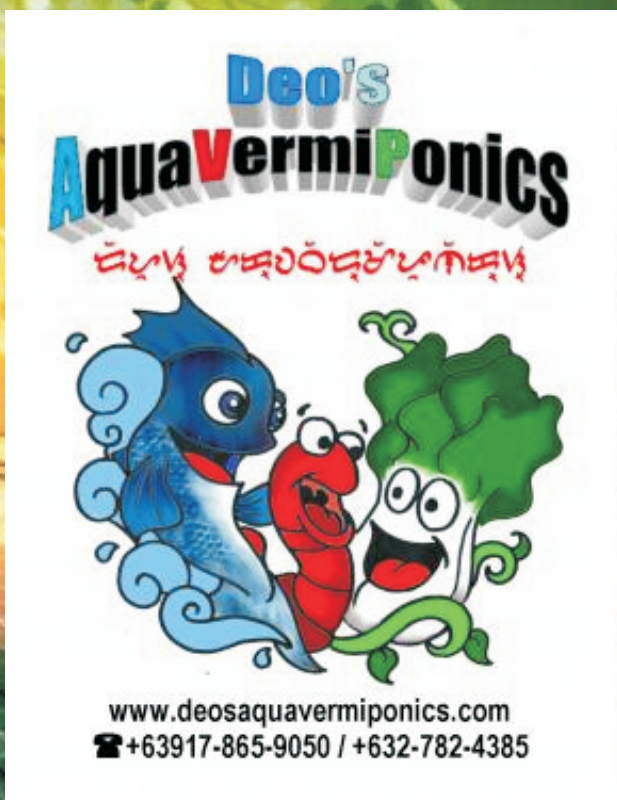
Researchers can now conveniently determine the availability of materials they need such as articles, monograph, serials, thesis and dissertations with just one click. Further, research materials can be explored depending on the researcher's preference under certain categories: communities and collection, issue and date, author, title, and subject. Basic information about research theses and dissertations such as author, description and even abstract can also be viewed by the online guest. Further, some of the detailed proposals can also be downloaded depending on the level of accessibility provided by the contributor. The latest articles, monographs, serials, thesis and dissertations submitted by BAR through the UPLB Main Library were also posted in the PhilAgriNet website and database.

Intellectual Property Rights Support

Intellectual Property Management facilitates the making of a successful business by making the enterprise's products distinctive, providing better market access and making products attractive to local and foreign investments. Thus, the Bureau of Agricultural Research is continuously providing Intellectual Property Support not only to the successful BAR-funded projects but also to other efforts of private and public institutions.

The Intellectual Property Rights Management Section (IPRS) of BAR ensures that the IPs produced by the NaRDSAF community are given proper protection through IP registration with the Intellectual Property Office of the Philippines. Trademark application is the most frequent IP support facilitated by IPRS.

A total of seven IPR trademarks were applied in 2012, two of which were released in the same year. St. Ambrose Logo and Device is being used for products of St. Ambrose Industries Ltd. which presently are different types of fruit wines like *bignay*, coffee, banana, citrus, etc. The company is also planning to use the brand for other products aside from wine.



Deo's Aquavermiponics is a system brand owned by Mr. Deogracias Magbal, Jr. The title of mark is written in one word with its Baybayin counterpart written below it. Images of blue fish, red worm and green leafy vegetable are placed below the trade name. Deo's Aquavermiponics is engaged in the promotion of agriculture, aquaculture, and vermiculture by offering products and services such as machines, machine tools, motors, engines, trainings and consultancy. In fact, the system won three awards from the 2012 National event held by the Philippines Business for Social Progress (PBSP)-Business Investment Development.

Major ACTIVITIES

Part of BAR's effort to bring technologies closer to people is to continuously update them with the latest technologies and interventions that will make their lives better and easier. To realize this, yearly, the bureau conducts the "Agriculture and Fisheries Technology Forum & Product Exhibition (NTF)" every August and the "National Research Symposium (NRS)" every October.

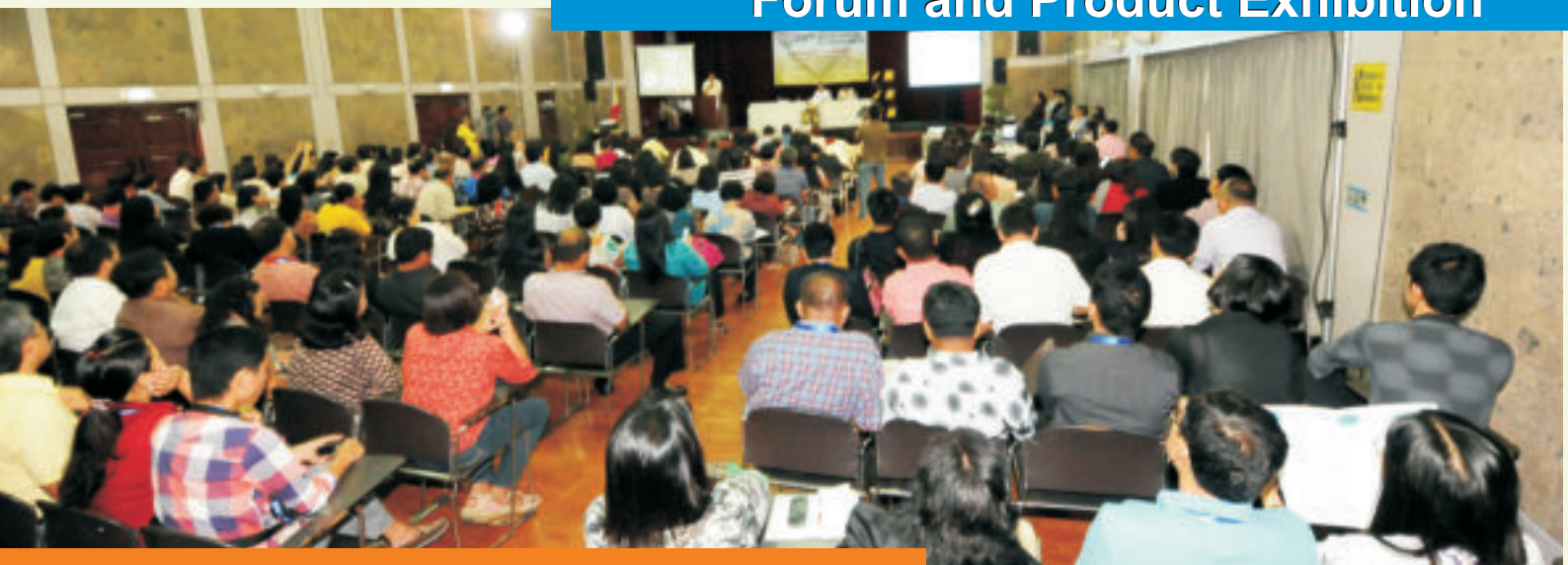
The NTF is annual showcase of viable technologies developed by SUCs, the DA national and regional

offices, and other R&D partner-institutions which also serves as opportunity to strengthen linkage between public and private sectors.

The NRS 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 catalyst for developing R&D that matters to the sector.



Agriculture & Fisheries Technology Forum and Product Exhibition



National Research Symposium

8th Agriculture and Fisheries National Technology Forum & Product Exhibition



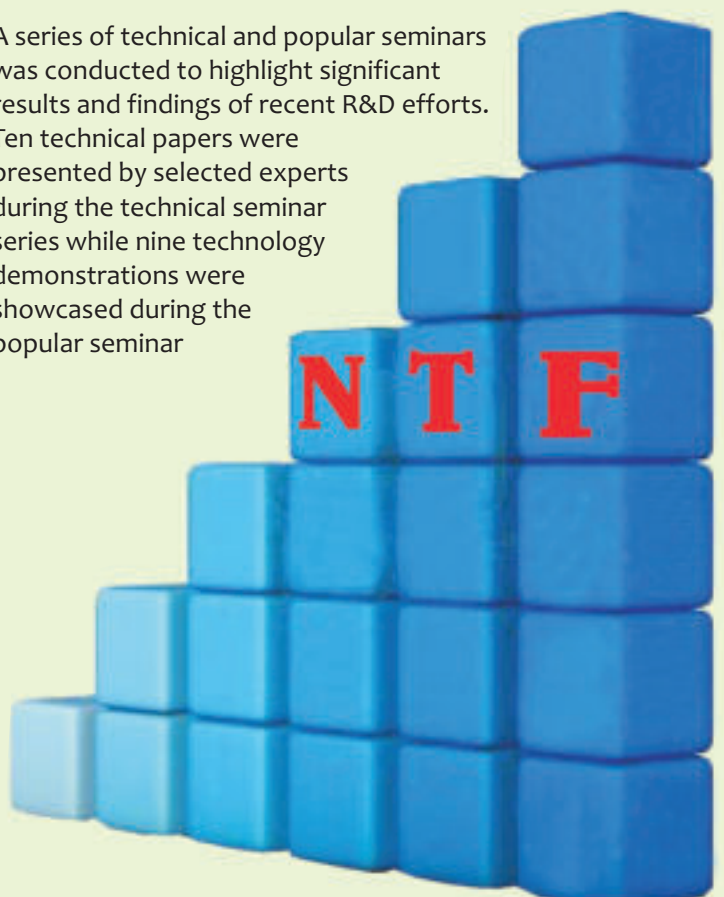
In 2012, the Bureau of Agricultural Research conducted the 8th Agriculture and Fisheries National Technology Forum and Product Exhibition (NTF) which adopted the silver anniversary theme, *BAR @ 25: Celebrating R&D Excellence in Agriculture and Fisheries*. Annually held since 2005, the NTF showcases technology and product innovations developed by DA national and regional offices, international organizations, SUCs, and other R&D partners with the goal of developing and strengthening technology-based agri-entrepreneurial linkages and providing commercial opportunities.

The guest of honor for the event was Honorable Secretary Proceso J. Alcala who acknowledged the Bureau's continuous dedication to the promotion of various useful and innovative technologies and research interventions that can aid in achieving a food-sufficient and food-secure Philippines. Dr. William D. Dar, former DA secretary and current director general of the International Crops Research Institute for the Semi-arid Tropics (ICRISAT) also graced the event and emphasized the significance of R&D in advancing the agriculture sector.

Held on 9-12 August 2012 at the SM Megatrade Halls 1 and 2, the event featured 135 exhibits that showcased technologies, services, and products under the following thematic areas and fields: climate change, health and wellness, high-value crops, and organic agriculture. The four-day event drew 8,346 visitors and guests from both public and private sectors. Key personalities included Congressman Luis R. Villafuerte, Sr. of the 3rd District of Camarines Sur, Albay Governor Joey S. Salceda, and UP Board of Regents Member Evelina G. Escudero. Former UPLB Chancellor Luis Rey I. Velasco and SLSU President Cecilia N. Gascon also visited the event.

A series of technical and popular seminars was conducted to highlight significant results and findings of recent R&D efforts. Ten technical papers were presented by selected experts during the technical seminar series while nine technology demonstrations were showcased during the popular seminar

The four-day event drew 8,346 visitors and guests from both public and private sectors.



8th Agriculture and Fisheries National Technology Forum & Product Exhibition



series. Also highlighting the event was a cultural presentation recognizing the creativity and talent of BAR's regional partners in Luzon, Visayas, and Mindanao.

Also held were the awarding of outstanding BAR employees, best booths, and best products. Twenty-one BAR employees received the 2012 BAR Outstanding Employee Award for their commendable dedication and professionalism. The Best Booth Award was given to DA-RFU 4A (1st Place), UPLB Bee Network (2nd Place), and DA-RFU 5 (3rd Place). Receiving the Best Product Award was the Green Rescue Organic Products (GROP) for their outstanding turmeric product lines.

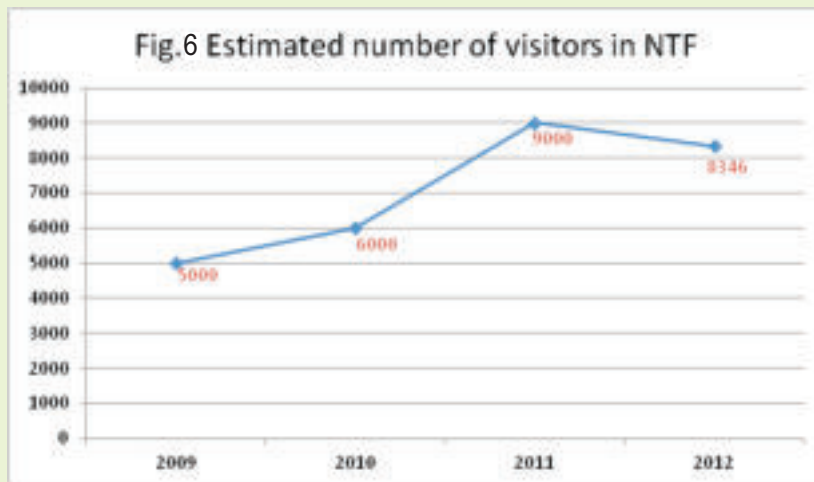
Another highlight of the event was the launching of the 2012 BAR Primer and BAR's new website. The primer is a 15-minute audio-visual presentation which narrates how BAR has been performing in its role and responsibilities as the national coordinating agency for agriculture and fisheries R&D. Meanwhile, the new BAR website was built with a new design and interactive mechanisms that make for a more comprehensive and user-friendly repository of recent significant information on agriculture R&D.



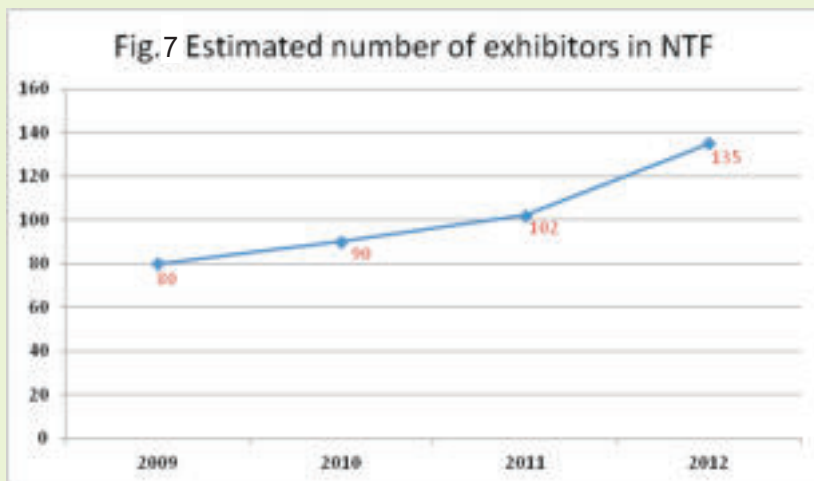
21 BAR employees received the 2012 BAR Outstanding Employee Award for their commendable dedication and professionalism.



8th Agriculture and Fisheries National Technology Forum & Product Exhibition



As reflected in Figure 6, there has been a constant rise in the number of guests in the NTF since 2009 until 2011. A slight decline of 7.27% in 2012 is due to monsoon floods that hit Metro Manila during the NTF that impeded the ingress of visitors.



As reflected in Figure 7, there has been a constant rise in the number of exhibitors in the NTF exhibit since 2009. This shows the enthusiasm of R&D partners in and outside the country to showcase their own technologies and products to the public and to create opportunities to establish network and linkage with other institutions.



24th National Research Symposium



In 2012, the Bureau of Agricultural Research conducted the 24th National Research Symposium (NRS) with the theme, *Responsive R&D Excellence towards Food Security and Growth in Agriculture and Fisheries*. Held since 1989, the NRS is an annual event that extols the significant roles and accomplishments of R&D practitioners in the field of Agriculture & Fisheries.

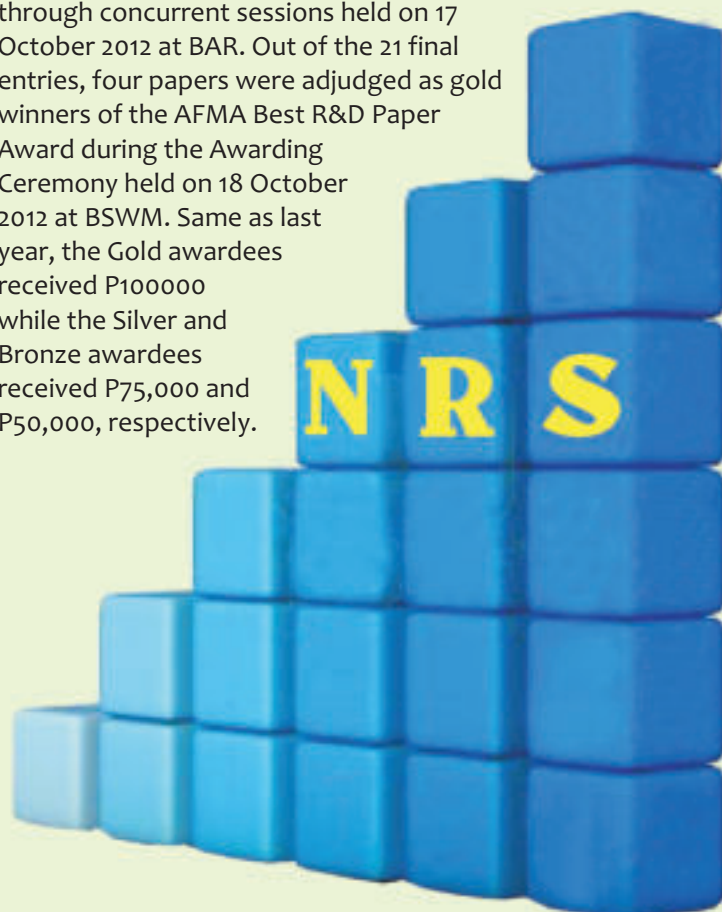
In support to the DA's goal of attaining food security, the 24th NRS was commended by the Honorable Secretary Proceso J. Alcala for serving as an effective platform wherein new research and technologies are properly recognized and tapped for their potentials to become key factors for a more productive agriculture sector.

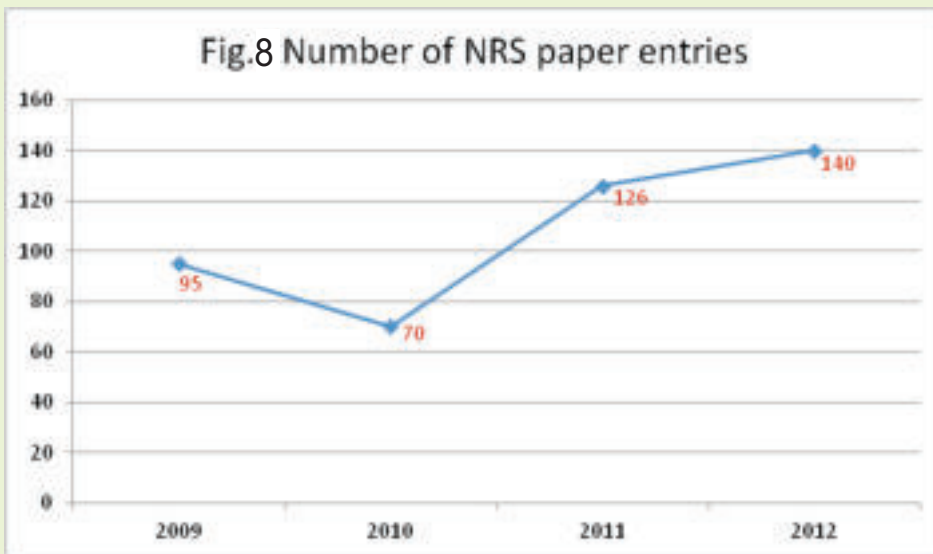
For the 2012 NRS BAR received 140 paper entries which were initially subjected to screening based on scientific relevance, quality of science, innovativeness, and relevance to the Agriculture and Fisheries Modernization Act (AFMA) goals.

NRS is an annual event that extols the significant roles and accomplishments of R&D practitioners in the field of Agriculture and Fisheries.

After the initial screening and evaluation, 21 entries were accepted as finalists to compete under five categories: 1) basic research, 2) applied research for technology/information generation (agriculture), 3) applied research for technology adaptation/verification (agriculture), 4) applied research for technology/information generation (fisheries), and 5) development research (agriculture).

The final evaluation of entries was conducted through concurrent sessions held on 17 October 2012 at BAR. Out of the 21 final entries, four papers were adjudged as gold winners of the AFMA Best R&D Paper Award during the Awarding Ceremony held on 18 October 2012 at BSWM. Same as last year, the Gold awardees received P100000 while the Silver and Bronze awardees received P75,000 and P50,000, respectively.





As reflected in *Figure 8*, there has been a constant rise in the number of paper entries submitted to BAR since year 2010. In 2011, the cash prizes for Best AFMA R&D Papers in each category were increased by more than 100 percent which, not only enticed more R&D practitioners to join the competition, but also encouraged them to continue producing high-quality research.



Gracing the awarding ceremony in behalf of Agriculture Secretary Proceso J. Alcala is Atty. Emerson U. Palad, undersecretary and chief of staff of the Department of Agriculture.

2012 NRS WINNERS

	Title	Authors	Agency
A. Basic Research			
Gold	Etiology and Incidence of Jackfruit Decline in the Philippines caused by <i>Phytophthora palmivora</i> (Butler)	Lucia M. Borines Carlos S. dela Cruz Renie G. Gerona Ruben M. Gapasin Victoria G. Palermo Gil Guadalquiver Rosalie Daniel David Guest	VSU DA-RFU III University of Sydney, Australia
Silver	Retrogradation Control in Acid-Pasteurized Japonica Rice Cultivars	Ma. Patricia V. Azanza Jennibeth F. Paglinawan	UPD
B. Applied Research TG/IG (Agriculture)			
Gold	Utilization of Mango Peels as Source of Pectin	Ma. Cristina B. Gragasin Aileen R. Ligisan Rosalinda C. Torres Romulo R. Estrella	PhilMech DOST
Silver	Development of Organic Varieties of Pole Sitao (<i>Vigna unguiculata</i> (L.) Walp. subsp. <i>Sesquipedalis</i> (L.) Verdc.)	Rodel G. Maghirang Gloria S. Rodulfo Fatima Amor M. Tenorio Maria Emblem O. Grulla Milagros Cacal	IPB-UPLB Palawan Agricultural Center



Gold winner for basic research



Gold winner for applied research TG/IG agricultue category

2012 NRS WINNERS

	Title	Authors	Agency
C. Applied Research TG/IG (Fisheries)			
Silver	Preliminary Study of “Tikod Amo” (<i>Spondylus</i> sp.) on its Potential as an Oyster Culture Species	Gemma A. Asufre Miguel O. Baay	Surigao Del Sur State University BFAR-RFU XIII
Bronze	Reproductive Biology of <i>Portunus pelagicus</i> (Linnaeus, 1758) caught in Western Visayas Sea, Philippines	Drusila Esther E. Bayate Sheryll V. Mesa Jose V. Dayao Edgar R. Madrid	BFAR-RFU VI
D. Applied Research TA/TV (Agriculture)			
Gold	Lowland Irrigated Good Practice Options for Disaster Risk Reduction/Climate Change Adaptation in Bicol, Philippines (GPOs for Rice Farming)	Edgardo B. De La Torre Luz R. Marcelino Jose V. Dayao Edgar R. Madrid	DA-RFU V
Silver	Enhancing the Yield of Cabbage in Phosphorus-Deficient Acid Soil through Site-Specific Nutrient Management and Nutrient Balance Studies	Anabella B. Tulin Marciana B. Galambao	VSU



Gold winner for applied research TA/TV agriculture category



Gold winner for development research agriculture category

2012 NRS WINNERS

	Title	Authors	Agency
Bronze	Site-Specific Nutrient Management Strategies for Hybrid Yellow Corn Production in Tayabas, Quezon	Avelita M. Rosales Aida J. Reyes Anna Pamela O. Agudilla Abner Zubieta	DAR-FU IVA OPA-Lucena City OMA-Tayabas, Quezon
E. Development Research (Agriculture)			
Gold	Peanut Seed Security Support Program in Region 02	Rose Mary G. Aquino Orlando J. Lorenzana Lorenzo M. Caranguian Norma A. Nerona Vanessa Joy V. Fortin Roman M. Santon, Jr.	DAR-FU II
Silver	Enhancing the Productivity of Abaca Farms in the Bicol Region through Integrated Farming System: ABAKAYAMANAN Program	Editha O. Lomerio Daniel Lachica Lea Casim	FIDA
F. Best Poster Competition			
Gold	Utilization of Mango Peels as Source of Pectin	Ma. Cristina B. Gragasin Aileen R. Ligisan Rosalinda C. Torres Romulo R. Estrella	PhilMech ITDI- DOST
Silver	Lowland Irrigated Good Practice Options for Disaster Risk Reduction/Climate Change Adaptation in Bicol, Philippines (GPOs for Rice Farming)	Edgardo B. De La Torre Luz R. Marcelino Jose V. Dayao Edgar R. Madrid	DAR-FU V
Bronze	Value-adding of Goat Meat Products Through Processing and Packaging	Jonathan N. Nayga Emelita B. Valdez Mila R. Andres Beulah B. Estrada Emelina A. Lopez Roger B. Tamayo Aubrey Joy M. Balbin	ISU

A scenic landscape featuring a turquoise lake, a dead tree in the foreground, and a mountain range in the background. The word "APPENDIX" is overlaid in white text on the left side of the image.

APPENDIX

BAR IN THE NEWS

January 2012

Researchers participate in first in-country training course on rainfed agriculture



A contingent composed of senior faculty and researchers from SUCs, senior research staff of DA- RFU CAR, provincial and municipal agriculturists in Cordilleras, and selected technical staff from BAR, attended and participated in the “First In-Country Training Course on Strengthening Rainfed Agriculture Research, Development and Extension” on 8-13 January 2012.

The first in-country training is part of the components of the PhiRARDEP, a program which is envisioned to strengthen and invigorate the

existing rainfed farming systems and practices, thereby hastening the development of rainfed agriculture in the country.

The purpose of the training, aside from capacitating researchers and program implementers particularly the farmers, was to demonstrate improved knowledge and skills on rainfed cropping systems and natural resource managements. Participants were also expected to share viable information on rainfed agriculture and mobilize stakeholders involved in the process leading to the development and evaluation of proposed RDE agriculture projects. ###

January 2012

DA researchers trained on project design and proposal writing

To capacitate researchers on project proposal writing and packaging, BAR collaborated with the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) to design a capacity-building initiative through the “Training on Project Design Cycle and Proposal Writing” held on 24–27 January 2012 at the View Park Hotel, Tagaytay City.

This initiative is part of the BAR-SEARCA project titled, “Strengthening Research Project Development and Management for Agri-Pinoy Agricultural Development Project” which aims to guide researchers involved in R&D initiatives by enhancing competency in proposal writing and packaging.

Three modules were discussed during the workshop: 1) project approach to Agri-Pinoy agriculture development, 2) project design cycle,

and 3) proposal writing and packaging, intended for skill enhancement in project designs and as a management tool for supervising, monitoring, and evaluating projects.

The four-day training is the first batch for this year. Attending were representatives from the Regional Integrated Agricultural Research Centers (RIARCs), Bureau of Fisheries and Aquatic Resources (BFAR), and state universities and colleges (SUCs) of Regions 4A, 4B, and 5, and selected technical staff from BAR.

Facilitators for the training were: Prof. Wilfredo B. Carada, Ms. Mayo Grace C. Amit, and Prof. Sony B. Querijero of the University of the Philippines Los Baños (UPLB). Special messages were delivered by SEARCA Representative Lope Santos, BAR Assistant Director Teodoro S. Solsoloy, former UPLB Chancellor Luis Rey I. Velasco, and SEARCA Project Development Division Manager Bessie M. Burgos. ###

February 2012

Local field trials of crops from Singapore conducted

In line with the goal of introducing Philippine high value crops to Singapore, representatives from DA-HVCDP, BAR, other DA agencies and institutions, SUCs, and research institutions convened for a follow-up meeting *cum* workshop on 3-4 February 2012 at BAR to discuss updates on the adaptability trials of vegetable varieties and Japanese sweet potato from Singapore under Philippine conditions. The collaboration between the Philippines and Singapore is expected to provide a means for Filipino farmers to establish markets in Singapore.

To date, DA Regional Field Unit 4A, 5, 10, 11, TCA, UPLB, and BPI-LBNCRDC have conducted adaptability trials of the following introduced vegetable crops: chili, cabbage, broccoli, coriander, tomato, lettuce, *pak choi*, okra, eggplant and spinach and as well, sweet potato. Local check plants (control) were also planted side-by-side to determine its competence with that of the imported varieties. As noted,



Singaporean businessmen are also interested in trying out the local varieties which possess desirable characteristics similar to those of the imported vegetables.

DA has committed funds for the technology demonstration to cover activities under the project. ###

BAR joins 11th Food Expo

Food security is mirrored in full plates with your pockets still not empty. This was the advocacy of the 11th Philippine Food Expo held on 23–26 February 2012 at the World Trade Center, Pasay City as it highlights the importance of food producers of this country.

With this year's theme “From Farm to Fork: The Best Philippine Food Products of the World”, the organizers made sure that food producers—those involved in the initial steps of farming to the exportation of goods—were given a venue to showcase their goods to the public and make known their products as the best of Philippine food products to date.

The Philippine Food Processors and Exporters

Organization, Inc. (PhilFoodEx), together with its government partners and a conglomeration of business owners, launched this annual convention with a goal of bringing together all sectors involved in food production to enhance the businesses and projects of both the public and private sectors, and to improve the products recognized as Filipino-made.

Cooperators include BAR, that also joined and participated in the exhibit and in the conduct of seminars. A BAR-funded project on Edible Landscaping implemented by UPLB was exhibited during the expo. A seminar on edible landscaping, sapinit products and by-products, as well as adlai food products were also held during the stretch of the expo, facilitated by UPLB (for edible landscaping) and BAR (for all three seminars). ###

March 2012

BAR, PhilAgriNet join forces to update and enhance skills of PhilAgriNet members

One can never underestimate the importance of agricultural literatures in strengthening research and development. The need for such literatures by researchers and various stakeholders from the agricultural sector gave rise to the Philippine Agricultural Information Services Network (PhilAgriNet), a database where members can have access to agriculture-related documents.

However, a database cannot operate on its own. It needs people who are equipped with proper knowledge and skills for it to be fully useful and functional. Hence, the Bureau of Agricultural Research (BAR), in partnership with PhilAgriNet, conducted a seminar-workshop on updating and enhancing the skills of PhilAgriNet members on database content management on 1-2 March 2012 at Hotel Kimberly, Tagaytay City. The activity also served as a venue for a general assembly meeting among its members.

The seminar-workshop aimed to review and update the current status of the PhilAgriNet database. Moreover, it intended to further improve the skills of PhilAgriNet members regarding database content management of their respective databases. On the other hand, the general assembly focused on the following

aspects: 1) comprehensive assessment of the inputs of each member to the database; 2) identification of best practices and obstacles encountered; 3) possible solutions to identified obstacles and future plans; and 4) election of officers.



The two-day activity was divided into three sessions. The first session started with a review on the PhilAgriNet Database and Database Content Development which tackled the current status of the database including updates on the network's membership, review of objectives, and information on the statistics of records. Topics such as Dspace and subject indexing were also included. The second session introduced the workshop proper where Dspace encoding was demonstrated and hands-on exercises on automated indexing were given to the participants. Lastly, the third session was devoted for the election of officers and zonal coordinators. ###

April 2012

Dar's book launched at BAR

A book, "Feeding the Forgotten Poor: Perspectives of an Agriculturist" authored by Dr. William D. Dar with Prof. Arun Tiwari, was launched by the Bureau of Agricultural Research (BAR) on 10 April 2012 at BAR, Visayas Ave., Diliman, Quezon City.

Dr. William D. Dar is the director general of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) while Prof. Arun Tiwari is the CEO of Indo-US Healthcare Pvt. Ltd. who also teaches at the School of Management Sciences in University of Hyderabad, India.

The publication of this book is timely and relevant in the agriculture sector as it discusses two of the most compelling challenges of our time: food security and poverty. Agriculture is the nexus of hunger and poverty alleviation. Given today's growing world's population which is projected to grow up to 9 billion in 2050, the disconcerting question is— will there be enough food to feed the world? — to which the 144-page book tried to address in the perspective of an agriculturist.

Feeding the Forgotten Poor consists of four chapters, namely: 1) Soil and Roots, 2) Stems, Leaves and Fruits, 3) Skin of the Earth, and 4) Growth and Prosperity.



Prior to its Philippine premiere, the book was launched in New Delhi, India in February 2012 during the inaugural session of the 2nd Global Agri-Business Incubation Conference wherein former India President APJ Kalam graced the activity as keynote guest.

The book launch is part of the symposium titled, "Enhancing Philippine-ICRISAT Partnership in Agricultural Research for Development" which aimed to highlight the partnership between the Philippines' Department of Agriculture (DA) particularly, BAR and India's ICRISAT. ###

April 2012

BAR, SEARCA hold 1st batch of training workshop on KM

People empowerment is one of the best practices which enable an organization to achieve success. As one of its components, capacity building equips people with information, knowledge and first-hand experiences to be able to work productively and efficiently.

With this, the Bureau of Agricultural Research (BAR), in partnership with the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), held the first batch of training workshop on knowledge management (KM) capacity building on 26-27 April 2012 at Drilon Hall, SEARCA, Los Baños, Laguna.

It was participated in by information officers, researchers, and technical staffs from the Luzon and Visayas clusters representing various research-implementing institutions, agencies, and bureaus of the DA. It also provided a venue for the participants to share their current practices on

information and knowledge management (IKM) and their capacity development requirements which were assessed through training needs analysis.

Generally, the activity served as a leveling off on the concept, tools and processes involved with IKM and a supplementary activity for the BAR-SEARCA joint project titled, "Capacity Development Program on Knowledge Management". This project aims to improve the capacities of the participants to be able to manage the knowledge that they acquire through various R&D projects and properly disseminate them to concerned stakeholders to further enhance the agriculture and fisheries sectors.

Dr. Alexander G. Flor, professor of Information and Communication Studies at the University of the Philippines - Open University (UPOU) and a knowledge management expert, served as the resource speaker for the event. ###

May 2012

Philippines' BAR hosts 7th ATWGARD Meeting

The Philippines, through the Bureau of Agricultural Research (BAR) of the Department of Agriculture (DA), spearheaded the 7th Meeting of the Association of Southeast Asian Nations Technical Working Group on Agricultural Research and Development (ATWGARD) held on 16-18 May 2012 at Century Park Hotel, Malate, Manila. BAR Director Dr. Nicomedes P. Eleazar served as the chair for this international event.

ATWGARD was established in 2003 to address issues related to productivity, production, and food security through R&D cooperation and the need to enhance knowledge flow and exchange and come up with collaborative research and development (R&D) projects. Its members include ASEAN member countries Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

In the ATWGARD meeting, the member countries presented updates on the progress of their



agriculture-related activities and projects and offered recommendations and inputs on new initiatives for ASEAN cooperation in agricultural R&D. The delegates also exchanged information regarding the status of research and development of the sector in their respective countries.

Delegates from Indonesia, Malaysia, Philippines, Thailand, and ASEAN Secretariat attended the 7th ATWGARD meeting.

May 2012

BAR showcases R&D products in Horti Asia 2012

Looking into the importance of promoting products generated from research and development, BAR joined the Horti Asia 2012, an international exhibition that showcases the latest and sophisticated technologies and know-how's in horticultural and floricultural production and processing on 9-12 May 2012 in Bangkok, Thailand. The event was participated in by 12 more countries, namely: Australia, Israel, China, India, Germany, Malaysia, USA, Italy, France, the Netherlands, Taiwan, and the Philippines.

The Philippine delegation is composed of 20 companies from the public and private sector. The Philippine pavilion showcased the horticultural products and services that the country can best offer. Horti Asia 2012 is the first international exhibition that BAR participated in. The BAR booth showcased various products generated from its R&D endeavors including oregano products (soap and tea), ginger tea, *kalamansi* and guava soap, *sapinit* products (jam and juice), *makapuno* strains,

and mango products (dried and pickled).

The oregano products, ginger tea, *kalamansi* soap and guava soap are results of the R&D projects of STIARC, DA-RFU IVA. The *sapinit* products and *makapuno* strains are from DA-QAES while mango products are from Mr. Lito Arenas of L.A Tradings. All of these products are funded under the banner program of BAR, the NTCP.

Also, participating in the exhibit was the Labo Progressive Multi-purpose Cooperative (LPMCP) which is famous for their Queen Pineapple products. The products showcased in the exhibit included pineapple juice, processed bottled pineapples (rum pineapple, salsa pineapple, pickled pineapple, and syrup pineapple), and pineapple fabric. LPMCP is an institution which focused on livelihood creations through pineapple production and processing. BAR and LPMCP has been long known for their partnership in further developing and enhancing the queen pineapple industry. ###

Seventh-Day Adventist commits support to government's soybean program

Representatives from the Seventh-Day Adventist showed interest in the production of soybean in the Philippines, and thus committed to support the government's soybean program. This was highlighted during the "Soybean Technical Working Group Meeting" held on 7 June 2012 at the Bureau of Agricultural Research (BAR).

Pastor Nelson de Chavez of the North Philippine Union Conference (NPUC) of the Seventh-Day Adventist shared possible lands being coordinated/owned by the group that could possibly be planted with soybean. "We are willing to help and can allot a few hectares for the soybean program," he said.

The Adventist University of the Philippines, based in Cavite, is willing to provide up to 30 hectares of their land for seed production. Other Possible techno-demo areas are in Florida Blanca, Pampanga and in Naga, Palawan.

To date, DA has provided soybean for seed

production and are already planted in 1) Santiago, Isabela; 2) Busilak, Bayombong, Nueva Vizcaya; 3) Naga View College in Bicol; and 4) Alicia, Isabela— all of which are owned by the Seventh-Day Adventist.

As per agreement, Mr. de Chavez will assist in determining and developing the available land for soybean. Likewise, planning and programming of soybean activities in their area which includes members and non-members. Seventh-Day Adventist will also be included as member of the Soybean TWG being the private sector partner of the program. The Seventh-Day Adventist is a group that promotes healthy habits/lifestyle to their community and encourages consumption of vegetables.

Mr. Ricardo Navis, a member of Seventh-Day Adventist, is also the founder of Makabagong Gabay sa Kalusugan (MGSK) processing food products out of soybean. These include soymilk, soy sauce, soy coffee, taho, tofu, and vegetables noodles. BAR provided support in the product development of these products. ###

July 2012

BAR awards two research grants to advocacy groups helping Ips

BAR, led by Director Nicomedes P. Eleazar, awarded two checks worth PhP1.5M each to two groups of Indigenous People (IP), the Manobo and the Lumad. These IPs are represented by two NGOs: 1) Dulangan Manobo Free Farmers Organization (DMFFO), and 2) Southphil Muslim Lumad Christian People's Development Foundation, Inc. (SMLCPDF), as part of BAR's support to the self-empowerment of indigenous peoples and the upliftment of the lives of indigenous communities in the country.

Receiving the checks were DMFFO President Balindo C. Apang and SMLCPDF President Orlando B. Tongcua on 6 July 2012 at the 2F BAR Conference Hall, Visayas Avenue in Diliman, Quezon City. Present during the awarding were staff members from BAR and from the Office of Senator Francis Escudero.

The BAR-funded DMFFO project is titled, "Technology Utilization and Promotion of Rubber (*Hevea brasiliensis*) Production in the Uplands of



Kalamansig, Sultan Kudarat," and aims to plant rubber in 1,000 hectares in Kalamansig, Sultan Kudarat by 2016 and develop a model community-managed rubber nursery in the area. The other BAR-supported project, SMLCPDF's, "Community-based Participatory Organic Agriculture Project," hopes to optimize the value of existing idle lands by utilizing them for agricultural and other economic purposes to provide livelihood opportunities and to promote food security in the community. The project also seeks to introduce and/or enhance organic-based farming systems and promote the use of organic inputs. ###

Daive's FSTP gains recognition in 2012 Ramon Magsaysay Awards

In view of “honoring greatness of spirit in selfless service to the peoples of Asia”, the Ramon Magsaysay Award is bestowed to individuals and organizations who have exemplified the qualities possessed by the late President Ramon Magsaysay in coming up with sustainable solutions to address issues on poverty, public health, environment, education, and human rights, among others.

This year, six individuals who have made extraordinary impact to their community were given the prestigious award considered as Asia's internationally-known Nobel Peace Prize on 28-30 August 2013.

For the Philippines, it was our very own Romulo Davide. He became famous for developing the BIOCON technology, now registered as BIOACT, which serves as a biological control against nematode pests that attack agricultural crops. The said technology is now being used worldwide.

As an agriculture extension worker, he discovered a way to change the course of the lives of the Filipino farmers in Argao, Cebu. When he was awarded by the DA as an “Outstanding Agricultural Scientist” in 1994, he used his prize to embark on a project, “Corn-based Farmer-Scientists Research, Development and Extension Program for Sustainable Agricultural Development,” or simply FSTP. It aims to empower and turn farmers into farmer-scientists to uplift their living conditions. From merely planting rice, they are taught to do the experiments themselves.

The success of the program's implementation was evident when farmers were able to register a surplus of corn because of an increase in yield from up to 6 to 12 times. Because of the higher yield, there was an increase in income due to the sales of the surplus corn. They were also able to adopt the intercropping system, as well as technologies involving animal production which provided them with additional income. As Davide said, “FSTP has successfully demonstrated that poor farmers can be technically empowered through direct contact with agricultural scientists/experts to improve their living conditions beyond the poverty level”.



Technical empowerment for farmers, improvement of agricultural production, increase in farmers' income which enable them to send their children to schools, and improving the quality of their lives and their living standard – these are only among the many fruitful results that the program has accomplished. Argao moved up the social ladder, from a 5th class town towards becoming a 1st class town since 2006. In 2008, FSTP was implemented as a National Program, reaching out to poor farmers and catering to the indigenous peoples in mountainous communities.

The Bureau of Agricultural Research (BAR) believed in the change that the program can achieve. Hence, it was one of the institutions who supported the initiative by providing funding support for the program through its Community-based Participatory Action Research (CPAR) project. ###

September 2012

R&D Facility in BUCAF inaugurated



In celebration of the centennial anniversary of the college, the Bicol University College of Agriculture and Forestry (BUCAF) inaugurated one of its premier infrastructures, the Research and Technology Commercialization and Information Centre, on 7 September 2012. The centre, known also as the Market and Information Centre, was established through an Institutional Development Grant from BAR.

Through the grant, BUCAF has been able to acquire equipment and improve its facilities which are essential to the delivery and enhancement of its services in the areas of instruction, research, extension, and production geared to technology commercialization.

Moreover, the BAR has supported BUCAF's projects under the basic and applied research categories.

These include, the "Assessment of the Status of Swimming Crabs Fishery Resource in San Miguel Bay with Focus on Christian Crab"; and "Integrated Management Systems in the Rice Production Areas of Albay under Changing Rainfall Pattern". The latter project is in line with the DA goal of developing adequate responses to the impact of climate change.

###

October 2012

UPLB Landscape Horticulture R&D Facility inaugurated

The Landscape Horticulture Research and Propagation Facility of UPLB was inaugurated at its Ornamental Crops Nursery, on 22 October 2012. The facility serves as the propagation house of the nursery and demonstration area for students and other researchers in the conduct of basic and applied research studies on landscape horticulture. It was funded through the Institutional Development Grant (IDG) Program of BAR.

Another highlight of the inauguration was the presentation and demonstration of the equipment purchased under the National Technology Commercialization Program (NTCP)-funded project, "Technology Utilization of Landscape Organic Waste Materials for Crop Production."

The wood chipper or tree chipper is a gasoline-

powered machine used for reducing wood, such as tree limbs or trunks, to wood chips. As demonstrated during the inauguration, the equipment can reduce even large branches into small chips loading these straight to a collecting truck. The leaf vacuum/ debris collector, on the other hand, can collect massive amounts of leaf waste.

The UPLB team has started collecting and segregating wastes and is currently planning to expand this service to the areas immediately surrounding the campus. From their initial collections, the team has been able to conduct a dry run for the processing of landscape organic waste materials into compost using effective microorganisms. An evaluation of the compost as to its physical and chemical properties for use in crop production is in order. ###

November 2012

2012 Gawad Saka outstanding agri scientist, researcher announced

Agriculture Secretary Proceso J. Alcala, represented President Benigno S. Aquino III, in honoring the 2012 Gawad Saka national winners. The awarding ceremony was held on 13 November 2012 at the PhilRice, Science City of Muñoz in Nueva Ecija where the formal launching of Year 2013 as the National Year of Rice (NYR) was also done.

Dr. Mudjekeewis D. Santos, a DOST-conferred Scientist I from NFRDI-BFAR, bagged the national Gawad Saka Outstanding Agricultural Scientist (OAS) for contributing to the country's efforts of addressing food security and safety particularly in the aquaculture and fisheries management.

Meanwhile, Mr. Ambrosio Raul R. Alfiler, an entomology expert from PCA-Albay Research Center, was declared national Outstanding Agricultural Researcher (OAR) for his pioneering and successful researches on coconut pest

management in the country.

The winners in the two categories received a P1 million (P900,000 as project grant and P100,000 cash) each courtesy of BAR.

Gawad Saka is an annual event of DA in cooperation with other government institutions, non-government organizations and the private sector. Initiated in 1970, the Gawad Saka aims to give due recognition and to pay tribute to dedicated individuals and institutions whose exemplary accomplishments in their respective fields of endeavor and contribution in the country's agricultural development are deemed worthy of emulation. It is a tribute to farmers, fisherfolk, and institutions in recognition of their agricultural contribution towards a modernized and equitable agriculture. ###

December 2012

PhI hosts international rubber conference



Given the promising potentials and benefits of smallholder rubber-based agroforestry system, the Philippines hosted the "International Conference on Smallholder Rubber-based Agroforestry" on 5-7 December 2012 at Bayleaf Intramuros Hotel in Manila. The event was organized by BAR, in partnership with IRRDB, UPLB-IAF, and PAFERN.

It was participated in by rubber practitioners and experts from Malaysia, Vietnam, Thailand, India, Indonesia, Cambodia, and the Philippines. Also present were project leaders and proponents of rubber and rubber-based R&D initiatives from DA-

Regional Field Units, local government units, and the private sector.

The conference aimed at capturing the recent developments in Southeast Asia with regard to smallholder rubber-based agroforestry systems. It sought to bring together various stakeholders in the industry in order to understand better the technical, biophysical, and socio-economic requirements that will further improve the said production system.

Rubber is considered a profitable agro-industrial crop in Southeast Asia. It is one of the crops which can be integrated into an agroforestry system as it encourages the sustainable use of land. As reported by the Food and Agriculture Organization (FAO) of the United Nations, rubber, along with coconut and oil palm, has spurred interest among stakeholders for their increasing importance in industrial fiber supply. Furthermore, through extensive research and development, rubberwood has developed into one of the most successful export timbers in Southeast Asia. ###

TRAININGS

INTERNATIONAL TRAININGS

GRANTEES	AGENCY	EVENT	VENUE
Fe dela Cueva	UPLB	ISHS/Pro Musa International Symposium on Banana	Thailand
Digna L. Sandoval	BAR	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Eloisa Aquino	BAR	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Patrick Raymond Cabrera	BAR	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Tessie Navarro	TCA	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Manuelo Agsaoay	TCA	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Eureka Teresa Ocampo	UPLB	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Rodel Maghirang	UPLB	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Allan P. Bacho	DARFU X	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Carlota Madriaga	DARFU X	Regional Symposium on High Value Vegetables in Southeast Asia: Production, Supply and Demand	Thailand
Jaime A. Manalo IV	PhilRice	M4D2012 (Mobile phones for development) Conference	India
Mila T. Benabise	QSC	5 th Annual International Symposium on Agriculture	Greece
Salvacion Ritual	BAR	Training-workshop on Environmental Leadership in a Climate Change Adaptation for Southeast Asia	Thailand
Anthony Obligado	BAR	Training-workshop on Environmental Leadership in a Climate Change Adaptation for Southeast Asia	Thailand
Amavel Velasco	BAR	Training-workshop on Environmental Leadership in a Climate Change Adaptation for Southeast Asia	Thailand
Celerina Miranda	DARFU II	Training on the Development of Longan as a High-Value Fruit Crop in the Philippines	Thailand
Berly Tatoy	DARFU X	Training on the Development of Longan as a High-Value Fruit Crop in the Philippines	Thailand
Anecita Telabangco	DARFU XI	Training on the Development of Longan as a High-Value Fruit Crop in the Philippines	Thailand
Primitivo Santos	UPLB	Training on the Development of Longan as a High-Value Fruit Crop in the Philippines	Thailand
Miriam E. Pasqua	MMSU	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Victoriano C. Estira	PSU	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Rafael B. Querubin	ISPSC	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Ben D. Ladlad	BSU	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India

TRAININGS

INTERNATIONAL TRAININGS

GRANTEES	AGENCY	EVENT	VENUE
Gerardo I. Mendoza	BASC	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Jeter S. Sespeñe	PSU	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Andrew B. Villacorta	DARFU III	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Marilyn Sta. Catalina	DA-CAR	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Valentino C. Perdido	DARFU I	PHIRARDEP Scientists Exchange Visit (Capability Building of DA & SUCs Scientists and Researchers on Rainfed Agriculture R&D and Climate Change Adaptability Facility)	India
Marilyn Sta. Catalina	DA-CAR	International Community-Based Adaptation Conference	Vietnam
Victoriano B. Guiam	BAR	2 nd Meeting of the ASEAN-India Working Group on Agriculture and Fishery	Indonesia
Leoncia B. del Mar	BAR	International Conference for the Project on Climate Change R&D Capability Building Project (Phase 2)	Australia
Rosalía G. Maranan	BAR	International Conference for the Project on Climate Change R&D Capability Building Project (Phase 2)	Australia
Emilio Cruz	CLSU	2012 World Livestock Fair and Rodeo	USA
Dolores Ricafranca	DARFU 5	2012 World Livestock Fair and Rodeo	USA
Joell H. Lales	BAR	International Conference on Multifunction Agriculture and Urban-rural Relations	Netherlands
Nicanor del Rosario	BAR	Five-Day Rapid Bioassay of Pesticide Residues (RBPR) briefing, hands on exercise and field trips to RBPR stations	Indonesia
Cynthia Remedios V. de Guia	BAR	6 th International Conference on Community-Based Adaptation to Climate Change	Vietnam
Daechel Dara A. Granada	BAR	6 th International Conference on Community-Based Adaptation to Climate Change	Vietnam
Ethcel Princess H. Patulot	BAR	6 th International Conference on Community-Based Adaptation to Climate Change	Vietnam
Eduardo A. Jarcía	NFA	Training Course on Integrated Pest Management (IPM)	Israel
Maylen D. Villareal	BAR	International Conference: Innovative Research in a Changing and Challenging World	Thailand
Mara Shyn M. Valdeabella	BAR	International Conference: Innovative Research in a Changing and Challenging World	Thailand
Rhea Aileen L. Neo	BAR	International Conference: Innovative Research in a Changing and Challenging World	Thailand
Cleofas R. Cervancia	UPLB	API MONDIA Executive Council Meeting	Romania
Edward Jude C. Acebedo	BAR	2 nd Annual Conference on Accounting and Finance	Singapore
Digna L. Sandoval	BAR	Horti ASIA 2012	Thailand
María Louella S. Dejelo	BAR	Horti ASIA 2012	Thailand
Francisco Grettchin	BAR	Horti ASIA 2012	Thailand
Consuelo Belarmino	RFU I	Horti ASIA 2012	Thailand
Rolando Cuasay	RFU IV-A	Horti ASIA 2012	Thailand

TRAININGS

INTERNATIONAL TRAININGS

GRANTEES	AGENCY	EVENT	VENUE
Diana Rose de Leon	BAR	Horti ASIA 2012	Thailand
Jose Tolentino	RFU I	5-day RBPR Briefing, Hands on Exercise and Field Trips to RBPR Stations	Taiwan
Aida Solsoloy	RFU I	5-day RBPR Briefing, Hands on Exercise and Field Trips to RBPR Stations	Taiwan
Valentino Perdido	RFU I	5-day RBPR Briefing, Hands on Exercise and Field Trips to RBPR Stations	Taiwan
Eric Palacpac	PCC	XII World Congress of Rural Sociology	Portugal
Teresita Anonuevo	BAR	Training on Financial Management Strategies and Processes for the Philippine BAR	Indonesia
Gretel Rivera	BAR	Training on Financial Management Strategies and Processes for the Philippine BAR	Indonesia
Ellen Garces	BAR	Training on Financial Management Strategies and Processes for the Philippine BAR	Indonesia
Gladys Gammad	BAR	Training on Financial Management Strategies and Processes for the Philippine BAR	Indonesia
Salvacion Ritual	BAR	4 th International Conference on Climate Change: Impacts and Responses	USA
Judith Maghanoy	BAR	4 th International Conference on Climate Change: Impacts and Responses	USA
Robert o Quing, Jr.	BAR	4 th International Conference on Climate Change: Impacts and Responses	USA
Jay Invisor Bermas	BAR	Training Course on Participatory Monitoring and Evaluation (PM&E)	Thailand
Jiamy Jae Apacionado	BAR	Training Course on Participatory Monitoring and Evaluation (PM&E)	Thailand
Marah Garcia	BAR	Training Course on Participatory Monitoring and Evaluation (PM&E)	Thailand
Kris Thea Marie Hernandez	BAR	Training Course on Participatory Monitoring and Evaluation (PM&E)	Thailand
Juan Nikolas Paller	BAR	Training Course on Participatory Monitoring and Evaluation (PM&E)	Thailand
Patrick Raymund Lesaca	BAR	16 th Pacific Asia Conference on Information Systems (PACIS)	Vietnam
Ryan Joseph Abrigo	BAR	16 th Pacific Asia Conference on Information Systems (PACIS)	Vietnam
Rey Naval	QSC	International Conference on Environmental Engineering and Applications	UAE
Victor Ella	UPLB	International Conference of Agricultural Engineering	Spain
Arsenio Ella	UPLB	2012 IUFRO Forest Products Conference	Portugal
Herbert Salalila	BAR	7 th International Postharvest Symposium	Malaysia
Wilbert Newton Pollisco	BAR	7 th International Postharvest Symposium	Malaysia
Digna Narvacan	RFU IV-A	7 th International Postharvest Symposium	Malaysia
Victoriano Guiam	BAR	ASEAN Special SOM-33 rd AMAF and Special SOM-AMAF + 3	Indonesia
Maureen Mangaring	BAR	6 th Knowledge Management International Conference (KMI Ce 2012)	Malaysia
Alvin Fontanil	BAR	6 th Knowledge Management International Conference (KMI Ce 2012)	Malaysia

TRAININGS

INTERNATIONAL TRAININGS

GRANTEES	AGENCY	EVENT	VENUE
Leila Denisse Padilla	BAR	6 th Knowledge Management International Conference (KMI Ce 2012)	Malaysia
Ma. Fe Cabullo	RFU IV-A	Regional Security and Development Study (RSDS)	Cambodia
June Haidee Acuña	RITM	Molecular Biology Summer Workshop	USA
Joell Lales	BAR	2 nd Alliance Council Meeting of the Global Research Alliance on Agricultural Greenhouse Gases	Canada
Marilyn Sta. Catalina	CAR	NCCARF National Conference on Climate Adaptation in Action: Sharing Knowledge to Adapt	Australia
Antonio Gerundio	RFU VIII	ICRISAT Exchange Visit	India
Rufino Ayaso III	RFU VIII	ICRISAT Exchange Visit	India
Elvira Torres	RFU VIII	ICRISAT Exchange Visit	India
Roberto Olinares	RFU II	ICRISAT Exchange Visit	India
Fernando Lorenzo	RFU III	ICRISAT Exchange Visit	India
Corazon Sinnung	RFU IV	ICRISAT Exchange Visit	India
Jennifer Remoquillo	HVCDP	ICRISAT Exchange Visit	India
Ma. Eloisa Aquino	BAR	KM Australia Asia Pacific Congress 2012	Australia
Julia Lapitan	BAR	KM Australia Asia Pacific Congress 2012	Australia
Rita dela Cruz	BAR	KM Australia Asia Pacific Congress 2012	Australia
Merdelyn Lit	UPLB	XXIV International Congress of Entomology (ICE)	South Korea
Lorina Galvez	VSU	5 th International Symposium on Tropical and Subtropical Fruits	China
Bonifacio Cayabyab	UPLB	International Congress of Entomology	South Korea
Leonora Panlasigui	UPLB	16 th IUFOST World Congress of Food Science and Technology	Brazil
Juanita Salvani	RFU X	Exchange Scientists/Experts Mission Program of PCAARRD-RDA Work Plan of Cooperation for 2012	South Korea
Joel H. Lales	BAR	DA-BAR ICRISAT Collaborative Program on Rainfed Agriculture and Research for Development at ICRISAT Headquarters	India
Rene Santiago	BAI	AFITA/WCCA 2012 ICT Applications in Agriculture and Natural Resources	Taiwan
Dolores Ricafranca	RFU V	AFITA/WCCA 2012 ICT Applications in Agriculture and Natural Resources	Taiwan
Cecilia Gascon	SLSU	DA-BAR ICRISAT Collaborative Program on Rainfed Agriculture and Research for Development	India
Marito Bernales	CBSUA	2012 Administrator's Tour on Beekeeping	India
Ramonchita Larano	c/o DA	DA-BAR ICRISAT Collaborative Program on Rainfed Agriculture and Research for Development	India
Rhea Desalesa	BAR	1 st International Conference on Animal Nutrition and Environment (ANI-NUE 2012)	Thailand
Marissa Luna	RFU IV-B	1 st International Conference on Animal Nutrition and Environment (ANI-NUE 2012)	Thailand
Anthony Obligado	BAR	1 st International Conference on Animal Nutrition and Environment (ANI-NUE 2012)	Thailand
Lorna Tepper	BPI	International Symposium on Organic Agriculture	South Korea
Remedios Acasio	BAI	1 st International Conference on Animal Nutrition and Environment (ANINUE)	Thailand
Magdalena Wawan	CAR	II Asia Pacific Symposium on Postharvest Education and Extension: APS 2012	Indonesia
Gian Carlo Espiritu	BAR	II Asia Pacific Symposium on Postharvest Education and Extension: APS 2012	Indonesia

TRAININGS

INTERNATIONAL TRAININGS

GRANTEES	AGENCY	EVENT	VENUE
Rommel Obias	BAR	II Asia Pacific Symposium on Postharvest Education and Extension: APS 2012	Indonesia
France Gayzel Caceres	BAR	II Asia Pacific Symposium on Postharvest Education and Extension: APS 2012	Indonesia
Salvacion Ferrer	BFAR-NFRDI	BIT's 1 st Annual International Congress of Marine Algae 2012	China
Elena Garces	BAR	BIT's 1 st Annual International Congress of Marine Algae 2012	China
Anthony Obligado	BAR	Workshop on the Potential of Local Resources and Establishing Network Among Agricultural Research Centers on Food Diversification	Indonesia
Evelyn Juanillo	BAR	11 th Asian Apicultural Association Conference and ApiEXPO	Malaysia
Luz Marcelino	RFU V	11 th Asian Apicultural Association Conference and ApiEXPO	Malaysia
Jennifer Alianza	BAR	11 th Asian Apicultural Association Conference and ApiEXPO	Malaysia
Marjorie Mosende	BAR	11 th Asian Apicultural Association Conference and ApiEXPO	Malaysia
Ligaya Santolices	BAR	11 th Asian Apicultural Association Conference and ApiEXPO	Malaysia
Julia Lapitan	BAR	4 th International Conference on Knowledge Management and Information Sharing and Visit FAO and International Fund for Agricultural Development	Spain Italy
Rita dela Cruz	BAR	4 th International Conference on Knowledge Management and Information Sharing and Visit FAO and International Fund for Agricultural Development	Spain Italy
Patrick Raymond Lesaca	BAR	4 th International Conference on Knowledge Management and Information Sharing and Visit FAO and International Fund for Agricultural Development	Spain Italy
Rex Victor Cruz	UPLB	IUFRO Landscape Ecology Conference	Chile
Mara Shyn Valdeabella	BAR	Writeshop on Translating Research Findings into Knowledge Accessible to Extension Workers and Farmers	Indonesia
Anne Camille Brion	BAR	Writeshop on Translating Research Findings into Knowledge Accessible to Extension Workers and Farmers	Indonesia
Solita Sicat	BPI	6 th Session of the Intergovernmental TWG on PGRFA	Italy
Cleofas Cervancia	UPLB	10 th Apicultural Association Conference and Api-Expo	South Korea
Victoriano Guiam	BAR	Regional Consultation with Asian-Pacific Member Countries of CABI	India
Jovita Datuin	RFU I	15 th Asian-Australasian Association of Animal Production Animal Science Congress	Thailand
Melissa Resma	BAR	Expert Workshop on Agricultural Technology Information Network (ATIN)	Sri Lanka
Hazel Antonio	PhilRice	2012 International Development Conference	New Zealand

TRAININGS

LOCAL TRAININGS

PARTICIPANTS	EVENT	VENUE
Rodolfo Galang (BAR)	4 th Agribusiness Economics Conference	Davao City
Leonisa Artes (UPLB)	ISHS 4 th Symposium on Improving the Supply Chains in the Transitional Economies	Cebu City
Selected BAR Staff , DA-RFU CAR, I, II PLGU/MLGU in Cordilleras, SUCs	PHIRARDEP – In-Country Training Course on Strengthening Rainfed Agriculture Research, Development and Extension (1 st batch)	IFSU
Selected BAR Staff, DA-RFU VI, VII, VIII, SUCs, PAO-Iloilo, PAO-Negros Occidental	PHIRARDEP – In-Country Training Course on Strengthening Rainfed Agriculture Research, Development and Extension (2 nd batch)	BISU
Selected BAR Staff, DA-RFU I, III, LGU- MAO Pinili, Ilocos Norte, OPAG –Ilocos Norte, Ilocos Sur, La Union, SUCs, BAPAMIN	PHIRARDEP – In-Country Training Course on Strengthening Rainfed Agriculture Research, Development and Extension (3 rd batch)	MMSU
Selected BAR Staff, DA-RFU IX, X, XI, XII, CARAGA, ARMM, DA-LGU Bukidnon, SUCs, PhilRice, ICRISAT	PHIRARDEP – In-Country Training Course on Strengthening Rainfed Agriculture Research, Development and Extension (4 th batch)	Davao City
Selected BAR Staff, DA-RFU II, III, PLGU- Batanes, SUCs	PHIRARDEP – In-Country Training Course on Strengthening Rainfed Agriculture Research, Development and Extension (5 th batch)	DA-RFU II - CVLMROS

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ACRONYM

ADB	Asian Development Bank
ACIAR	Australian Centre for International Agricultural Research
ACD	Applied Communications Division
AFACI	Asian Food and Agriculture Cooperation Initiative
AMAS	Agribusiness and marketing Assistance Service
ASU	Aklan State University
ATIN	Agricultural Technology Information Network
ATWGARD	Association of Southeast Asian Nations Technical Working Group on Agricultural Research and Development
AVRDC	The World Vegetable Center
ADP	Agribusiness Development Projects
AFRDIS	Agriculture and Fisheries Research and Development Information System
AFMA	Agriculture and Fisheries Modernization Act
AFPRU	Agriculture and Fisheries Policy Research Unit
ATI	Agricultural Training Institute
AYT	adaptability yield trials
BAI	Bureau of Animal Industry
BAR	Bureau of Agricultural Research
BPI	Bureau of Plant Industry
BFAR	Bureau of Fisheries and Aquatic Resources
BSWM	Bureau of Soils and Water Management
BUCAF	Bicol University College of Agriculture and Forestry
CEMIARC	Central Mindanao Integrated Agricultural Research Center
CLSU	Central Luzon State University
CNSC	Camarines Norte State Colleges
COGENT	Coconut Genetic Resources Network
COMSTE	Commission on Science and Technology and Engineering
CPAR	Community-based Participatory Action Research
CPREMS	Commodity Production Resource Management System
CRGM	Competitive Research Grant Manual
CSSP	Crop Science Society of the Philippines
CVIARC	Cagayan Valley Integrated Agricultural Research Center
DA	Department of Agriculture
DFIMDP	Diversified Farm Income Market Development Project
DMFFO	Dulangan Manobo Free Farmers Organization
DMMMSU	Don Mariano Marcos Memorial State University
DNCRDC	Davao National Crop Research and Development Center
DOST	Department of Science and Technology
DRTS	Document Recording and Tracking System
EDTRS	Employee's Daily Time Recording System
EO	Executive Order
EVIARC	Eastern Visayas Integrated Agricultural Research Center

ACRONYM

FAO	Food and Agriculture Organization
FARM	Foundation for Agriculture-related Missions
FIDA	Fiber Industry Development Authority
GEF	Global Environment Facility
GIS	Geographic Information System
GPO	Good Practice Options
HIP	High Impact Projects
HRDP	Human Resource Development Program
HVCDP	High Value Crops Development Program
IAF	Institute of Agroforestry
ICRISAT	International Crops Research Institute for the Semi-arid Tropics
ICT	Information and Communication Technology
IDD	Institutional Development Division
IMU	Information Management Unit
IDG	Institutional Development Grant
IDU	Infrastructure Development Unit
IHRMIS	Infrastructure and Human Resource Monitoring Information System
IEC	Information Education Communication
IP	Intellectual Property
IPB	Institute of Plant Breeding
IPO	Intellectual Property Office
IPGRI	International Plant Genetic Resources Institute
IPMIS	Intellectual Property Management Information System
IRRDB	International Rubber Research and Development Board
ISU	Isabela State University
ISO	International Standards Organization
ITDI	Industrial Technology Development Institute
JICA	Japan International Cooperation Agency
KM	Knowledge Management
KR2	Kennedy Round 2
LAES	Lipa Agricultural Experiment Station
LDC	Livestock Development Council
LGU	Local Government Unit
LPMCP	Labo Progressive Multi-purpose Cooperative
LSU	Leyte State University
MGSK	Makabagong Gabay sa Kalusugan
MMSU	Mariano Marcos State University
MOA	Memorandum of Agreement
MSI	Marine Science Institute
MSU	Mindanao State University
MTA	Material Transfer Agreement
M&E	Monitoring and Evaluation

ACRONYM

NAFC	National Agricultural and Fishery Council
NARTDI	National Apiculture Research, Training and Development Institute
NaRDSAF	National Research and Development System for Agriculture and Fisheries
NCPAG	National College of Public Administration and Governance
NIRDEAP	National Integrated Research and Development Extension Agenda and Programs
NGO	Non-Government Organization
NOMIARC	Northern Mindanao Integrated Agricultural Research Center
NRC	National Research Centers
NRS	National Research Symposium
NTCP	National Technology Commercialization Program
NVSU	Nueva Vizcaya State University
OAS	Outstanding Agricultural Scientist
OFR	On-Farm Researchers
OPREMS	Onion Production Resource Management System
OMA	Office of the Municipal Agriculturist
OPTION MPC	OPTION Muscovado Plant Cooperative
PAFERN	Philippine Agroforestry Education and Research Network
PBRC	Philippine Bamboo Rattan Center
PBSP	Philippines Business for Social Progress
PhilMech	Philippine Center for Postharvest Development and Mechanization
PCA	Philippine Coconut Authority
PCC	Philippine Carabao Center
PhilAgriNet	Philippine Agricultural Information Services Network
PhilFoodEx	Philippine Food Processors and Exporters Organization, Inc.
PhiRARDEP	Philippine Rainfed Agriculture Research, Development and Extension Program
PIM	Pre-implementation Meeting
PMED	Project Monitoring and Evaluation Division
PPDD	Planning and Project Development Division
PRA	Participatory Rural Appraisal
PSU	Palawan State University
PO	Private Organization
PTMIS	Proposal Tracking Monitoring Information System
PTV	People's Television Network
QSC	Quirino State College
RDMIS	R&D Management Information System
RFRDC	Regional Fisheries Research and Development Center
RFU	Regional Field Unit
RIARC	Regional Integrated Agricultural Research Centers
RRDEN	Regional Research and Development Network
ROS	Research Outreach Station
R&D	Research and Development
SCBI	San Carlos Bioenergy Inc.

ACRONYM

SEARCA	Southeast Asian Regional Center for Graduate Study and Research in Agriculture
SEMS	Scholarship Evaluation and Monitoring System
SLSU-JGE	Southern Luzon State University-Judge Guillermo Eleazar
SMLCPDF	Southphil Muslim Lumad Christian People's Development Foundation, Inc.
SNAP	Simple Nutrient Addition Program
SPG	Scientific Publication Grant
STIARC	Southern Tagalog Integrated Agricultural Research Center
SUCs	State Universities and Colleges
SPPEMS	Supplies, Property, Plant and Equipment Monitoring System
TCD	Technology Commercialization Division
UNDP	United Nations Development Programme
UPD	University of the Philippines Diliman
UPLB	University of the Philippines Los Baños
UPLB-FI	University of the Philippines Los Baños Foundation, Incorporated
UPPAF	University of the Philippines Public Administration Research and Extension Service Foundation, Inc.
UPV	University of the Philippines Visayas
USM	University of Southern Mindanao
VDTMS	Vehicle Dispatching and Trip Monitoring System
VSU	Visayas State University
WMSU	Western Mindanao State University
ZAMPIARC	Zamboanga Integrated Agricultural Research Center
ZRCAF	Zonal Research Centers for Agriculture and Fisheries

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