2016 ANNUAL REPORT

Delivering R&D Results in a Changing Agri-Fisheries Landscape

About the Cover

A woman farmer in Maddela, Quirino Province is holding a bunch of newly-harvested Adlay (*Coix lacryma-jobi* L.) also known as "Job's Tears". Adlay belongs to the family Poaceae or the grasses, the same family to which wheat, corn, and rice belong. It produces good yield in areas where rice and corn hardly grow, like the highlands. Just like rice, farmers grow adlay as their staple crop for its good eating quality. It bears tear-shape grains which when matured are harvested, pounded, threshed, and winnowed, cooked and served steamed just like rice.

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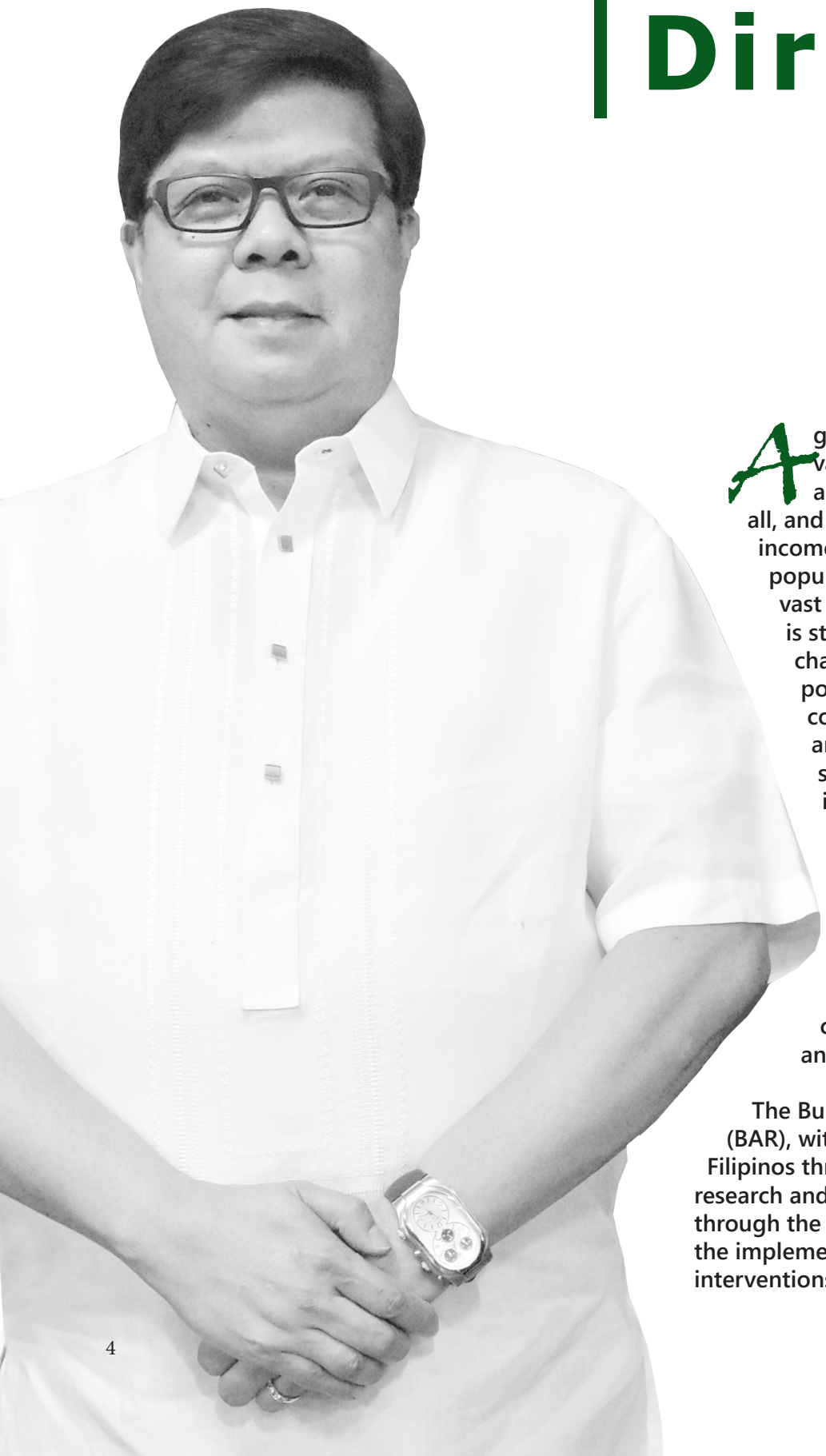
Message from the Director



Agriculture has long proven its value in assuring the production and availability of food for all, and in generating livelihood and income for a third of the country's population. Even with its rich and vast fertile lands, the Philippines is still confronted with the challenge of feeding its growing population. In the urgent need to continuously boost the growth and competitiveness of the sector, amid numerous growing issues such as climate change and decreasing agricultural land area, the Department of Agriculture (DA) capitalizes on research and development (R&D) to generate and improve technologies that will increase the productivity and competitiveness of our farmers and fisherfolk.

The Bureau of Agricultural Research (BAR), with its vision of a better life for Filipinos through responsive agri-fishery research and development (R&D), has through the years, developed and supported the implementation of R&D programs and interventions that go beyond increasing

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farm yield. BAR, as the DA’s mandated national agency for coordination of agri-fishery R&D, places the empowerment of farmers and fishersfolk at the core of its priorities. In supporting R&D activities, BAR looks into how projects can yield positive impact resulting, not only improved farm productivity and enhanced incomes, but also capacitating farmers and fisherfolk to make informed decisions.

With the theme, “Delivering R&D Results in a Changing Agri-fisheries Landscape”, the *BAR 2016 Annual Report* highlights the programs and interventions that the Bureau intensified in 2016 to ensure that effective R&D results were brought to their intended end-users resulting to profitable and lasting benefits to the farming and fishing communities. This report also provides a vivid portrayal on how BAR, through its R&D programs, reached out to its clients and conveyed to them the knowledge, information, and technologies enabling them not only to be aware of the availability of technologies and innovations but to actually use them in their own fields.

This report outlines the accomplishments of BAR’s banner and R&D programs in 2016 drawing attention as to how R&D technologies were able to empower farmers and fisherfolk both in financial and social terms. It also highlights the collaborations of BAR with its partners including series of consultations and workshops to update medium-term plans and agenda. Two important outputs were the National Research and Development and Extension Agenda and Programs (RDEAP) for Agriculture and Fisheries, and the Climate Change RDEAP which are helpful in aligning and prioritizing research proposals for funding.

As we continue to calendar year 2017, I would like to thank BAR’s R&D partners from DA and BFAR Regional Field Offices, state universities and colleges (SUCs), international and non-government agencies, and local government units (LGUs) for their unwavering support. Likewise, the BAR technical and administrative staff members for their continuous commitment and dedication, and the DA management for their trust and confidence in BAR. You are all part of what BAR has accomplished and will continue to accomplish.

Mabuhay!

DR. NICOMEDES P. ELEAZAR, *CESO IV*

Delivering R&D results
in a changing agri-fisheries landscape

So it came to pass that on 1 July 2016, an important date for the agriculture sector, Emmanuel F. Piñol was installed as Secretary of the Department of Agriculture (DA). Along with this development, major changes were introduced in DA.

One game changer was a redirection of the Department's work. Secretary Piñol realized that the DA's bureaucracy needed to change its orientation and reminded it of its fundamental mission of making certain that food is both available and affordable. With this, the DA faced two basic questions: 1) What do Filipinos eat, and where and how do we produce these commodities? and 2) What do the local and foreign markets need which the Philippines could produce?

The Department needed to increase its focus on commodities for food to meet the Filipinos' nutritional requirement and on the agricultural items that can provide farmers and fishers and others dependent on agriculture with the means and income for survival and prosperity. In response, the DA agencies remapped their approaches, reset their sights, and reworked earlier plans.

The Bureau of Agricultural Research (BAR) is no stranger to change. In fact, change is second nature to it. Its work environment undergoes flux every now and then with the arrival of new trends in scientific thought and concepts and of new discoveries, and revolutionary approaches in research. These have enabled BAR to make incremental improvements as an organization. With the announcement of the DA's fresh directions, the Bureau was quick in making adjustments.

Year 2016 was full of change and new things. The updating of the RDEAP came to lay emphasis on the value chain approach. Changes in the RDEAP's specific to Climate Change and Organic Agriculture were also due with new concerns arising from their dynamic natures. Renewal of partnerships with CIAT, WorldFish, IRRI, and other CGIAR centers as well as international institutions was a natural as these continue to be important sources of new knowledge. New horizons, concepts, and approaches were explored such as the use of social media for promoting agriculture (e.g., PRISM), the novel Technology Commercialization on Wheels (TCOW) and the development of 10-year compendiums of agri-fishery research projects supported by the bureau.

The development of a new breed of agri-development workers in AgRiDOC and CPAR farmer-adopters were seen too. Products from unfamiliar plants and animals such as an aquaculture immunostimulant from *Sargassum* seaweed and tilapia ice cream came as pleasant surprises. The inauguration of new R&D facilities in various regions went full speed. There were also fresh thrusts for cacao, adlay, natural rubber, native pig *lechon*, and bee culture, among others.

"I shall not pass this way again" was part of an old Quaker saying from the late 18th century that talks about relationships and the need to stand together in the "now" as we won't be together tomorrow. People of the present time, cannot defer to the future the acts of doing good as it is best left to those who will come after us as, after all, they will be in the best position to decide what should be done under future scenarios. And so, BAR has been mobilizing the resources to make the needed changes to strengthen the RDE system for it to meet tomorrow's exigencies and vicissitudes head on.

As the country braced for ASEAN integration, the DA assessed how the sector can remain competitive and resilient despite the bigger competition. With this concern, BAR, as the mandated national agriculture and fisheries research and development (R&D) coordinator of the Department, sought ways how research institutions can respond to the challenges of the ASEAN integration.

BAR realized that, in order to be competitive, the capabilities of Philippine agricultural research institutions must, at the very least, be at par with those of the other ASEAN members. In the BAR-SEARCA training of partner researchers related to the project, "Strengthening Agricultural Research and Development towards ASEAN Integration", BAR Director Nicomedes P. Eleazar stated that "this is one crucial step that we are taking towards the goal of making the agriculture sector resilient and competitive in the face of the changing local and international agricultural landscape".

Multi-stakeholder activities have become the norm be it about setting research agenda and programs, or about revisiting issues and concerns such as climate change and biodiversity conservation, or about gender concerns or some emerging threats such as cassava witches' broom disease or mango Cecid fly, and others.

The "morphed" BAR is best described in the words of Director Eleazar as he exhorted the people involved in updating the RDEAP: "At the very end, BAR (in producing the RDEAP) continues to be responsive to the current demands and needs of the sector and accomplishes this by being consultative with the R&D community and stakeholders, and aggressive in innovating and improving its mechanisms for the optimum benefit of the farmers and fishers of this nation." ■

Banner Programs

Community-based Participatory Action Research (CPAR)

CPAR is a location-specific research cum extension program that deals with improved farming systems technologies. Nineteen years later since its first implementation in 1998, BAR has supported and coordinated 271 CPAR projects nationwide, with more than 14,000 farmer-beneficiaries.

In 2016, there were 87 projects funded and coordinated, of which 11 projects were newly-funded.

The Program Monitoring and Evaluation Division (PMED) of BAR leads the coordination of all CPAR projects.

MAJOR ACTIVITIES CONDUCTED UNDER CPAR PROGRAM

1) CPAR Technical Working Group (TWG) Meetings

TWG meetings are conducted to ensure that activities with respect to the CPAR program are effectively carried out. In 2016, the following were the discussions during the meetings:

Plans and assessment of the program for 2016;

Concepts and preparatory activities for the conduct of community organizing seminar workshop;

Review of proposal for the CPAR financing program of Agricultural Credit Policy Council (ACPC); and

Planning workshop for the 3rd CPAR Congress (logistics, theme, topics to be presented, etc.).

2) CPAR Orientation Workshop

In an effort to establish CPAR in all the provinces of the country, BAR, through PMED, identified provinces which have not yet carried out a CPAR project. These provinces included Kalinga (CAR), North Cotabato (Region 12), and Samar (Region 8).

On September 22 and October 13, PMED coordinated the conduct of the CPAR briefing and orientation workshops in North Cotabato and Kalinga provinces, respectively. This activity resulted to new CPAR proposals to be packaged and supported by the Bureau.

3) Community Organizing Workshop

This activity was conceptualized to strengthen the implementation of CPAR projects. Community organizing is considered a viable strategy and a tool to elicit active participation and cooperation among farmer and fisher cooperators; establish and strengthen a formal structure of collaborations (e.g. farmers' association); and forge partnership among other groups. PMED coordinated the seminar workshop on community organizing on 5-7 July 2016 at BAR. CPAR implementers from Regions CAR, 1, 2, and 3 participated in the seminar workshop. Topics discussed were: basic concepts of community organizing, organizational development and management, project development, and social enterprise building.

TECHNOLOGIES INTRODUCED THROUGH CPAR PROJECTS

CPAR ensures the transfer and adoption of technologies from research to farmers' fields. Since the program focuses on verification, demonstration, and adoption of agricultural technologies at the community level, CPAR interventions target to improve both the productivity and empowerment of farmers.

In 2016, among the significant technologies that were introduced and adopted by the farmers and fisherfolk through the CPAR program were the following:

1. **CPAR on rice-based integrated farming system in Palague and San Pablo, Candaba, Pampanga**

   Drum seeder for the rice production: The intervention is the introduction of drum seeder and two bags of certified seeds per hectare. The use of drum seeder is a cost reduction technology in terms of seed requirement and labor. This was introduced to lessen the number of seed requirement per hectare. The rate of 1-2 bags per hectare is sufficient to plant a hectare using drum seeder.

   Duck raising: Feeding management and proper stock selection as well as health management were the interventions. Marketing of the farmers' produce were the responsibility of the cooperative.

2. **CPAR on integrated coffee-based farming system in Brgys. Tala and Pagasa, Orani, Bataan**

   Integrated coffee-based production system: Integrated cultural management for coffee and vegetables production includes interventions such as crop rejuvenation, fertilizer and water management.

3. **CPAR on tilapia pond-based hatchery in Cayetano, Dinagat Islands**

   Tilapia hatchery technology: Pond preparation, pond water management, stocking of fry, feeding of fingerlings, broodstock development, fry collection and selling were the introduced interventions as part of the integrated production system.

4. **CPAR on modular pond culture of tilapia at Brgys. Pigtauranan and Bacusanon, Pangantucan, Bukidnon**

   Delayed feeding strategy, all male strategy, *tilanggit* production, weekly fertilization strategy and percentage satiation feeding method: Delayed feeding strategy is a culture technique introduced to minimize feed consumption but with the same result; all male strategy is an alternative culture technique based on the fact that male tilapia grows faster than female tilapia; *tilanggit* production is product developed from the all-male technology segregation; weekly fertilization strategy is a food production-based technique on natural foods; while the percentage satiation feeding method is a type of feed management.

CPAR SUCCESS STORIES

1. CPAR on Organic Vegetable-based Integrated Farming in Ifugao

Various CPAR projects in Ifugao demonstrated notable results through its expansion and growing number of farmer-adopters who fully embraced technologies introduced through CPAR. One of the success stories involved Nene Pahiwon, an adopter of the technology through CPAR. She did not only gain a profitable hobby but also new knowledge on the different package of technologies on organic vegetable production. The most important thing for her was how it taught her to conserve the soil while producing healthy vegetables, particularly lettuce. "I learned how to make the soil healthy, and my family healthy, too," she shared. "I easily dispose my vegetables because people here have become health conscious. In a university alone, nauubos ang harvest kong gulay," she added. Her new found knowledge has helped her sustain her family's income. "I was also taught of relayed cropping of lettuce, that's why I harvest every month," said Pahiwon.

The same is true for Nida Bongat, a farmer-adopter in Brgy. Naminlangan, Alfonso Lista. When she learned of the good benefits of CPAR in her community, she did not hesitate to learn and eventually practice the technology. She learned to produce organic Cavendish banana, while intercropping legumes and integrating peanuts, soybean, and livestock. Now, she is included in the group of CPAR farmers whose produced bananas are being exported in some markets in Japan.

2. CPAR on Organic Vegetable and Organic Chicken Production in Kiangan, Ifugao

In 2011, Jesus "Jess" Domingo learned about the CPAR on organic vegetable production and organic chicken production being implemented in Kiangan, Ifugao led by Dr. Catherine V. Buenaventura of the Provincial Agriculture Environment and Natural Resources Office (PAENRO). Along with other farmer cooperators, Jess was introduced to various production techniques and capacitated them in organic production technologies through the conduct of Farmers' Field School (FFS) sessions as well as organizational meetings and workshops. He applied all his learning including the principles of organic vegetable production and organic chicken production which he got during the FFS, resulting in a successful and profitable production. He expanded his vegetable production to chili pepper production, as well as tomatoes and bell pepper, which he now markets in Alfonso Lista, Santiago City, and in Metro Manila.

Now, Jess' very own farm, Rancho Domingo Integrated Organic Farm, is an accredited training center by the Department of Agriculture-CAR and has become one of the lead farm destinations among organic farming enthusiasts and advocates.

3. CPAR on Sugar Apple (*Atis*) Production

CPAR became an effective means to determine the limiting factors and provide adequate solutions to boost *Atis* farming in Lobo. The decline in the production of *Atis* in the last few years was attributed to the lack of proper pest management. It was during the participatory rural appraisal (PRA) that the project team, along with the 20 farmer-cooperators, established a rather simple solution to the mealy bug infestation. In this project, CPAR did not only introduce a technology, but, and more importantly, it taught the *Atis* farmers to unlearn ineffective farming measures that caused low productivity for quite some time. Since the project's implementation, farmers were able to experience a significant increase in their yield and income. With these possibilities of a more profitable production of *atis*, CPAR can help further strengthen and promote the municipality of Lobo as the *Atis* capital of the Philippines which was officially declared in 2011.

4. CPAR on Fishpond Production in Lamut, Ifugao

The CPAR project aimed to promote the adoption of improved technology on tilapia production to fisherfolk using the farmers' field school (FFS) approach; and promote fish processing and packaging technologies to add value to fishery products and provide consumers with better quality fish products. Among the interventions introduced in the project included the establishment of tilapia fishpond production demonstration sites wherein each cooperator where provided at least 400 square meters of their fishpond areas for their on-farm trials.

Villafuerte Camat, Jr., a farmer from Lamut, Ifugao and owner of the Camat Farm, is one of the farmers who adopted the package of technologies introduced through CPAR. Camat was able to develop his own feed formulation for his swine, chicken, and fish and is now producing his own fertilizer using Azolla in combination with the manure for his organic swine. In 2013, Camat Farm was fully converted into an integrated organic farming which included: rice production, fish culture, organic swine production, chicken production, vegetables in plots and plastic containers, and rabbit production.

His 0.5-hectare organic tilapia production was further strengthened when he attended a training on postharvest and value-adding. One of its distinct characteristics is that, it is meatier compared to *danggit*. This provided value-adding to tilapia production and opened opportunities for livelihood and additional income to fisherfolk in the area. Products from tilapia, both fresh and processed, are being sold at the local market in Lamut. Many of Camat's buyers usually go to his farm to buy his produce.

5. CPAR on Potato-based Farming System

Implemented in Imbayao, Malaybalay City, Bukidnon, the CPAR project was led by DA-RF0 10, in collaboration with the local government unit of Malaybalay City. The project aimed to improve the productivity and profitability of potato farmers by ensuring sustainable agricultural production and augmenting their source of income. It is hoped that farmers will be able to produce their own quality potato seeds for commercialization, increase their potato yield by more than 20 percent, and augment their profit through crop and livestock integration and other recommended interventions.

Among the interventions introduced through CPAR include field bulking (semi-potato seed production), crop rotation (crucifers, corn, and beans), goat production, seed plot technique (disease-free potato seed production using biofumigation technology), commercialization of quality potato seeds, and crop and goat integration. Since then, the farmers became the source of clean planting materials of potato from their own produce. Now, they are envisioning that they can still provide or serve the other potato-growing areas in Region 10 and in Mindanao.

Banner Programs

National Technology Commercialization Program (NTCP)

The NTCP is another banner program of the Bureau that complements the CPAR. It ensures that technologies will be strategically placed and transferred to areas and communities that need them the most.

The Technology Commercialization Division (TCD) of BAR coordinates projects under the NTCP and provides technical assistance in the planning, finalizing, and implementing various activities of different commodity- or industry-focused roadmaps developed by DA and the subsequent funding of projects under these priority areas.

In 2016, TCD received 77 proposals from different agencies. Out of these proposals, 35 projects were funded. These were being undertaken through technology sourcing activities. Majority of the submitted proposals were on crops with most of the implementers from SUCs.

On top of the 35 newly-funded projects in 2016, TCD also coordinated and managed 63 on-going projects resulting to a total of 98 projects being coordinated under NTCP through various fund sources. *(Table 1)*

Table 1. Number of TCD-coordinated funded projects.

Funding Source	Ongoing	New	Total
AFMA	30	13	43
HVCDP	22	20	42
Organic	9	1	10
Corn	1	1	2
Rice	1	0	1
Total	**63**	**35**	**98**

MAJOR ACTIVITIES CONDUCTED UNDER NTCP

1. Technology Business Incubation (TBI)

With the need to establish mechanisms and to identify strategies that can sustain the NTCP and the need to provide appropriate environment for researchers to pursue more business-friendly and responsive technology development efforts, BAR established the TBI Program. It is a facility that supports start-ups through providing needed resources and services to increase business survival in a competitive market. It provides advice and support to innovators in agri-based business establishment and development.

To support small start-up companies in the country, benchmarking visits were conducted by the Design and Diagnosis Team (DDT) to TBIs in three different countries, namely: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India, Incubator for Agribusiness and Agroindustry-Bogor Agricultural

University (IAA-IPB) in Indonesia, and Malaysian Technology Development Corporation (MTDC) in Malaysia. DDT was divided into three groups that simultaneously visited the TBIs in each region on 10-15 April 2016 to observe the different modalities and lessons that they could adopt, including taking notes of the various challenges met in developing a successful TBI in their area.

2. Technology Commercialization On Wheels (TCOW)

Through the collaborative efforts between BAR through the NTCP, and the University of the Philippines Los Baños Foundation Inc. (UPLB-FI) through the College of Development Communication (UPLB-CDC), the TCOW was officially launched in April 2016 in Lucban, Quezon and Legazpi City, Albay.

The TCOW project is an innovative approach and initiative to improve local agricultural conditions and enhance the social marketing appeal of agriculture and fisheries commodities. This is done by introducing Package of Technologies (POTs) to areas that needed them the most using a mobile exhibit truck, a popularly used tool to bring technologies and knowledge products to remote areas. Unlike the usual exhibit vehicles, TCOW provided a venue for stakeholders to meet and ask the researchers, scientists and experts for their needed information on production, processing, packaging, financing, and marketing of their products.

Among the technologies featured included adlay, soybean, seaweeds, oregano, pineapple, cacao, gourmix, malunggay, bee, coffee, cacao, herbs and spices, native swine, among others.

In June, the "Roll-out to Communities" was conducted in eight municipalities of Quezon including Tiaong, Dolores, Calauag, Mulanay, San Narciso, Infanta, Lucban, Tagkawayan; and five municipalities in Albay namely: Tiwi, Legazpi, Malilipot, Guinobatan, and Manito. Featured discussions and demonstrations involved matured technologies from various BAR-funded projects. During the roll-outs, scientists who have developed the technologies joined the TCOW team in an effort to bring agricultural innovations to inaccessible communities.

The roll-out activities were conducted in two barangays per pilot municipality/city which were attended by farmers, fisherfolk, women's groups, agriculture students, and other community associations. The LGU of each municipality took part in the roll-out through identification of stakeholders and barangays based on the technologies to be introduced. Representatives from microfinance institutions discussed services that stakeholders could avail of to start their businesses. Experts from DA-Agribusiness and Marketing Assistance Division (AMAS) for information on market linkage were also given time to present marketing services.

TECHNOLOGIES COMMERCIALIZED FROM NTCP PROJECTS

1. Technology promotion and packaging development of high-value products from selected indigenous fruits

Establishment of quality assurance system for fruit wine, cordial, and other high-value products; and improvement of product presentation through proper packaging design were conducted.

2. Developing the potential of native pigs for organic meat production

This involved technology on feeding using *Trichantera* and other indigenous feeds. The project tested the nutrition and feeding of native pigs in producing the best quality, organic meat and has efficient growth performance.

3. Development of new areas for seaweed farms

The project introduced floating methods for seaweed culture (single and multiple floating long line methods) to expand farming in deeper areas of seaweed farms. The project assessed and developed new areas in Bolinao-Anda reef complex in Pangasinan to augment production of seaweeds and to provide sustainable source of livelihood for fishermen in the locality. The project demonstrated the potential of integration of seaweeds into nutrient-rich areas (in fish mariculture areas) for bioremediation and economic diversification.

4. Commercialization of off-season tomato production technology

The technology showed that grafting of tomato to an eggplant variety EG203 tolerates flooding and showed considerable resistance to bacterial wilt, the use of raised planting beds, plastic mulch, trellis, and rain shelters (protective structures). These package of technologies are employed during the off-season tomato production.

TECHNOLOGIES COMMERCIALIZED FROM NTCP PROJECTS

5. Promotion and utilization of some fishery products

The project included the production of developed POTs for canned tuna in oil and *bangus* French style, *bagoong* and other fish products, for promotion and marketing including technology transfer to interested groups or individual.

6. Product enhancement of smoked soft-boned bangus

This included value-adding of milkfish by developing it into smoked soft-boned *bangus* that is preserved and enhanced with herbs. The project also included development of packaging and labeling of the product.

7. Technology promotion and utilization of window pane oyster (*Placuna placenta*) products

Kapis products like Christmas lanterns, wall or hanging lamps, mirrored wall decors, tables, chairs, *kapis* panels as room divider, candle holder, decorative and serving plates, wind chimes, boxes, among others were being processed by small entrepreneurs. Packaging of small- to medium-sized products was developed with the use of sticker labels in promoting the products. *Kapis* product-making is competitive and profitable.

8. Environmental assessment of community-based and commercial-scale biofuels processing systems using alternative biofuel feedstocks: An effort towards climate change mitigation in the Philippines

Biofuel feedstocks identified in this study are jatropha for biodiesel production and sweet sorghum for bioethanol. Material balances for biofuel processing systems for commercial- and community-based scales were determined, as well as the plantation area requirement and necessary fertilizer input. Plant design was carried out for each processing system, which includes plant layout, piping, equipment sizing, and structural and construction design. With this technology, about 155 percent greenhouse gas (GHG) reduction can be realized from commercial scale bioethanol production, while 263-268 percent GHG reduction can be attained from biodiesel production of the same scale.

NTCP SUCCESS STORIES

1. Utilization and commercialization of selected indigenous and endemic plants found in Region 4 with potential economic uses

Looking into the potentials of indigenous plants in the Philippines, the Crop Science Cluster of the College of Agriculture, University of the Philippines Los Baños (UPLB) embarked on a project to introduce and promote indigenous plants in Region 4 that exhibit potentials as source of food and non-food products. Five of the collected plants were selected for further studies namely: *Canna* (*Canna indica* L.), *Balbas bakiro* or *Gac* (*Momordica cochinchinensis*), *Lagikway* (*Abelmoschus manihot*), *Apulid* or water chestnut (*Eleocharis dulcis*), and *Talinum* or waterleaf (*Talinum fruticosum* and *Talinum triangulare*). Others were retained for collection purposes. Possible products that can be developed from these five plants were assessed, including processing *Gac* into snacks, tea, and food color; *Lagikway* into chips; *Canna* into flour and starch; *Apulid* into pickles; and *Talinum* into animal feeds. These were subjected for composition analysis and initial product testing.

Also part of the project was the conduct of initial studies on propagation and production practices. Seedlings of selected plants were likewise subjected to drought and waterlogged conditions under a greenhouse setting. Initial testing was done to determine the period of drought and waterlogged condition as basis for treatment implementation.

2. Value chain analysis (VCA) of native *lechon* in Luzon

The bright prospect of native pig production and processing requires a value chain analysis that can serve as reference point for improving business environment and support services to various stakeholders. This can also help in identifying constraints and opportunities to increase the income of farmers and native *lechon* makers.

To boost the production of native animals for food and to study the dynamics of *lechon* making and marketing, BAR partnered with the Center for Environmental Law and Policy Advocacy (CELPA), Inc., to prepare an industry value chain map for native *lechon*; and determine cost and profit of producing and marketing live native pigs and native *lechon*.

No detailed market study has been done yet on native pig production so this project is a pioneering activity to determine its demand as a commodity. The project undertook series of market reconnaissance in selected provinces in Luzon profiling 184 native pig farmers and 70 native pig traders from Luzon and 32 native pig *lechon* processors. CELPA has completed the value chain mapping in terms of describing the key value chain and market channels, as well as the description of geographic flow of products including indicative volume levels. In terms of markets and market opportunities, they studied the supply and demand trends based on the different stakeholders' perception and native pig out shipment data from the offices of the Provincial Veterinarian in Quezon and in Marinduque.

The study of the value chain of native *lechon* industry in Luzon is necessary to ascertain how much and at which stage of the chain is needed and added to enhance the production and marketing of native *lechon*.

3. Enterprise development through the promotion and utilization of citrus wine and other citrus by-products in Nueva Vizcaya

Nueva Vizcaya, considered as the "Citrus Capital of the Philippines", is a major producer of citrus fruits including Mandarins (Satsuma and Ponkan) and Perante oranges. The province contributes about 70-80 percent of the total annual volume of citrus production in the Cagayan Valley region and about 43 percent of the total Mandarin production in the country.

It became an advocacy of the Nueva Vizcaya State University (NVSU) to support the province in strengthening its citrus industry. Thus, in 2007, NVSU established its Citrus Resources Research and Development Center (CRRDC) to specifically pursue endeavors that will help sustain the citrus industry in Nueva Vizcaya. With funding support from BAR, NVSU sought to scale-up production and commercialize the citrus products that will be developed and produced.

NVSU-Food Processing Unit developed and refined its formulation to produce citrus wine. The group found that citrus is a desirable raw material for wine-making, and the best quality of citrus wine can be achieved if aged from two to four years in barrels. The citrus wine named *Citro Vino* was well-appreciated by consumers. Other citrus products developed by NVSU include: citrus cider, conserves, marmalades, jelly, juice, and juice blends. These products are undergoing further refinements including shelf-life testing and nutrient content analysis.

4. Technology enhancement and commercialization of tilapia ice cream

BAR provided funding support to the project, "Technology Enhancement and Commercialization of Tilapia Ice Cream" under the NTCP. This led to the Central Luzon State University (CLSU) being able to develop various tilapia products including the tilapia ice cream, tilapia ice cream with tilapia praline, tilapia ice cream sans rival, and tilapia ice cream with tilapia cookies. There are also thin plain tilapia cookies, tilapia cookies with tomato jam, and tilapia hermits dipped in lemongrass-pandan chocolate.

In 2002, BAR supported the development of value-added products from tilapia in Region 2. Products included tilapia longganisa, nuggets, tocino, and roll. As one of the agencies actively developing technologies to improve the propagation of improved breeds of tilapia, the CLSU-College of Home Science and Industry hosted the "Tilapia Food Festival" in 2011 that paved the way to the development of more products, dishes, and even beverages utilizing tilapia meat as the main ingredient. This was also through the challenge and encouragement of CLSU President, Dr. Tereso A. Abella. According to Prof. Dana G. Vera Cruz, project leader and chair of CLSU's Department of Hospitality Management, selling processed tilapia is more profitable than selling them in fresh form.

The tilapia ice cream bagged the gold medal as the Innovation World Winner Awardee during the Salon International de l'Agroalimentaire (SIAL) ASEAN Manila 2016.

5. Promotion of generated cacao technologies and development of new products towards improved livelihood

In Region 2 where cacao is suitable for growing, research activities are being done to address the problems confronting the local cacao farmers which include: a) availability of healthy cacao seedlings, b) inadequate knowledge on best production and post-production practices, and c) processing and marketing aspects of cacao production.

Through the initiative of the Isabela State University (ISU), cacao production in Region 2 has taken off as it addressed the predicament of the cacao farmers. As a result of massive promotion of cacao production, the area planted to cacao and the number of cacao trees planted increased tremendously. Four cacao varieties, BR 25, UF 18, PBC 123, UIT 1, which are adapted to the local agro-climatic conditions of Region 2 and performed well in the region in terms of number of pods per tree, were propagated under the project for distribution to farmers. Farmers and stakeholders ventured into cacao production in the region as a result of the massive promotion made by the cacao project.

Dubbed as *Sikulati*, the "on top-of-table tops" processed hot chocolate, the famous *champorado*, and other product lines that include tablea tops and kisses, 80 percent dark chocolate, *yema*-filled dark chocolate, *polvoron* de cacao, *pastillas de cacao*, tablea-mango tart, tablea-raisins tart, tablea-soybean chips, choco-nut crispy cookies, choco cream pie, and choco custard pie were all promoted by the project for local production in the region. Other by-products developed for the market include fossilized cacao leaves, cacao pods for organic fertilizer, and cacao pods for livestock feed.

6. Adoption and utilization of nipa palm sugar processing technology in Lanuza, Surigao del Sur

Considering the strategic position of the Philippines, being the country with the third largest area of Nipa palm plantations in Southeast Asia, the Foundation for Rural Enterprise and Ecology Development of Mindanao (FREEDOM), Inc. looked into expanding the selection of Nipa palm-based products. This initiative was done together with the Sitio Ipil Wine Makers Association (SIWA) and the Municipality of Lanuza wherein the latter will have the full marketing contract to purchase the Nipa palm sugar produced by SIWA members for resale to interested buyers.

The project seeks to improve the nipa palm sugar product of the community, contribute to mangrove rehabilitation and protection, and strengthen local people's organizations. Components of the project include organizing innovative sap processing technology training, product packaging and labeling, and market linking.

Before FREEDOM's research project, the farmers in Barangay Agsam, Lanuza had depended on nipa wine making, and rice and corn farming as their sources of income. With the help of the project, their income opportunities significantly increased. SIWA, the chosen project beneficiary, is now managing the common service processing facility and is responsible for producing high-quality nipa palm sugar. The facility that produces the sugar on a weekly basis, houses a mechanical dryer that can process 40 kilograms of sugar per batch.

7. Technology development and commercialization of production system and meat processing from organically-grown native pig and native chicken

To promote native pig as primary source of *lechon,* and native chicken as healthier meat alternatives, a group of researchers ventured into raising organically-grown native pig and native chicken, and developing meat processing and preservation techniques. The objective of the study is to increase the income of animal raisers by at least 15 percent through commercialization of developed technologies.

The Department of Agriculture-Regional Field Office (DA-RFO) 4A-Southern Tagalog Integrated Agricultural Research Center (STIARC) developed an effective preservation technique that will lessen meat wastage, maximize its potential in terms of market acceptability, and increase availability of the product to the majority of consumers. The development of processed meat products from organically-grown native pig and native chicken using different combinations of organically-grown herbs and spices were also conducted.

Among the meat products developed from native pigs were: 1) wet, sundried and smoked tapa; 2) burger; 3) tocino; and 4) siomai. For native chicken: 1) roasted chicken; 2) siomai; and 3) tocino were developed. Other products such as *lechon* belly and smoked ham are still on-going.

8. Commercialization of shiitake production and product development technology in Nueva Vizcaya

Mushrooms are nutritious and low in calories. They are good sources of B vitamins, especially niacin and riboflavin, and rank the highest among vegetables for protein content. In their dried form, they have almost as much protein as veal (meat of calves) and a significant amount of complex carbohydrates called polysaccharides. One of the most valuable mushrooms, nutrition- and flavor-wise, is shiitake (*Lentinula edodes*).

In an effort to promote shiitake mushrooms as a viable income opportunity and as an alternative food source, a research project to increase shiitake production and commercialize the production of the commodity was implemented. The project targets enterprise development through upscaling shiitake production and product development in Nueva Vizcaya. The Nueva Vizcaya State University (NVSU), through its existing mushroom development project, engaged in commercial shiitake spawn production, continued optimization of substrate composition, and value-added processing and by-product development. The university also aims to

develop shiitake growers in the province, each with a capacity of at least 300 logs producing at least 1,000 kilograms of mushrooms per year from NVSU spawn. A simple cost-benefit ratio shows that, for the first year of operation, producing 50 kg of Class A; 45 kg of Class B; and 52.5 kg of Class B in 50 logs of shiitake mushrooms can obtain a net income of roughly Php37,500.00.

9. Technology commercialization of cashew-based products/agri-based enterprise development project

The project of the Department of Agriculture-Palawan Research and Experiment Station (DA-PRES) on cashew project paved for the whole cashew fruit to be put into use and given economic value.

On 13 April 2016, cashew-based products were sold in Puerto Princesa International Airport. In coordination with the Department of Trade and Industry, the products are displayed at the Surublien Palawan Trade House found inside the airport. Among the cashew-based products being sold are wines, juice, jam, jelly, and prunes.

Commercialization of the cashew products has now become evident as they are now displayed in mainstream market and are sold at a competitive price. With the increasing demand for cashew products in Palawan due to tourist influx, the technology commercialization initiatives will contribute in increasing the income of the local cashew farmers.

10. Commercialization of off-season tomato production technologies

The Tarlac Agricultural University (formerly Tarlac College of Agriculture) introduced tomato grafting as an off-season farming technique, which has been adopted by tomato growers in Luzon.

Planting tomatoes during the rainy season makes the crop highly susceptible to bacterial wilt. To combat the plant disease, farmers were taught to graft tomatoes with eggplant wherein they utilize the lower part of the eggplant's anatomy as an aiding root stock for the tomato plant growing above ground. Unlike the roots of a tomato, an eggplant's roots can tolerate flooding and is also resistant to bacterial wilt. The use of raised beds and plastic mulch are important to protect the crops from pests because tomato plants are sensitive to rainfall.

Whether or not tomatoes are in season, the low price in the market either stays the same or goes up in insignificant amounts. What arises then is the need to retain a good harvest of tomatoes during the rainy months. Along with tomato grafting, another solution to preserve the growing tomato industry is the development of an enterprise for value-added products. These included the development of tomato-based products such as candied tomato, tomato jam, and dried tomatoes. Starting an enterprise based on tomato is a promising endeavor due to its abundance when in season as well as its ease in processing the fruits as dried, canned, and bottled to prolong the tomato's shelf life. During off-season, selling tomato-based products can also make up for the loss in profit brought about by smaller harvests. Still, compared to other vegetable crops, tomatoes don't take too long to reach maturity and bear fruit. Tomatoes also fit easily into different cropping systems.

11. Production, processing, and marketing of herbs and spices

Herbs and spices exhibit a lot of advantages for their use. Aside from the fact that herbs need only minimal water for maintenance, the research team pointed out how herbs can serve as alternatives to various everyday necessities.

GreenBread specializes in pizza-making, creating healthy foods to customers. Mr. Wilfredo Lingao II, founder, co-owner, and chef of GreenBread Pizza, a restaurant based in Tagkawayan, Quezon, develops food recipes that are loaded with herbs and spices, and other vegetables. He dreamt of putting up a restaurant that will serve only healthy food. His dream materialized when he was tapped to be the agricultural technician of one of the projects implemented by the Southern Luzon State University-Judge Guillermo Eleazar (SLSU-JGE). The project aimed to reintroduce in Tagkawayan the cultivation of herbs and spices, and to promote their uses through value-adding activities and thus boost the herbs and spices industry in the municipality.

He started by looking for the right combination of herbs and spices that will complement the pizza dough. He incorporated the herbs into the dough, hence, Mr. Lingao's pizza dough is greenish in color. Mr. Lingao expanded his business to offer other varieties of food such as pasta, fajitas, and rice meals. One of these which gained huge popularity is the chicken INA-Q, a chicken *inasal* seasoned with selected herbs and spices.

12. Evaluation and development of nutraceutical and cosmeceutical products from *saluyot* and *okra* as protective and preventive alternatives for health and wellness

Under an NTCP project, the Mindanao State University (MSU) has developed product lines from *saluyot* and *okra* extracts including lotions, facial creams, and capsules. The project's research outputs have potentials to be marketed and distributed by local small and medium enterprises (SMEs) located within the region. The project has also conducted a simple market research to explore market opportunities for the products developed from *saluyot* and *okra*.

13. Development and commercialization of selected strains of Philippine native pigs

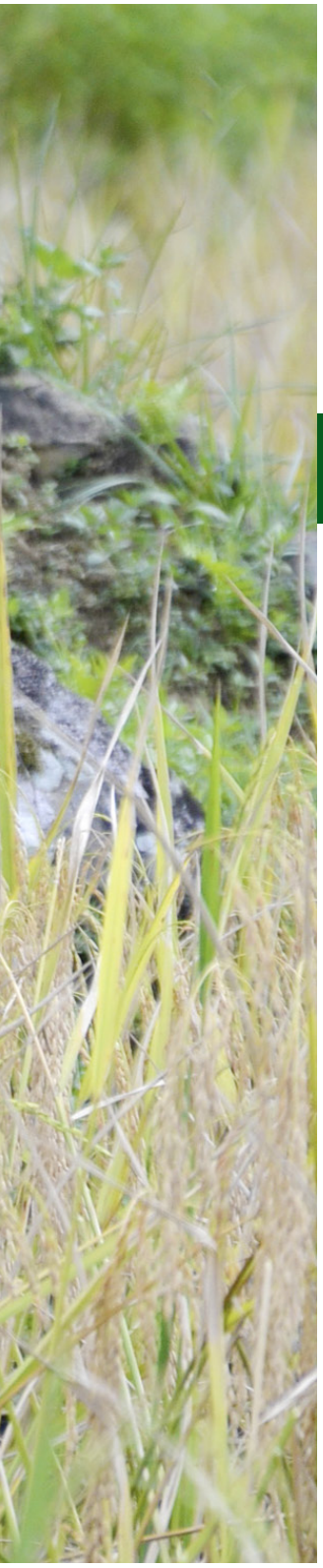
Edelissa A. Ramos, a civil engineer by profession, is a livestock entrepreneur who kept aside, for the time being, her pens, rulers, and compass– when she decided to become a full-time native pig farmer. In 2010, she tried to raise commercial pig breeds in a 3.5 hectare-family-owned farm located in Bagong Pook, Bukal Sur, Candelaria, Quezon. However, poor cash flow and unfavorable balance sheets did not allow her to proceed with the original plan of raising commercial breeds for commercial production, not until she was introduced to the "Commercialization of Potential Strains of Philippine Native Pigs," a sub-component of the "Development and Commercialization of Selected Strains of Philippine Native Pigs" project of the National Swine and Poultry Research and Development Center (NSPRDC) of the Bureau of Animal Industry (BAI), funded by BAR.

Engr. Ramos became one of the identified farmer-cooperators of the BAR-assisted project of the BAI-NSPRDC in 2013. The project involved the dispersal of Quezon, Mt. Province, and Marinduque strains of Philippine native pigs to selected and qualified farmer-cooperators in order to determine the productivity, performance, and profitability of raising native swine at the farmer's level of management.

As a beneficiary, Engr. Ramos was provided with two-month old native swine piglets with five pairs of males and females, with the agreement that the station will supervise the feeding and caring management until the pigs reach the 25-kilo or four-month old mark. Part of the signed agreement between the parties was the understanding that NSPRDC will retrieve five weanlings (a weanling weighs between 25 to 40 pounds), while the remaining animals will be retained by the beneficiaries for commercial production and for other livelihood purposes. The retrieved animals will be dispersed to other potential farmer-beneficiaries selected by the local agriculturists, same as with Engr. Ramos, in collaboration with the station.

Because of Edelissa's proficiency and effectiveness under the program, she was granted the same package again in 2014 and 2015. To date, she has more than 196 heads which keeps her busy managing her farm. To further augment her income, she is also into native pig meat processing with products such as l*onganisa, tocino*, and *humba*.

National Commodity Programs



A. RICE

The Rice Program is one of the banner components of the Department of Agriculture (DA) concerned with rice farming and uplifting the lives of Filipino rice farmers. Under the BAR's Rice R&D Program, 59 projects were funded and coordinated for 2016. From the 59 projects, 50 are new projects. The Bureau also facilitated the conduct of review of 22 Rice RDE proposals, and 37 on-going and 18 completed RDE Rice projects.

TECHNOLOGIES GENERATED/VERIFIED FROM RICE R&D PROJECTS

With continued investments in rice R&D by the DA, BAR provided support to several on-going R&D projects under the DA-IRRI Partnerships and Strategic RDE Projects.

DA-IRRI Partnership

1. Philippine Rice Information System Management (PRISM)

It generated the following: 1) rice area and planting date maps, 2) tabulated data of rice areas by municipality for the participating regions, 3) flood and drought damage assessment reports, and 4) database on pest injuries, production situation and yield using a standard protocol. The project also formally launched the PRISM website with data for the 16 regions available online (http://philippinericeinfo.ph). Other developments were the preparation of the draft PRISM operations manual and a sustainability plan as part of institutionalization and operationalization of the system at the DA (through PhilRice and DA-RFOs) as the project is to be completed in 2017.

2. Rice Crop Manager (RCM)

On its second phase, the project focused on the enhancement of RCM as an agro-advisory service which adjusts its farming advice based on information collected from farmers. It was upgraded to include deployment of information and advice to farmers via Short Messaging Service (SMS), or cellphone text, in addition to one-page printed recommendations. In field research and evaluation trials, it was demonstrated to be the cause of increases in the yield and net income of rice farmers who used RCM recommendations (in season 6 covering Dec 2015 – July 2016, its use increased average grain yield by 0.3 t/ha and increased the added net benefit to farmers by Php4,355/ha).

3. Next Gen Rice Varieties Project

The project on its breeding component, multi-location trials, release and adaptation, and GSR breeding and deployment, continued to establish trials and evaluate rice lines for various ecosystems and major biotic and abiotic stresses. Marker-assisted selection for genes with resistance to biotic and abiotic stresses, multi-environment testing trials, and participatory varietal selections were also carried out under the project. Results from the trials were used in the development of advanced lines with resistance/tolerance to biotic and abiotic stresses which led to the release of high-yielding varieties adapted to rapidly changing environment.

4. IPaD Project

This project enhanced the capability building framework and definition of Rice Extension Professionals or the Agricultural Development Officers (AgRiDOC) and Rice Extension Intermediaries. It supported the development and pilot testing of a six-modular training course (AgRiDOC training curricula). Then training of trainers was conducted for readying the regional roll-out of AgRiDOC training curricula. The regional roll-out fast tracked the training of 67 new AgRiDOCs from various DA-RFOs. Improvement of ICT tools, such as the text centers, Pinoy Rice Knowledge Bank, Rice Doctor and e-Extension, were also continued under the project.

5. Heirloom Rice R&D

Among the accomplishments of the project were the: 1) characterization of heirloom rice varieties from CAR and North Cotabato, 2) strengthening the capacities of farmer-leaders and other stakeholders through the conduct of training activities and a farmers' field school, 3) formation of the self-help groups (SHGs) into provincial cooperatives that are CDA-registered, and 4) drafting of the Code of Practice (COPs) of four heirloom rice varieties: Ominio for Mountain Province, Lasbakan for Benguet, Chong-Ak for Kalinga and Tinawon white (Innawi) for Ifugao, incorporating various aspects of research results or outputs that are now used as science-based information that can guide farmers in good agricultural practices (GAP) and appropriate production of heirloom rice.

6. Associated Rice Production Technologies R&D Project

It studied and demonstrated the following technologies with the partner irrigators associations/farmers organizations: 1) alternate Wetting and Drying (AWD) technique for efficient water utilization, 2) use of recommended seeding rate for transplanted and direct-seeded rice to reduce time and labor for wet seeding, 3) use of the Rice Crop Manager and the Minus-One Element Technique (MOET) as bases for fertilizer applications, 4) use of high quality seeds of a recommended variety, and 5) use of machines for timely farm operations and to reduce postharvest losses. These improved rice yields by 10-18 percent. The project also developed a field guide for weed management for AWD and direct seeding, and designed a prototype zero/reduced-till planter with fertilizer applicator for direct seeding.

Strategic RDE

This consists of various R&D support projects implemented both on national and regional scopes to address specific concerns in the rice and rice-based farming sector.

1. Policy Studies

In 2016, there were four policy studies conducted, one is on "Value Chain Analysis of the Rice Industry" that analyzed the rice value chain in the top 20 major rice-producing provinces and identified/recommended priority interventions and specific policy directions and strategies for improvement. Another policy study was on "Rice Yield Gap and Economic Efficiency" which assessed the causes of yield variation across intensively cultivated and irrigated rice areas in selected countries in Asia and across rice producing provinces in the Philippines. This also generated policy briefs/papers submitted to DA for improving Philippine rice efficiency and competitiveness. Other two policy studies were on "Rice-Based Farm Households Survey in the Philippines" and "Benchmarking R&D Capacities of the Regional Rice and Rice-based R&D Network" which identified capacity building needs in rice R&D, including formulating capacity development framework and identifying recommendations to improve the DA regional research staff capacity for effective research for development in rice and rice-based farming systems.

2. R&D initiatives on the country's specialty and traditional rice

Among the initiatives were focused on the comprehensive profiling of selected traditional rice varieties (TRVs), studies on the mechanisms of the TRV's insect pest and disease resistance for development of genetic stocks with novel sources of resistance genes, and assessment of production and marketing. For hybrid rice, continuous support was facilitated to a study on finding positive transgressive segregants from 26 Philippine-released hybrid varieties with yield equal to or better than the hybrid check varieties that are adapted to lowland and rainfed ecosystems.

3. Support to DA's Small-Scale Irrigation Program (SSIP) Masterplan

The Bureau supported the SUC-led regional R&D projects on "Identifying Suitable Sites for Small-Scale Irrigation Projects in the Regions through GIS-based Water Resources Assessment" in close coordination with the Bureau of Soils and Water Management (BSWM). These R&D projects will generate regional water resources assessment maps for SSIP projects and GIS-based water resources assessment model for identifying location suitability of SSIP in the regions which will serve as guide for strategic planning and implementation of SSIPs nationwide. Supported were projects for Regions 1, 2, 3, CAR, 5, 11, and 12.

4. Rice-based Integrated Farming Systems R&D

The Bureau funded new and on-going CPAR projects of the DA-RFOs and LGUs in Caoayan, Ilocos Sur; Culing Cluster in Cabatuan, Isabela; Camalig, Albay; Dumalag, Capiz; San Lorenzo, Guimaras; Pan de Azucar Island in Concepcion, Iloilo; and San Miguel, Iloilo. These will develop rainfed and irrigated rice-based farming system models and identify possible enterprises using packages of technologies for whole farming systems. A related project in the Cordillera Administrative Region also funded by BAR will develop and promote sustainable community-based mushroom-heirloom rice farming system and the practices of heirloom rice communities.

B. CORN AND CASSAVA

The National Corn/Cassava Program is one of the banner programs of the Department of Agriculture which aims to increase the production of quality corn and cassava for human consumption, feeds, and industrial uses as well as empower the corn farmers to increase their yield and income and improve their quality of life. In support to this program, in 2016, the BAR has a total of 75 R&D projects funded and coordinated; of which 56 are new projects.

TECHNOLOGIES GENERATED/VERIFIED FROM CORN AND CASSAVA R&D PROJECTS

1. SSNM-Nutrient Expert Software

The software was launched on November 25, 2016 in Quezon City. The launching was attended by corn farming stakeholders from 16 DA-RFOs, UPLB, International Plant Nutrition Institute (IPNI), private sector, LGUs, and corn farmers. A product of many years of scientific field research, the Nutrient Expert for Maize was developed by UPLB and IPNI using data from numerous Site-Specific Nutrition Management (SSNM) trials (using hybrid variety from 2005-2015 from 332 trials; open pollinated varieties from 2012-2015 from 252 trials; and traditional varieties from 2012-2014 from 119 trials).

2. Corn Germplasm Utilization through Advanced Research and Development (CGUARD)

The CGUARD is a vital project that aims to conserve the still-existing native and traditional corn varieties which have special traits; and develop breeding materials with the genes responsible for unique traits such as resistance to insect pest and diseases, drought and waterlogging tolerance, extreme pH resistance, and resistance to biotic and abiotic stresses.

Implemented by UPLB and DA-RFOs, the project has the following initial findings/results:

- Developed UPLB Cn N48 or Abra Glutinous, an early maturing traditional corn variety. Yield was enhanced while maintaining earliness through population improvement. The variety is now undergoing national cooperative testing (NCT).

- Identified three populations with exceptionally high downy mildew resistance (DMR): UPLB Cn N15 or Tiniguib D (18.8 percent incidence), UPLB Cn N33 or Manggahan White (25.5 percent incidence), and UPLB Cn N17 or Bulldog (27.0 percent incidence). These have high potentials in the development of DMR populations and lines, as well as in improving current open-pollinated populations and lines with high susceptibility to downy mildew. A composite of these materials has been sent to Samar where DM is a problem.

- Analyzed initial 46 native corn varieties for phytochemical contents that include scavenging activity, total phenols, total flavonoids, total tannins, and total carotenoids. The study showed that UPLB Cn N15 has 64.81 percent scavenging activity and is reported to have good resistance to downy mildew.

- Collected 1,875 accessions from various areas in 15 regions with CGUARD project.

3. Development of the Corn Crop Manager (CCM)

A mobile phone and computer-based decision-making support tool for increasing income and yield of corn farmers in the Philippines, the CCM was developed by the International Rice Research Institute (IRRI) for DA. It is designed for use by extension workers, crop advisors, agricultural service providers, and farmer-leaders who, through internet connections, can access CCM resources with the aid of a personal computer, tablet, or smart phone in assisting corn farmers. They can also make use of such electronic devices, with or without internet connection, in interviewing farmers about their rice farming practices, problems, and conditions.

4. Management of Cassava Phytoplasma Disease: Survey, Diagnosis, Characterization, and Control

Streptomycin sulfate antibiotic was demonstrated by the Philippine Root Crop Research and Training Center (PhilRootcrops) at the Visayas State University to effectively control cassava "witches' broom" disease. Based on the results of the study, the antibiotic appeared to be the most effective among various materials tested as it provided control over two croppings. It helped increase yield by 50-64 percent and starch content by 33-61 percent for the first cropping.

5. Demonstration of Crop Rotation for Sustained Corn Farm Productivity and for Increasing Farmers' Income

The project aims to demonstrate the advantages of using crop rotation in corn areas in terms of soil fertility improvement and enhancement of net farmers' income with additional sources of income. The project envisions promoting the diversification of the Filipino meal beyond rice and corn to include soybean, mungbean, and peanut. Application of the technology will be expanded to include additional corn areas.


Columbia
COACH

C. HIGH-VALUE CROPS

The High Value Crops Development Program (HVCDP) aims to address food security, poverty alleviation, and sustainable growth. It also promotes the production, processing, marketing, and distribution of high value crops. BAR and the HVCDP have collaborated on several R&D projects on industrial crops, fruits, vegetables, alternative staple food crops, and legumes to contribute in addressing the overall goals of the DA.

Under the program, 94 projects were funded and coordinated and from which 46 are new projects. The funded projects are under applied researches, technology commercialization, R&D facilities development projects (e.g., enhancement of tissue culture laboratories, upgrading of mushroom houses and laboratories, establishment of food processing research laboratory, and plant genetic resources (PGR) center), and interventions to promote the development of valued crops in the country.

TECHNOLOGIES GENERATED/VERIFIED FROM HVCDP R&D PROJECTS

1. Development of Pest Control Strategy Against Cecid Fly in Mango

A scientific investigation was conducted to understand the nature of attack of Cecid fly and devise strategies for its control. Several researches were conducted such as: 1) biological and ecological studies of Cecid fly in mango, 2) evaluation of cultural control options, and 3) development of chemical control schemes against Cecid fly.

2. Developing and Adopting Location-Specific Control Measures for Major Diseases of Rubber in the Philippines

The study evaluated different treatments (antagonists, organic-based formulations, botanical extracts, and fungicides) for efficacy against three major diseases in rubber farms, namely: white root rot cause by *Rigidoporus lignosus*, pink disease caused by *Corticium salmonicolor*, and stem bleeding caused by *Pasiodiplodia theobromae*.

3. Determination of the Incidence of Field and Postharvest Pests and Diseases of Rimas or Breadfruit (*Artocarpus altilis*) and Documentation of its Crop Production and Management Practices Adopted by Farmers

The scope of the survey of the pests and diseases of rimas includes 19 provinces in the 6 six regions of Mindanao. There were 21 species of insects and arachnids identified and further categorized into field, postharvest insect pests, arachnid pest, insect predator, arachnid predator, and insect pollinators. Foliar diseases of rimas were also documented and were found out to be caused by several fungi. The incidence of the pests and diseases of rimas was also correlated to weather factors. The farmer's practices in the production and utilization/consumption of rimas were also documented.

4. Survey, Strain Identification, and Management of Huanglongbing (HLB) Disease of Citrus in the Philippines

Information generated showed that HLB disease or citrus greening disease (predominantly Strain II) is present in 61 percent of citrus orchards or 15,044/213,758 (7 percent) trees in the country, as well as its insect vector, *Diaphorina citri*. It is found out that HLB can be identified through symptomatology, iodine starch test (85 percent detection level), and PCR. Moreover, specific strategies to manage HLB were not implemented due to the low awareness of growers, instead orchards management is done in general. There are other pest and diseases of citrus which are equally serious and can compound the damage caused by HLB.

Diaphorina citri, the insect vector in citrus.

5. Indigenous Vegetables Development in Region 1, 4B, and 12

Ethnobotanical aspect of indigenous vegetables and production, propagation and pollination habits of some indigenous vegetables were looked into in three regions for their practical uses through the traditional knowledge of local culture and people.

6. Feasibility Study on the Establishment of a Commercial Irradiation Facility for Agricultural Products and Other Purposes

The feasibility study presented the potential commodities that require gamma irradiation to preserve its quality, as well as, the technical, operational, and financial requirements for the establishment of a commercial scale gamma irradiation facility. The profitability indicators for the investment in a commercial scale gamma irradiation facility and the environmental issues and concerns for its establishment were also included. Furthermore, the study identified the sustainability issues for setting-up a commercial scale gamma irradiation facility.

7. Rimas (Breadfruit) Biodiversity Research, Conservation, and Propagation in the Bicol Region

The study identified the best propagation techniques among all the possible methods of propagation evaluated. Also, six new recipes were developed out of the rimas fruit.

8. Biological Control of Fruit Flies Using *Beauveria bassiana* through Autodissemination

Utilization of *B. bassiana* as biological control agent for fruit flies through a new approach such as autodissemination using lure in a specially designed trap whereby only the target insect pest is affected thus, conserving the beneficial insects.

D. LIVESTOCK AND POULTRY

BAR supports the DA in ensuring the country's native animals conservation through the provision of proper information and technologies generated through R&D.

As it continues to support the livestock program of the DA and that of the Philippine Native Animals Development (PNAD) program of the Bureau of Animal Industry, the Bureau, as of 2016, has coordinated and funded 21 livestock- and poultry-related projects, of which one is a new project, for the generation of reliable technologies on livestock production, management and post-production. These were done in collaboration with the various project proponents and farmers organization.

The projects funded in 2016 ranged from sourcing baseline data for native pigs, recommended feeding rations, information on the existing native pig gene pool in the country, as well as breeding management and production, among others.

TECHNOLOGIES GENERATED/VERIFIED FROM LIVESTOCK AND POULTRY R&D PROJECTS

1. Value Chain Analysis of Native *Lechon* in Luzon, Philippines

Value chain analysis of native *lechon* in Luzon presented the nature and structure of producers and other actors or participants involved and their interrelationships in the value chain and the constraints and opportunities they are facing in order to improve the marketing of native *lechon* in the country. The project examined the value chain for native pig *lechon* in Luzon, Philippines and identified the opportunities and problems/constraints encountered.

2. Agricultural Systems Approach to Commercialization of Native Swine in Quezon

Technologies generated are: 1) native swine enterprise; 2) alternative feeding systems for native swine utilizing locally-available materials; 3) native swine housing and breeding scheme; 4) meat processing technologies; and 5) alternative marketing systems for native swine.

3. Demonstration and Commercialization of Native Swine Production Technologies in Selected Areas in the Philippines

The project aimed to commercialize native swine production using the methodologies and technologies developed by BAI-NSPRDC.

National Thematic Programs

A. ORGANIC AGRICULTURE

Organic Agriculture is one of the R&D priority thrusts of BAR in the implementation of agriculture and fishery projects. The integration of this approach is within the context of food production, which warrants food safety and has a direct bearing to environmental protection.

For 2016, BAR supported 34 RDE projects composed of 21 applied research (of which two are new projects), 10 production and postproduction technologies for commercialization (of which is one is a new project), and 3 R&D facilities.

TECHNOLOGIES GENERATED/VERIFIED FROM ORGANIC AGRICULTURE R&D PROJECTS

1. Efficient Management and Utilization of Agricultural Wastes for the Production of Quality and Nutrient Enriched Organic Fertilizer

The study was undertaken to promote efficient management and utilization of agricultural wastes by converting into valuable by products like organic fertilizers. It involved identification of substrate combinations and evaluation of its efficacy as a source of plant nutrient for selected crops and its effect on soil properties. The study generated a Techno Guide for organic fertilizer production and formulated a ratio substrate combination for organic fertilizer.

2. Sustainable Community-based Commercialization of Organic Vegetable while Promoting Food Security and Safety

The volume of production and year-round availability of organic vegetables was increased using protected culture techniques to adapt to climate change. Implementation of this action research was guided by the principles of organic agriculture, participatory development, and holistic systems approach to sustainable development.

3. Developing Organic Farming Technologies for Sugarcane Production in the Province of Tarlac

The project formulated organic bionutrient sources for sugarcane production and applied pest management guide for *okra* to sugarcane organic farming.

4. Comparative Analysis of the Supply Chains and the Economics of Production of Organic and Conventional Rice and Vegetables in Luzon

Generated information that was used to address policy issues, implications, and opportunities for improving the economic efficiency of production of organic rice and organic vegetables, and facilitate the transition by rice farmers from inorganic fertilizers to organic fertilizer and compost identified and discussed.

5. Variety Evaluation On-Farm Trials and Seed Production of Organic Vegetables In Region 1

Identified and selected lines/varieties which are comparable or if not better than the existing OPV varieties and can outyield existing varieties that can help increase farmer's income. POT for organic production and seed production for eggplant, tomato, pepper, ampalaya, and squash for Ilocos was also established.

6. Development and Validation of Organic-based Production and Pest Management of Selected Vegetables

Generated information on organic-based agricultural technologies, specifically organic fertilizer and pest management which were applied to increase the production of pole sitao and *ampalaya*

7. Evaluation of Pest Management Strategies for Organic Strawberry and Citrus Production in the Cordillera

Information generated was applied on the use of biological agents like Metarrhizium and Beauvaria; botanical pesticides like hot pepper and ginger; and agricultural oil spray and wood vinegar in the organic pest management and production of strawberry and citrus.

8. Supply Chain Analysis of Selected Organically-Grown Temperate Vegetables

The study generated information on the marketability and production situation of organically-grown temperate vegetables. The best production practices of stakeholders and marketing problems were also documented by the study. The overall sustainability of the organic temperate vegetable industry was also analyzed.

9. Postharvest Quality and Safety Management of Organically-grown Fruits and Vegetables

The study developed and generated several technologies including: 1) evaporative cooling technique (single-crate, 4-crate collapsible) for temporary storage, quality maintenance and shelf-life extension; 2) Modified Atmosphere Packaging (MAP) of organic 'Balangon' banana for shelf life extension and crown rot control; 3) organic-based disinfectants for disease control (calamansi juice, lemon juice vinegar, baking soda, chlorine, chlorine dioxide, hot water treatment); and 4) bioethylene sources for ripening induction.

10. Development of Strategies and Support Systems for Farmers in Conversion from Conventional to Organic

A database of farms/farmers who have converted to OA was established by the completed study. Strategies and support systems were also identified and disseminated to encourage farmers to convert to OA.

11. Value Chain Analysis of Selected Products (in transition to Organic) in Region 2

The completed study identified indigenous technologies and the key actors and stakeholders in the chain of selected products through benchmarking and monitoring. Strength, weaknesses, opportunities, and threats (SWOT) of actors and key stakeholders along the chain in each commodity were also analyzed. The study also established a value chain map including the cost information of selected products (in transition to organic) in Region 2 such as chicken, swine, rice, corn, and organic fertilizer. Initial geographic information system (GIS) was also developed for tracing out the location of the commodities.

12. Adoption and Utilization of Nipa Palm Sugar Processing Technology (NPSPT) in the Municipality of Lanuza, Surigao del Sur

The technology used was already commercialized, which included the proper tapping techniques, preparation, and handling of nipa sap and nipa syrup conversions, and preparation of nipa palm sugar using production standards. The product developed has now a wide market reach and is being marketed as a healthier sugar alternative.

B. CLIMATE CHANGE

To ensure the successful implementation of the DA's climate change-driven programs and strategies, the Department directed all its offices to mainstream climate change into their respective programs, plans, and budget. One of the programs in which BAR has a large part of is the Mainstreaming of Climate Change Adaptation and Mitigation Initiatives in Agriculture (AMIA). It defines the DA's national framework in addressing climate change in agriculture and serves as the umbrella program.

In 2016, BAR funded 60 projects, of which 33 are new. These projects are categorized as: 1) AMIA 2 National Level Projects, 2) AMIA 2 SUC-led projects, 3) AMIA 2+ RFO projects, and 4) BAR Climate Change Projects. Meanwhile, 22 climate change-related applied researches, and 38 policy researches were funded under the FY 2016 DA-AMIA funds.

Under AMIA 2, the projects funded are policy-oriented researches in support to the AMIA framework for building climate-resilient livelihoods and communities. Bulk of the activities under the funded projects are on: vulnerability assessment and risk targeting, development of knowledge pool of CRA options, CRA community action, and knowledge management of the results. The researches were implemented in 10 regions: 1, 2, 3, 4A, 5, 6, 10, 11, 12, and 18 (Negros Island Region).

The publication, "Climate Change Research and Development and Extension Agenda and Program (CC RDEAP)," was one of the major outputs of the program which serves as a guide in identifying and conducting RDE activities that strategically address issues related to climate change.

TECHNOLOGY GENERATED/VERIFIED FROM CLIMATE CHANGE R&D PROJECTS

Documentation of Indigenous Knowledge for Climate Change Adaptation

Implemented by UPLB, the project documented the practices of Indigenous People including *Ivatans* of Batanes, *Tagbanuas* of Palawan, *Sulodnon* and *Ati* of Iloilo, *Waray* of Leyte, *Matigsalog-Manobo, Bagobo-Klata* and *Bagobo-Tagabawa* of Davao.

Part of the output was a database on climate change adaptation that focused on high/low precipitation and extreme temperature changes. Highlighted in the project was the documentation of climate change adaptation practices that can be disseminated for CC adaptation strategies.

C. BIOTECHNOLOGY

BAR has been supporting the DA's Biotechnology Program Office (BPO) through funding priority biotechnology-related R&D projects and activities of the government and other stakeholders including the NAST, state universities and colleges, and private organizations.

In 2016, there were 61 projects supported, of which 15 are new. These are being coordinated with various DA and non-DA institutions including the University of the Philippines Los Baños (UPLB)-BIOTECH, IPB; University of the Philippines Diliman–MSI; Biotechnology Coalition of the Philippines (BCP); and the International Service for the Acquisition of Agri-biotech Applications (ISAAA). The R&D supported projects were focused on the generation of screening protocols and improved crop breeding lines; value-adding technologies to process wastes and by-products; and species identification for resource management, conservation, and traceability purposes.

More than 50 percent of the Bureau's funding assistance and technical support went to the Biotech Research and Development (BRD), one of the project components of the DA-Biotech and BAR collaboration. Other components also supported were the Applied Biotech Research (ABR), Information Education and Communication (IEC), and Institutional Capacity Enhancement (ICE). Likewise, the Bureau assisted in the facility improvement of the Philippine Council for Agriculture and Fisheries. Through the DA-Biotech Scholarship Undergraduate Program, BAR supported the continuing education of 56 scholars in collaboration with UPLB, UP Visayas, CLSU, VSU, and USM.

TECHNOLOGIES DEVELOPED AND INFORMATION GENERATED FROM BIOTECHNOLOGY R&D PROJECTS

1. Use of Molecular Markers for Identification of NSIC-Registered Fruit Varieties and Selected Crop Species Use as Natural Products

Molecular markers for identification of NSIC-registered fruit varieties (pomelo, mandarin, sweet, oranges, mango) and protocol for extraction and purification of DNA

2. Biotechnological Conversion of Coconut Processing Wastes into Agro-industrial Microbial Cultures and High Value Products (Year 2)

Technology 1: Probiotic lactic acid bacteria
Technology 2: Biosurfactant - Development of protocol for harnessing biosurfactants from coconut processing waste

3. FISHCODES: Genetic Barcoding of CITES listed and Regulated Philippine Aquatic Species (Year 2)

Genomics and Bioinformatics (Generation of DNA Barcoding markers and profile sequence data of the Philippine Aquatic Species)

4. Production and Characterization of Bacterial Phospholipases

This includes enzyme extraction and characterization (optimized extraction protocol for economically-important Phospholipases) and product development of Phospholipases-derived industry.

R&D Grants and Support Services

A. SUPPORT TO BASIC AND STRATEGIC RESEARCHES

In 2016, BAR supported 30 basic and strategic researches from the crops, livestock and poultry, and fisheries and aquaculture sectors. Six of these projects were newly funded.

New projects for the crops sector included phenotyping and morphological evaluation of durian cultivars in the Philippines, and the field trial evaluation and technology piloting of new Papaya ringspot virus (PRSV)-tolerant papaya F1 hybrids. For the livestock and poultry sector, new projects supported were on the performance and quality evaluation of upgraded goats and its chevon meat supplemented with *Indigofera* sp. under organic practice, and the phylogenetic characterization and detection of the emergent Newcastle disease virus in the Philippines using dry format reverse transcription loop-mediated isothermal amplification (RT-LAMP).

Meanwhile, support for the fisheries and aquaculture sector were given for the implementation of new projects including the hatchery management and broodstock development for breeding of *Pigek* (Tapiroid Grunter); and resource assessment, biological evaluation, and phytochemical screening of economically-important seaweeds. A study on the environmental and anthropogenic stressors affecting the biology, ecology, and fishery potential of *Pijanga* (Tank Goby) in Lake Mainit, Northeastern Mindanao was also supported.

TECHNOLOGIES DEVELOPED AND INFORMATION GENERATED FROM BASIC AND STRATEGIC RESEARCHES

1. Development of National Codex Organization (NCO) Database on Food and Food Safety Researches in the Philippines

A web-based databank on food and food safety researches in the Philippines was developed, launched, and maintained by UPLB. The system provides retrievable information on Philippine literature on plant and animal food researches to develop and defend country positions in Codex-related activities. Website: *http://nco.uplb.edu.ph/*

2. Development of a Twining Machine for the Production of 1 mm-diameter Abaca Twine

A motorized twining device was developed with four major components: housing assembly, power transmission assembly, twining assembly, and spooling. The machine is 60 inches long, 27 inches wide, and 31 inches high with approximately 80 kg; can produce good quality 1.5 mm-diameter twine at 150-200 meters/hour. The machine approximately costs Php 45,000.00. Prototypes were already produced and distributed to Zamboanga and Palawan.

3. NSAP-Atlas: Development of a GIS-based Marine Fisheries Resources Atlas Using the National Stock Assessment Program Data

The development of the fisheries resource atlas will enhance NFRDI's functions in providing useful information for the assessment of the growth and performance of the fisheries sector as affected by the fish habitat and other environmental factors.

4. Evaluation of Nile Tilapia Strains for Aquaculture in the Philippines (Phase 2)

A collaborative project of WorldFish and CLSU, the project has established a standardized data collection and recording protocol for the assessment of on-farm performance of tilapia in hatchery, broodstock, and grow-out stages. It generated information and evaluation of the best performing improved tilapia strain subjected to various farmer's practices, the identified Nile tilapia 'site specific super strains' will help increase the farmers' production and income.

5. Achievable Levels of Cadmium in Philippine Seafoods for Export

Implemented by the National Food Authority-Food Development Center (NFA-FDC), the project developed a handbook guide for use of technical personnel during sampling of seafoods for identification of presence of cadmium and related heavy metals.

6. Enhancing In-Vitro Production of Embryos from Vitrified Buffalo and Bovine Oocytes by Intracytoplasmic Sperm Injection (ICSI) Technique

Cryotec and solid surface vitrification protocols proved to be most favorable for oocyte cryopreservation. Optimized system for embryo production combining cryopreservation, Intracytoplasmic Sperm Injection (ICSI) technique, and in-vitro culture were introduced to harness reproduction and productivity of vitrified buffalo and bovine.

B. POLICY RESEARCH AND ADVOCACY

Aside from the continued coordination of the UPPAF project, "An Assessment of Sustainability of CPAR Projects at the Local Government Level," BAR went on with its collaboration with SEARCA for the implementation of the project, "Linking Farmers to the Market: Transforming Subsistence Philippine Agriculture to Commercial Farms." The study documented the best practices in farm-market linkages and drew up policy recommendations/reforms to promote farm-market linkages in Philippine agriculture to help enhance farmers' economic development.

Technical inputs have also been provided by BAR on the following: 1) Action Plan of Agricultural Cooperation between the Philippines and China; 2) Implementing Rules and Regulations for RA 10817 or An Act Instituting the Philippine Halal Export Development and Promotion Program, Creating for the Purpose the Philippine Halal Export Development and Promotion Board, and for Other Purposes; 3) Proposed Philippine National Standards for 2018; 4) Principles, guidelines and procedures for the establishment of participatory guarantee system; 5) OECD Review of Agricultural Policies in the Philippines; 6) First Philippine-Thailand Joint Agriculture Working Group; and 7) Memorandum of Understanding between the Philippines and Pakistan.

As required by DA offices and oversight agencies, BAR consistently complied with the periodic preparation and submission of plans, accomplishments, and other related documents. These included submission of the Summary of Plan and Budget Proposal, Budget Execution Documents/Agency Performance Measures, Budget Preparation Form 201-B-MOOE, Budget Accountability Reports, Physical Performance Reports, Major R&D Program Portfolio, Budget Hearing Portfolio, Physical and Financial Performance, and Climate Change Expenditures.

Towards the end of 2016, BAR organized the "RDEAP 2017-2022 Prioritization Workshop" participated in by experts and industry representatives in the agri-fishery sector. The activity helped BAR in prioritizing and evaluating R&D proposals in the next medium term, taking into consideration their contribution to the attainment of the DA's current thrusts and objectives of making food available and affordable, increasing the income of farmers and fisherfolk, and increasing resilience to climate change risks.

C. HUMAN RESOURCE DEVELOPMENT

To improve the manpower capability of the overall R&D system, BAR provided financial assistance to members of the NaRDSAF community under its Human Resource Development Program (HRDP).

In 2016, support was given to five qualified researchers and employees who were pursuing graduate studies in accredited universities under the Degree Scholarship Program (*Table 2*) and to 12 deserving UPLB undergraduate students of agriculture, agricultural biotechnology, and other related fields under the DA-BAR-UPLB Undergraduate Scholarship Program (*Table 3*).

Table 2. Grantees of the Degree Scholarship Program for 2016.

Name of Scholar	Institution	Course	University
1. Eusala, Cheryl L.	LGU-Makilala, Cotabato	PhD Community Development	UPLB
2. Gonzales, Kristine P.	DA-RFO 1	MS Community Development	UP Diliman
3. Loraña, John L.	DEBESMSCAT (Masbate State College)	PhD Environmental Management	CLSU
4. Magistrado, Myleen L.	National Fisheries Research and Development Institute	MS Environmental Science	UPLB
5. Pamunag, Rictibert C.	DA-RFO 9	MS Agronomy	UPLB

Table 3. Grantees of the DA-BAR-UPLB Undergraduate Scholarship Program for 2016.

Name of Scholar	Course
1. Aram, Noelene Anne C.	BS Agriculture
2. Bangcal, Damsel C.	BS Agricultural Biotechnology
3. Bugia, Sophia Aleli C.	BS Agriculture
4. Cañaveral, Earl Vincent M.	BS Agriculture
5. Dela Merced, Noline J.	BS Agricultural Biotechnology
6. Diamante, Bryan Anthony A.	BS Agricultural Biotechnology
7. Dollete, Maribell A.	BS Agricultural Biotechnology
8. Felicitas, Emerald Flor A.	BS Agriculture
9. Fortes, Angeline D.	BS Development Communication
10. Ignacio, Lawrence Gabriel C.	BS Food Technology
11. Mercene, Solo Arman P.	BS Agriculture
12. Timbreza, Samantha Johanna T.	BS Development Communication

Emerging as this year's winners of Gawad Saka were Dr. Nelly S. Aggangan of UPLB as the Outstanding Agricultural Scientist and Dr. Sailila E. Abdula of PhilRice as the Outstanding Agricultural Researcher.

Graduating DA-BAR-UPLB Scholars

Part of the HRDP is the Non-degree Support Program that aims to enhance the skills and update the knowledge of R&D personnel in professional, technical, and scientific areas in agriculture and fisheries. For 2016, BAR supported the participation of 85 researchers and employees to seminars, workshops, trainings, conferences and other relevant R&D activities held locally and internationally. The Bureau also provided assistance to the conduct of thesis/dissertation studies of four researchers from the NaRDSAF community.

Meanwhile, under HRDP's Productivity Enhancement Program is BAR's participation to the DA's annual Gawad Saka Search for Outstanding Agricultural Scientist (OAS) and Researcher (OAR). In 2016, BAR chaired the search for both categories and facilitated the conduct of screening, extensive field validation, deliberation, and presentation to the Board of Judges (BOJs) of the nominees.

Emerging as this year's winners were Dr. Nelly S. Aggangan of UPLB as the Outstanding Agricultural Scientist and Dr. Sailila E. Abdula of PhilRice as the Outstanding Agricultural Researcher. Each received trophies, plaque of recognition, Php 100,000 cash award, and Php 2,000,000 worth of research grants during the awarding ceremony held in December 2016 at the Philippine International Convention Center in Pasay, Metro Manila.


GROUND BREAKING CEREMONY OF THE INSTITUTIONAL
(SoMInAL)
DEPARTMENT OF AGRICULTURE
Regional Field Office XI
Project name:
Southern Mindanao Integrated Agricultural Laborato
Davao City
50 has.

D. R&D FACILITIES

Under the R&D Facilities Development Program, 37 R&D facilities of NaRDSAF-member institutions were supported for establishment and upgrading through BAR's Institutional Development Grant (IDG). The program is aimed at strengthening the institutional capacities of RDE network members with the upgrading and acquisition of priority agriculture and fisheries R&D facilities and equipment. (see Annex for list of projects)

For 2016, majority of the supported IDG projects were from DA-Regional Field Offices (20) followed by state universities and colleges (13).

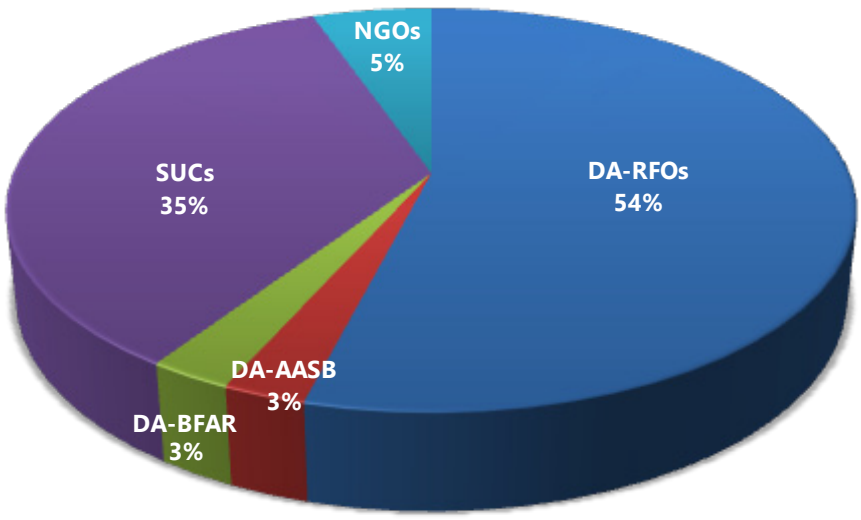


Figure 1. 2016 IDG projects by institution


Landscape Horticulture Research
and Development Facility


ORGANIC AGRICULTURE
R&D CENTER
Inauguration Cer
REGIONAL ORGANIC AGR
R & D CENTE

> For 2016, majority of the supported IDG projects were from **DA-Regional Field Offices (20)** followed by **state universities and colleges (13)**.

Supported R&D facilities through the IDG were also inaugurated in 2016. These include the Cagayan Valley Integrated Agricultural Laboratory (CVIAL), a co-funding project of the DA-RFO 2 together with BAR in February. It is the first integrated, state-of-the-art, one-stop-shop diagnostic R&D facility in the country that houses four major laboratories with modernized equipment. The integrated lab provides various diagnostic services, accurate analyses, and appropriate recommendations both for crops and animals from pre-production, processing, and marketing.

The OA R&D Center in Bicol, on the other hand, was inaugurated in October in Pili, Camarines Sur. The center serves as a knowledge hub of research activities, technology interventions, and other organic agriculture-related undertakings in the region that will cater to the information needs of stakeholders of the agri-fishery sector.

Also inaugurated were the Landscape Horticulture R&D Facility of UPLB in December, the Regional Fisheries Training and Fisherfolk Coordinating Center of the BFAR-Regional Office 1 in August, and the Multi-Purpose R&D Center for the Municipal Agricultural Office in Tagkawayan, Quezon in March.

Also under the program, a groundbreaking ceremony of the Southern Mindanao Integrated Agricultural Laboratory (SoMinAL) of the DA-RFO 11 was held. The SoMinAL is envisioned to be a one-stop-shop integrated laboratory aiming to provide vital diagnostic services, analyses, and recommendation needs of the farmers and fishers in the region towards ensuring the productivity of the soil, crops, and livestock; increase farmer's income and product quality; and promote consumer and environmental safety. Similarly, a groundbreaking ceremony was also held for the R&D Center of Romblon State University in November.

E. SCIENTIFIC PUBLICATION GRANT

In July 2016, the book, "Mineral Profile of Forages and its Influence on Goat Nutrition," was among the seven publications that bagged the 2016 Outstanding Book Award given by the National Academy of Science and Technology, Philippines (NAST PHL) during the 38th Annual Scientific Meeting held at the Manila Hotel, Ermita, Manila.

Supported by BAR through the SPG, the book provides important scientific information and significant findings that will contribute to achieving better performance and overall productivity of goats. These include information on common forages, mineral contents of selected forages, distribution and solubility of minerals in forages, and feeding options to improve mineral status, among many others.

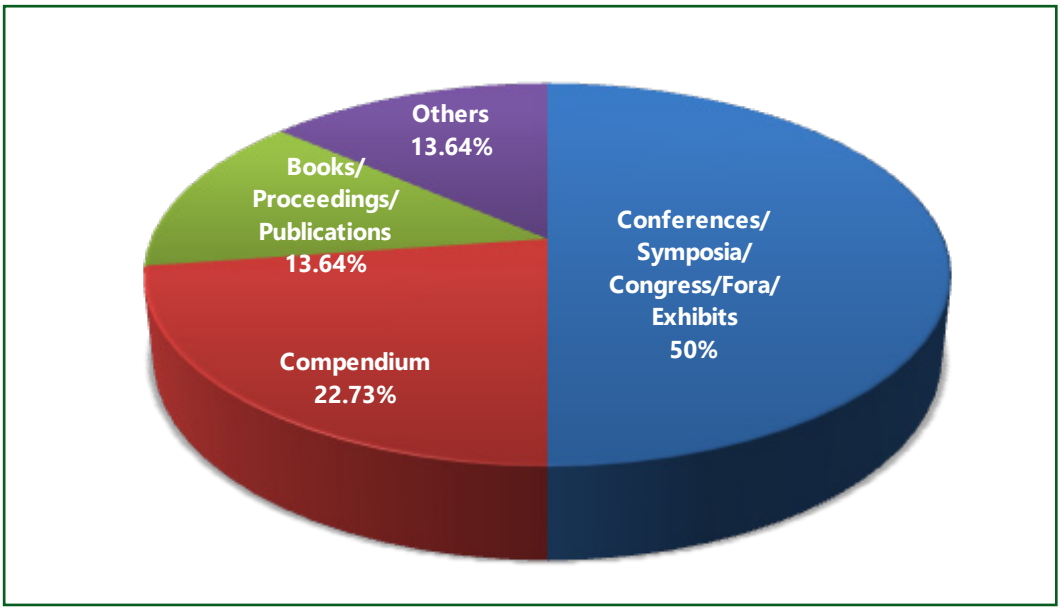


Figure 2. 2016 SPG projects by activity.

For 2016, BAR through its Applied Communication Division (ACD), supported 22 R&D undertakings of institutions, organizations, and scientific/professional societies under the Scientific Publication Grant (SPG). These included the holding of 11 conferences/symposia/congress/exhibits/fora; publication of 3 books/proceedings and 5 compendium projects; and conduct of 3 documentation of R&D-related activities. *(Figure 2)*

Various SPG-supported publications were also launched this year.

These included: 1) "Organic Farming: A Thriving Fashion and Passion" of the University of the Philippines Los Baños, 2) "Adlay Recipes" of the DA-Regional Field Office 4A, and 3) "A Decade of Success: A Compendium of Agriculture and Fisheries R&D Projects Supported by the Bureau of Agricultural Research from 2005 to 2014" which is a compilation of BAR-funded projects implemented by the DA-RFOs, Bureau of Fisheries and Aquatic Resources, and state universities and colleges.

F. R&D TECHNOLOGY COMMERCIALIZATION CENTER

Back in August 2009 when the Tech Com Center was launched, the DA's then top officials were applauding DA-BAR for putting itself in the best position to boost the sector's technology transfer program as well as its entrepreneurial aspect.

Seven years later, this still holds and much more. Through the Tech Com Center located at the ground floor lobby of the RDMIC Building, the Bureau puts a face in its two flagship programs: NTCP and CPAR.

Generated technologies and products from various BAR-funded research initiatives were showcased in the Center. Among the items on display were honey-based food and cosmetic products, alternative sources for cane sugar, and fruit wines, among others.

Through the Center, clients were not only presented with locally-made products from the agricultural sector, but they also became connected to a larger network of experts in the academe, agribusiness, and regional offices which will further help them in their concerns and inquiries.

In 2016, the Center received 1,670 walked-in visitors and 2,056 phone inquiries. Majority of the visitors were private individuals (584), government employees (468), and students (395). The purposes of the visit included: 1) request for Information, Educational, and Communication (IEC) materials such as brochure, BAR Digest and Chronicle, and Techno Digest; 2) request for Package of Technology (POT) for different priority commodities; 3) conduct of Feasibility Study (FS) and other reports such as market study and financial viability for different commodities; 4) inquiry for in-demand crops such as rice, rubber, soybean, cacao, and coffee; and 5) request for contact details of research proponents and concerned agencies.

Among the new products displayed and highlighted were: katmon, roselle, new fruit wines blueberry/mulberry, and nipa palm sugar.

G. KNOWLEDGE MANAGEMENT

The Bureau's Knowledge Management (KM) program focuses on technology and information dissemination from technology generators to users. To ensure that information and knowledge generated from its supported R&D researches and projects will reach the stakeholder, BAR produces and packages information, education, and communication materials generated from its supported R&D researches and projects. BAR utilizes different media forms to keep the farmers, fisherfolk, researchers, extension workers, policymakers, students, and other interested updated on the recent innovations and technologies in agriculture and fisheries R&D.

SEMINAR SERIES

For 2016, BAR, through its Applied Communication Division (ACD) conducted 30 seminars with participants from different walks of life, some representing non-profit organizations or walk-ins who wanted to learn new technologies to start a business.

To further promote the seminar topics, BAR utilized the Social Media, particularly through BAR's Facebook (FB) page, to further reach interested individuals into attending the seminar. Announcing the upcoming seminars of BAR on FB has also generated a steady amount of likes for the Bureau's FB page. Average attendees in the seminar series ranged from 80-200 participants.

Among the monthly seminar topics that garnered the biggest crowd were:

July seminars: Herbs and Spices; Status of Small Hive Beetles in Apiaries (196 attendees)

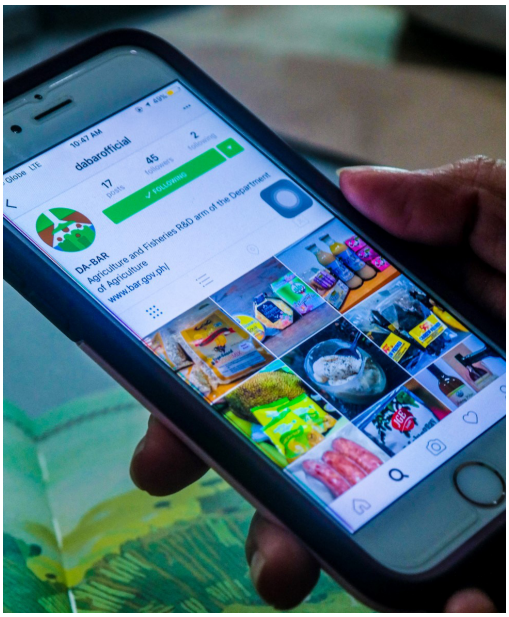
May seminars: Off-season Tomato Production and Tomato-based Products; Improving the Production of Organically-Grown Vegetables (105 attendees)

February seminars: Processing Roselle and Cacao Products (86 attendees)

September seminars: Developing Aesthetic and Medicinal Products from Lotus; Soil Quality and Food Safety in Organic Agriculture (82 attendees)

SOCIAL MEDIA

Aside from announcing seminar dates and activities through BAR's Facebook Page, the bureau used it as a venue to upload press releases and post-activity events. The FB page of BAR has also been a powerful tool to communicate with BAR's clients particularly in voicing out their inquiries and suggestions. With the FB page, BAR received a more immediate response/ feedback compared to email.



Quick Facts

- Generated 4,000+ likes
- Uploaded 4,176 photo releases
- Featured 23 technologies from BAR-supported projects
- Shared 38 BAR-related articles/write-ups from major dailies, BAR publications, and Instagram
- Shared 21 videos of *Mag-Agri Tayo* segments
- Created 23 BAR events
- Responded to 228 inquiries regarding various topics

IEC MATERIALS

BAR, through ACD, has intensified its distribution of Information, Education, and Communication (IEC) materials through its partnership with the Asian Food and Agriculture Cooperation Initiative. Brochures, magazines, newsletters, and other publications reproduced by BAR were distributed during seminars, trade fairs, and exhibits. BAR's regular publications: BAR Chronicle (monthly newsletter) and BAR R&D Digest (quarterly magazine) continue to feature and highlight R&D activities and research-generated technologies which were also distributed to clients along with its growing number of subscriptions.

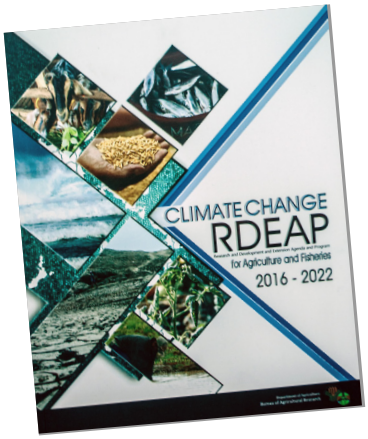
BOOKS

During the Agriculture and Fisheries Technology Forum and Product Exhibition (NTF) held on 11 August 2016 at SM Megamall, Mandaluyong City, BAR launched three books aimed to inspire and guide Filipino researchers and scientists in pursuing and implementing high-impact R&D initiatives.

The books were:

1. Research and Development, and Extension Agenda Programs (RDEAP) 2016-2022

The RDEAP serves as the Bureau's guide or main reference in prioritizing and evaluating agri-fishery R&DE proposals in support to the current thrusts and programs of the Department. The book was a result of a national multi-stakeholder's consultation workshop, the outputs of which were further reviewed, verified, and finalized by key players and experts.



2. Climate Change RDEAP for Agriculture and Fisheries 2016-2022

The publication contains an integrated research and development agenda specifically drawn up to address the challenges and threats of climate change that beset agricultural productivity and livelihood. The book was a product of collaborative efforts and consultations with various sectors including agencies from DA, academe, and other R&D partner institutions and experts.

3. Organic Farming: A Thriving Fashion and Passion

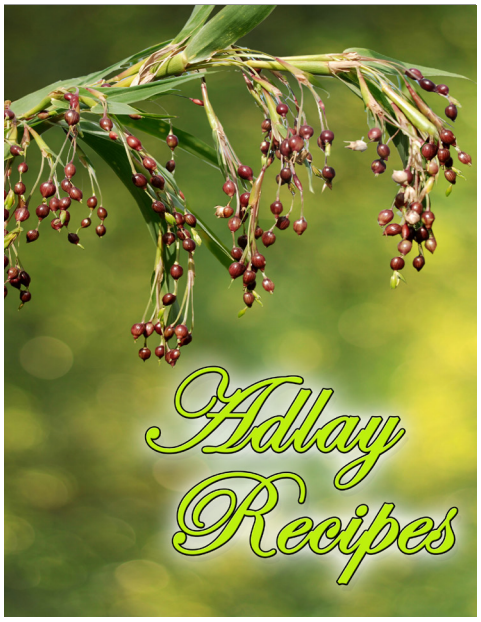
The book contains stories of organic farming champions and their families for whom organic farming is a passion. The book is a result of a three-year BAR and UPLB-funded research project titled, "Documentation and Assessment of Socio-cultural Aspect of Organic Agriculture." It was authored by Gloria Luz M. Nelson, Girlie Nora A. Abrigo, Joyce A. Ocampo-Dayao, Lucille Elna P. de Guzman, and Rowena P. de Guzman.

During the awarding and closing ceremonies of the 28th National Research Symposium (NRS) held on 27 October 2016, at the Bureau of Soils and Water Management (BSWM) Convention Hall, two more publications under BAR's Scientific Publication Grant (SPG) were launched.

These were:

1. Adlay Recipes

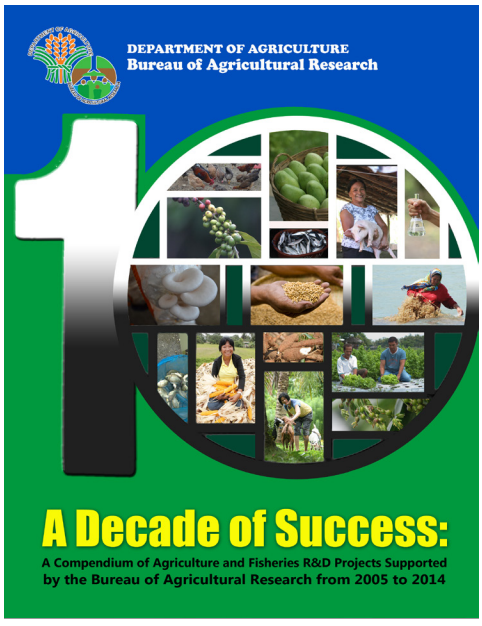
As the Adlay R&D Program is now heading towards product development and market establishment, the DA-RFO 4A saw the need to develop various adlay food products to encourage consumers to try adlay as an alternative food staple. The book aims to promote various recipes on adlay developed by DA-RFO 4A.



2. A Decade of Success: A Compendium of Agriculture and Fisheries R&D Projects Supported by the Bureau of Agricultural Research from 2005-2014

For more than a decade now, BAR has been supporting R&D initiatives that generated technologies and initiated interventions that benefitted farmers and fisherfolk. To disseminate information on these technologies to its stakeholders, particularly of what has been done in R&D during the last decade, BAR and its partners came up with a compendium that serves as a 10-year portfolio featuring BAR-supported projects implemented by its partners from DA-RFOs, BFAR Regional Offices, and SUCs.

The compendium is composed of 17 volumes of published material - of which 16 volumes highlight researches accomplished by the regions, while the remaining volume features the researches done by the Bureau's partner SUCs. The books summarize a decade of R&D efforts with concise information including project summaries, technology description and application, as well as the intended beneficiaries.



H. INTELLECTUAL PROPERTY (IP) SUPPORT

Continuous IP Management is done throughout the year as part of the mandate of BAR. Details of IP management include novelty spotting, evaluation of projects found with IP potential, drafting of applications conforming with the Intellectual Property Office (IPO) requirements, compliance with the IPO findings, and corrections of findings to meet the examiner's preferences.

Other aspects of IP management was the drafting of license agreements for the IPR owner and the licensee, as most DA units were not yet familiar with these instruments. Other owners of IPRs could not decide outright the path to take in commercialization of their technologies or protected IPs. Some business strategies had to be relayed to them to widen their choices and decisions. Many were also not familiar in managing and protecting their IP. What was crucial for BAR was to achieve a common understanding of the required data and procedures before the IP staff could start to evaluate the problem and start the actual IP application.

Most of the clients needed enhancement seminars and discussions for knowledge leveling-off and IPR functions or commercialization can commence.

IP applications released:

Galactomannans produced from liquid endosperm of makapuno and the process of producing the same – Dr. Ma. Judith Rodriguez of PCA-Albay Research Center (Patent)

NVCITPRO – Nueva Vizcaya State University (Trademark)

Jovimin – Dr. Jovita Datuin of DA-RFO 1 (Trademark)

The Barrows – Mr. Robert Sto. Domingo of Antipolo City (Trademark)

Daerrys – Central Luzon State University (Trademark)

License Agreements

Two license agreements, know-how/technology and trademark, of DA-Region 2 with the Jevita Marketing Corporation were drafted and finalized to accommodate the needs of both parties. These were both for the Gourmix brand. The licensee was given the sole distributorship locally and abroad. These were accomplished through consecutive meetings with Ms. Rose Mary Aquino, her staff, and a consultation meeting with DITTB, IPO.

Other Activities

Dr. Ruben Echeverria, present CIAT director general, paid a courtesy call at the Bureau of Agricultural Research on January 28, 2016. With him was Dr. Dindo Campilan, a Filipino scientist who has been appointed as the Director for Asia office of CIAT. Meeting the CIAT delegation were BAR key officials and staff members, led by BAR Assistant Director Teodoro Solsoloy.

Based in Cali, Colombia, CIAT (or the International Center for Tropical Agriculture) is one of the research and development organizations under the CGIAR umbrella. BAR has an on-going collaboration with CIAT on cassava through the project, "Co-Strengthening Capacities for Cassava Crop Health in the Philippines: Developing a Strategic Emergency Response to Pest and Disease Risks". The project addresses concerns on pests and current and emerging diseases of cassava particularly those in which local understanding is limited.

A. INTERNATIONAL PARTNERSHIPS

In ensuring the continuous progress of agri-fisheries R&D, BAR continues to share knowledge and resources with its partner agencies. It has formed partnerships and collaborations with international organizations that support the vision of the Philippines towards a progressive agriculture and fisheries sector.

1. Strengthening Agricultural Research and Development (ARD) towards ASEAN Integration (with SEARCA)

Through a survey and needs assessment, the R&D capacities of selected partner agencies (SUCs and DA-RFOs) in terms of researches conducted, collaborations, resources, and extension were assessed to identify the areas for improvement. As part of the capacity-building component of the project, SEARCA organized the "Training Workshop on Research Methods and Analytical Techniques in Physical, Natural, and Social Sciences" on September 27-28, 2016. To complement this activity, SEARCA conducted the "National Forum on Scientific Research on Physical, Natural and Social Sciences" on December 14-15, 2016 to showcase the research undertakings of ARD institutions in the Philippines.

2. Co-strengthening Capacities for Cassava Crop Health in the Philippines: Developing a Strategic Emergency Response to Pest and Disease Risks (with CIAT)

a) Collaborative project between CIAT/VSU and Philippines

Among the highlights of accomplishments include:

- Video-based training package on cassava pest recognition and field monitoring:
  The short-training video (English and Tagalog) covers key characteristics and symptoms of some of the most limiting pests and diseases in Southeast Asian cassava crops.

- Scoping study documenting pest impact on Philippine cassava value chains:
  The study aims to source additional data availability to refine the models and work towards development of economic valuations and forecasting based on their outputs.

- National workshop on active management and prevention of invasive cassava pests:
  To enhance the awareness and capacity of cassava focal persons on pests and disease management, and to strategically plan on longer-term actions for managing key pest and disease risks of cassava, a national workshop was held on March 15-17, 2016 at VSU, Baybay, Leyte. Cassava focal persons from 16 DA-RFOs, SUCs, and private sector attended the event.

b) Cross-country study missions

The study mission was composed of two parts. The first part is on "Study Program on Cassava Research and Development of CIAT," a week-long study exchange program involving DA senior officials held on February 22-27, 2016 in Hanoi, Vietnam. The program aimed to explore CIAT's global research program while forging a stronger collaboration between the two institutions.

The second part was a Philippine-Vietnam-Thailand exchange, a 10-day study mission which involved DA-RFO cassava focal persons enabling them to learn parallel efforts in Vietnam and Thailand, promoting cross-country knowledge exchange and experience sharing. It was participated in by a 20-member delegation from the Philippines held from April 26 to May 4, 2016.

B. BAR ANNUAL EVENTS

12th Agriculture and Fisheries Technology Forum and Product Exhibition

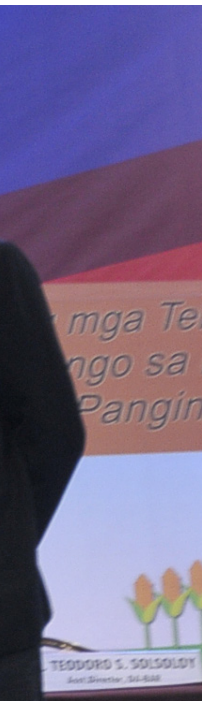
BAR staged the 12th Agriculture and Fisheries Technology Forum and Product Exhibition (NTF) on August 11-14, 2016 at SM Megamall, Mandaluyong City with the theme, "Pagsulong ng mga Teknolohiya sa Pamayanan tungo sa Maunlad na Pagsasaka at Pangingisda."

The 95 exhibitors were BAR's R&D partner institutions including DA attached agencies, staff bureaus, regional field offices, regional integrated agricultural research centers, Bureau of Fisheries and Aquatic Resources-regional offices, regional fisheries research and development centers, along with state universities and colleges, international organizations, and private sector groups. This year, the Asian Food and Agriculture Cooperation Initiative (AFACI) based in Korea and the Visayas State University joined as first time exhibitors. The participating agencies showcased various products, services, and technologies on high-value crops, natural products/ingredients for health and wellness, organic agriculture, and climate change.

The event officially opened with a ribbon-cutting ceremony led by Senator Cynthia A. Villar, vice chairperson of the Committee on Agriculture and Food; Atty. Hansel Didulo, assistant secretary for Visayas of the Department of Agriculture (DA); Dr. William D. Dar, president of the InangLupa Movement, Inc.; Dr. Nicomedes P. Eleazar, director of BAR; Dr. Teodoro S. Solsoloy, assistant director of BAR; Professor Rex B. Demafelis, vice chancellor for Research and Extension of the University of the Philippines Los Baños (UPLB); and Mr. Anthony B. Obligado, head of the Technology Commercialization Division of BAR. Senator Villar served as the keynote speaker, while ASec. Didulo and Dr. Dar gave messages of inspiration.

Among the highlights of the event were the launching of audio-visual presentations about the NTCP Primer and the Technology Commercialization on Wheels (TCOW) that were respectively presented by TCD Head Anthony B. Obligado and UPLB-College of Development Communication Dean Ma. Theresa H. Velasco.

The central display featured various products and technologies developed by the different regions that are also being promoted by the TCOW project that utilizes a specially-prepared truck to bring technologies and knowledge products to remote areas.



Technology seminars and business matching for possible partnerships and other ventures for profitable agricultural enterprises were also conducted. *(Table 4)*

Table 4. Seminars conducted during the 12th NTF.

12 August 2016	13 August 2016
Kapis Chips Processing and Cooking Demo *Dr. Lilian C. Garcia* Director, Bureau of Fisheries and Aquatic Resources 4A	**Soybean Cooking Demo** *Mylenne U. Vagay* and *Danisse Mae S. Paray* Quirino State University Grand Winners, *It's Soy time Cooking* Contest, NTF 2015
Processing of Chevon Products a "ready-to-eat food" Cooking Demo *Dr. Jonathan N. Nayga* Isabela State University	**Fish Cream Soup Processing and Cooking Demo** *Dr. Perlita C. Tiburcio* Nueva Vizcaya State University
Commercial Production of Free Range Chicken a Livelihood Program for Women *Dr. Ma. Asuncion G. Beltran* Tarlac Agricultural University	**Technology Business Incubation Program** *Dr. Lily Ann D. Lando* Worldfish, Philippines
Off-Season Tomato Production Technologies *Dr. Tessie A. Boncato* Tarlac Agricultural University	**Lending Facility for Farmhands and Fisherfolk** *Ms. Emmalyn J. Guinto* Chief, Information Systems Management Division, Agricultural Credit and Policy Council
Potential Economic Uses of Selected Indigenous Plants Found in Region 4 *Mr. Fredrick Odejar* Crop Science Cluster, University of the Philippines Los Baños (UPLB)	**Product Development and Maximizing the Power of Marketing** *Mr. Glenn N. Baticados* Director, Center for Technology Transfer and Entrepreneurship, UPLB
Shiitake Mushroom Production *Ms. Maribel S. Bacena* Nueva Vizcaya State University	**Farm Tourism Trends: Unlimited Opportunities** *Dr. Mina T. Gabor* President, International School of Sustainable Tourism
Nutraceuticals from *Saluyot* and *Okra:* Preventive Alternatives for Health and Wellness *Ms. Tres Tinna B. Martin* Mindanao State University	**Planting Materials and Agronomic Practices in Determining Productivity in Rubber Plantation** *Dr. Romulo L. Cena* University of Southern Mindanao

Three new books were also launched: 1) Research and Development, and Extension Agenda and Programs (RDEAP) 2016-2022, 2) Climate Change RDEAP for Agriculture and Fisheries 2016-2022, and 3) Organic Farming: A Thriving Fashion and Passion.

Highlight of the closing ceremonies was the special awards for the Best Product and Best Booth. *(Table 5)*

Table 5. Best Booth and Best Product Winners

Awards	Best Booths	Innovative Products
1st Place	Department of Agriculture-Regional Field Office 1	Cream Cheese University of the Philippines Los Baños
2nd Place	Department of Agriculture and Fisheries-Autonomous in Muslim Mindanao	Arrowroot Products Department of Agriculture-Regional Field Office 4A
3rd Place	Department of Agriculture-Regional Field Office 5	Nipa Salad Dressing Department of Agriculture-Regional Field Office 5
Special Citation (for non-food product)	-	Micro-nutrient Balls Department of Agriculture-Regional Field Office 1
Special Citation (for innovative technology)	-	Seaweed Tissue Culture Department of Agriculture-Bureau of Fisheries and Aquatic Resources 5

Awarding of IPR certificates was also part of the event. These were given to: 1) Hydroots logo of Mr. Robert Sto. Domingo; 2) PHTRC-UPLB logo of PHTRC, UPLB; 3) PHTRC Hot Water Tank logo of PHTRC-Plants and Seed Systems Division, UPLB; 4) Easy Encoder logo of Ms. Raquel Tolentino; 5) Santiago Malt-Brewery Logo of Mr. Jaime Gatlabayan; and 6) a Utility Model - Nanocomposite Coating for postharvest treatments of fruits of UPLB.

Other VIPs who graced the event and visited the booths were Mrs. Felicidad Sy, wife of SM Supermalls owner Henry Sy, Sr.; First District of Sorsogon Representative Evelina G. Escudero; AFACI Program Director Dr. Cho Yang-Hee; Former Governor of Camarines Sur Luis R. Villafuerte, Sr.; Third District of Bohol Representative Arthur C. Yap; and Mrs. Lorna Daffon of PTV 4's *Mag-Agri Tayo* Program.

The four-day annual event is being organized by BAR to highlight important technologies generated under one of its banner programs, NTCP. The technology forums and product exhibition provide opportunities to agri-preneurs and entrepreneurs to capitalize on various R&D technologies that are already developed, to farmers and fisherfolk to showcase their produce, and to the private sector to adopt these technologies on a commercial scale.

Opening day

Closing day

28th National Research Symposium

NRS sought out high impact researches that can contribute to the achievement of the goals and objectives of DA. It serves as a prestigious event where researchers and their works are given due recognition with citations and awards.

Highlighting the first day of the 28th NRS were presentations of the 24 qualifying research paper entries competing for the AFMA Best R&D Paper under the six categories: 1) Applied Research in Agriculture, Technology Generation/Information Generation (TG/IG); 2) Applied Research in Agriculture, Technology Adaptation/Technology Verification (TA/TV); 3) Applied Research in Fisheries, TG/IG; 4) Applied Research in Fisheries, TA/TV; 5) Socio-economics; and 6) Development in Agriculture.

To qualify for presentation in the symposium proper, a research paper must have scored an average of 85 percent and above in the initial screening. Simultaneously conducted was the competition for Best Poster.

This year, BAR received 134 research paper entries, a 21.8 percent increase compared to last year's entries which was only 110. Winners were announced during the closing ceremony held at the Bureau of Soils and Water Management's Convention Hall in Diliman, Quezon City on October 27, 2016. (*Table 6 and 7*)

Gracing the closing ceremony were Ariel T. Cayanan, DA undersecretary for Operations and national project director of DA-Philippine Rural Development Project representing Agriculture Secretary Emmanuel F. Piñol; and Dr. Victor C. Atienza, representing DA Assistant Secretary for Livestock, Dr. Enrico P. Garzon, Jr.

Two publications funded under BAR's Scientific Publication Grant were also launched during the program. The first book was "Adlay Recipes" which aims to promote various recipes on adlay that was produced by DA-RFO 4A. The second was "A Decade of Success: A Compendium of Agriculture and Fisheries R&D Projects Supported by the Bureau of Agricultural Research from 2005 to 2014" which is a compilation of various BAR-funded projects implemented by the DA-RFOs, BFAR Regional Offices, and SUCs for the last 10 years.

Table 6. AFMA Best R&D Paper Winners of the 28th NRS.

AWARD	TITLE	AUTHORS	AGENCY/IES
Applied Research in Fisheries, TG/IG			
BRONZE	Aquashade: Solution to the Low Seed Production of Nile Tilapia (*Oreochromis niloticus* L.) due to Climate Change	Emmanuel M. Vera Cruz Eddie Boy T. Jimenez Sherwin B. Celestino Eduardo A. Lopez Mia Bernadette G. Porlucas Jose S. Abucay Zaldy P. Bartolome	Central Luzon State University (CLSU)
	The Only Freshwater Sardinella (*Sardinella tawilis*) in the World: Its Spawning Patterns and Larval Distribution	Maria Theresa M. Mutia Myla C. Muyot Ma. Lourdes D. Merilles	National Fisheries Research and Development Institute (NFRDI)
SILVER	Phytoandrogen on Sex Inversion of Nile Tilapia (*Oreochromis niloticus L.*)	Ravelina R. Velasco Tereso A. Abella Lourdes D. Noscal Jamaica B. Mendoza Drexell Jay M. Dollente Michelle Z. Abella Erick Aldwin G. Suarez	Central Luzon State University (CLSU)
Applied Research in Fisheries, TA/TV			
BRONZE	Evaluation of Lying-in Hatchery Concept as Resource Enhancement Strategy for Swimming Crabs	Plutomeo M. Nieves	Bicol University Tabaco Campus
Development, Agriculture			
BRONZE	Community Empowerment through Community-based Participatory Action Research (CPAR): Sto. Domingo, Ilocos Sur Experience in Agricultural Development	Mark Ariel L. Agresor Melinda G. Calumpit Luciana T. Cruz Mary Ruth Menor Larina G. Zabala Consuelo N. Belarmino Mamerto Tacbas	Department of Agriculture-Regional Field Office 1
GOLD	PinoyGOURmix Technology Commercialization in Region 02	Rose Mary G. Aquino Orlando J. Lorenzana Robert B. Olinares Roynic Y. Aquino Leonida A. De Guzman Vanessa Joy F. Calderon Cristy Dela Cruz Vilma U. Atalin Samuel D. Barut, Jr. Mary Jane B. Ibarra Oliver A. Masinna Sheryl A. De Guzman	Department of Agriculture-Regional Field Office 2
	Technology Commercialization on Slaughter Goats (Triple Cross) in Pangasinan	Jovita M. Datuin Josefina P. Bueno Cathy B. Pastor Liza L. Ronquillo	Department of Agriculture-Regional Field Office 1

Table 6. Cont.

	Socio-economics		
BRONZE	Factors Influencing Adoption of Selected Peanut Production Technologies in Northern Luzon, Philippines	Cheryll C. Launio Janet S. Luis Yolanda B. Angeles	Benguet State University (BSU)
SILVER	Evaluation Study on the Effectiveness and Sustainability of Small Water Impounding Projects in Region 02	Maria Victoria Z. Gazmin Johny L. Tumaliuan Chonalyn A. Pascua Lovely A. Gaspar Orlando J. Lorenzana	Department of Agriculture-Regional Field Office 2
GOLD	Philippine Rice Competitiveness: Status, Prospects, and Directions	Flordeliza H. Bordey Piedad F. Moya Jerusa C. Beltran Cheryll C. Launio Aileen C. Litonjua Alice B. Mataia Rhemilyn Z. Relado Ronell B. Malasa Irene R. Tanzo Charmaine G. Yusongco Suennie Jane C. Paran Esther B. Marciano Ma. Shiela C. Valencia Mary Rose L. San Valentin David C. Dawe	Philippine Rice Research Institute (PhilRice)
	Applied Research in Agriculture, TG/IG		
BRONZE	Design, Testing and Evaluation of Compact Rice Mill with Impeller Huller	Michael A. Gragasin Jaywee P. Illustrisimo Romualdo C. Martinez	Philippine Center for Postharvest Development and Mechanization (PhilMech)
SILVER	Marker-assisted Immuno-based Identification of Philippine "Carabao" Mango	Edgardo E. Tulin Marciana B. Galambao Jo Rizjane B. Atok Donna Christine Q. Ramos	Visayas State University (VSU)
GOLD	Inclusive and Sustainable Village-and Nypa-Based Bioethanol Industry Development	Shirley C. Agrupis Nathaniel Ericson R. Mateo Joselito I. Rosario Marilou P. Lucas Ami Ruth R. Cocson Fiorello B. Abenes	Mariano Marcos State University (MMSU)
	Applied Research in Agriculture, TA/TV		
BRONZE	Enhancing Garlic Production in Ilocos through Adoption of Yield Boosting Technologies	Wilhelmina P. Castaneda Sylvia Igarta Jay-R Baligat	Department of Agriculture – Regional Field Office 1
SILVER	Production, Value-Addition, Promotion and Marketing of Organic Arabica Coffee Green Beans through Community S&T-based Farms in Sagada	Sonwright B. Maddul Teresita K. Mangili Marlo C. Abyado Christine L. Bulalin	Benguet State University (BSU)
GOLD	Development and Performance Evaluation of a Village Level Coconut Water Processing System	Ofero A. Capariño Kristine S. Soliven Jerry James M. Dela Torre	Philippine Center for Postharvest Development and Mechanization (PhilMech)

Table 7. Winners of AFMA Best Posters

AWARD	TITLE	AUTHORS	AGENCY/IES
BRONZE	Development and Performance Evaluation of a Village Level Coconut Water Processing System	Ofero A. Capariño Kristine S. Soliven Jerry James M. Dela Torre	Philippine Center for Postharvest Development and Mechanization (PhilMech)
SILVER	The Only Freshwater Sardinella (*Sardinella tawilis*) in the World: Its Spawning Patterns and Larval Distribution	Maria Theresa M. Mutia Myla C. Muyot Ma. Lourdes D. Merilles	National Fisheries Research and Development Institute (NFRDI)
GOLD	Design, Testing and Evaluation of Compact Rice Mill with Impeller Huller	Michael A. Gragasin Jayvee P. Illustrisimo Romualdo C. Martinez	Philippine Center for Postharvest Development and Mechanization (PhilMech)

The seven finalists for the Gawad Saka Outstanding Agricultural Researcher (OAR) and Outstanding Agricultural Scientist (OAS) were likewise recognized. *(Table 8)*

Table 8. *Gawad Saka* OAR and OAS Finalists

OUTSTANDING AGRICULTURAL RESEARCHERS	OUTSTANDING AGRICULTURAL SCIENTISTS
Dr. Sailila E. Abdula *Executive Director* DA-Philippine Rice Research Institute	**Dr. Nelly S. Aggangan** *Scientist I* National Institute of Molecular Biology and Biotechnology, UPLB
Dr. Riza G. Abilgos-Ramos *Supervising Science Research Specialist* DA-Philippine Rice Research Institute	**Dr. Lucia M. Borines** *Professor III/ Head of Plant Disease Diagnostic Lab.* Visayas State University
Ms. Rose Mary G. Aquino *Center Chief* DA-RFO 2 – Cagayan Valley Research Center	**Dr. Onofre S. Corpuz** *Professor/ Director of Research* Cotabato Foundation College of Science and Technology
Ms. Alicia D. Bulawan *Senior Science Research Specialist* DA-RFO 8-Abuyog Experiment Station	-

3rd National CPAR Congress

The 3rd National CPAR Congress gave due recognition to the valuable efforts of the country's farmers and fisherfolk in contributing to agriculture and fisheries research and development. This year's Congress was held on November 15-16, 2016 at Widus Hotel, Clark, Pampanga. This year's theme, "Masaganang Buhay para sa Magsasaka't Mangingisdang Pilipino sa Pamamagitan ng Progresibong Agrikulturang Pananaliksik at Pag-unlad," reflected the overarching goal of the Department of Agriculture (DA) to make agriculture a sustainable and profitable source of livelihood for the farmers and fisherfolk.

Gracing the event and leading the ribbon-cutting ceremony for the opening of the exhibit were Retired Commodore Eduardo Gongona, undersecretary for Fisheries and concurrent director of the Bureau of Fisheries and Aquatic Resources (BFAR), representing Agriculture Secretary Emmanuel Piñol; Dr. Nicomedes Eleazar, director of BAR; Dr. Teodoro Solsoloy, assistant director of BAR; Dr. Wilfredo Cruz, regional director of DA-BFAR 3; Dr. Arthur Dayrit, assistant research manager of DA-RFO 3; and Ms. Salvacion Ritual, head of BAR-Project Monitoring and Evaluation Division.

More than 260 participants composed of farmers, fisherfolk, researchers, experts, scientists, and representatives from the DA-staff bureaus and attached agencies, regional field offices, BFAR, and local government units across the country attended the event.

Highlight of the Congress was the farmers' and fisherfolk's testimonies on their experiences on being part of the conduct of CPAR projects. The following shared their stories: Ms. Erenia Nacion of Region 7; Mr. Alberto Ponce of Region 11; Ms. Leslie Bongalon of Region 5; Mr. Pablo de Castro of Region 4A; Ms. Marilou Catunao of Region 6; Ms. Rosa Cubelo of Caraga Region; Brgy. Captain Pedro Gelera of Region 6; Ms. Gina Mangalindan of Region 3; and Ms. Mery Ann Factor of Region 4B.

Several plenary session topics were prepared for the benefit of the farmers and fisherfolk present in the Congress (*Table 9*). Aside from the nine testimonials given by the farmers and fisherfolk, another six CPAR farmer cooperators and adopters also gave personal testimonies on how CPAR brought significant changes to their lives. In between presentations, farmers and fishers expressed their excitement on how both their farms and lives were improved.

Table 9. CPAR plenary session topics.

Special Topics	Session Topics
Philippine Carabao Center Programs *Dr. Liza Battad* Department of Agriculture-Philippine Carabao Center	**DA-RFO 10: The Oldest CPAR** *Ms. Fe Abragan* Department of Agriculture-Regional Field Office 10
Agritourism *Ms. Rose Mary Aquino* Department of Agriculture-Cagayan Valley Research Center	**Region 1: Partnership with the LGU** *Dr. JovitaDatuin* Department of Agriculture-Regional Field Office 1
Agricultural Training Institute (ATI): Farmers Business School *Ms. Karlene Grace Zuniga* Department of Agriculture-ATI	**PLGU CAR: On capacitating Farmers** *Dr. Catherine Buenaventura* Provincial Local Government Unit-CAR
YamangLupa Program *Mr. Roger Bagoforo* Department of Agriculture-Regional Field Office 9	**PLGU Leon, Iloilo: On Strengthening Farmer Organizations** *Mr. Ryan Caldito* Local Government Unit of Leon, Iloilo
	DA RFO 3: Coffee and CPAR Dr. Arthur Dayrit Department of Agriculture-Regional Field Office 3
	BFAR 6: Contribution of CPAR Fisherfolk Organization in Providing Alternative Income Source for the Coastal Community of Guimaras *Ms. Lissette Permocillo* Bureau of Fisheries and Aquatic Resources 6

Also part of the congress was the recognition of special efforts of the researchers, farmers' organizations, and farmer cooperators by awarding the Best Posters (*Table 10*) and the *Natatanging CPAR Farmer-Cooperator*. The recognition was given to farmer cooperators for their valuable contributions to the agri-fishery sector.

Table 10. National CPAR Congress Best Posters

Posters
CPAR on Organic Vegetable Production in Ifugao
CPAR on Integrated Coffee-based Farming System in Brgys. Tala and Pag-asa, Orani, Bataan
CPAR in Gigaguit, Surigao del Norte

> "87 farmer- and fisher-cooperators from the different regions were bestowed with the *Natatanging CPAR Farmer-Cooperator*".

2016 CPAR CONGRESS




> More than 260 participants composed of farmers, fisherfolk, researchers, experts, scientists, and representatives from the DA-staff bureaus and attached agencies, regional field offices, BFAR, and local government units across the country attended the event.

2016 CPAR CONGRESS

C. AWARDS AND RECOGNITIONS

PhilFIDA recognizes BAR as partner in fibercrop R&D

BAR was among the agencies given a Certificate of Appreciation by the Philippine Fiber Industry Development Authority (PhilFIDA) during its 3rd anniversary celebration held on June 10, 2016 at the Department of Agriculture, Diliman, Quezon City.

PhilFIDA awarded the certificate to BAR "in grateful recognition of its unwavering support for the pursuance of the Fibercrop Research and Development (R&D) agenda and programs and for the promotion and development of the Philippine fiber industry."

R&D efforts on abaca were among BAR's significant initiatives with PhilFIDA. One of which was the *Abakayamanan* Program that promotes combining abaca farming with coconut and other crops. By maximizing land use and integrating suitable production technologies, abaca farmers are endowed with improved farm productivity and increased incomes.

Accepting the certificate for BAR was Ms. Julia A. Lapitan, head of the Applied Communication Division representing Director Nicomedes P. Eleazar.

The recognition of partners was part of PhilFIDA's 3rd anniversary celebration themed, "Halamang Hibla: Yaman ng Bayan, Biyaya ng Kalikasan." Other agencies recognized were the Philippine Council for Agriculture and Fisheries, Bureau of Plant Industry, and Bureau of Agriculture and Fisheries Standards.

BAR-supported book on goat nutrition wins NAST PHL award

The book, "Mineral Profile of Forages and its Influence on Goat Nutrition," was among the seven publications that bagged the 2016 Outstanding Book Award given by the National Academy of Science and Technology, Philippines (NAST PHL) during its 38th Annual Scientific Meeting held on July 14, 2016 at the Manila Hotel, Ermita, Manila.

Funded by BAR under its Scientific Publication Grant, the book provides important scientific information and significant findings that will contribute to achieving better performance and overall productivity of goats. These include information on common forages, mineral contents of selected forages, distribution and solubility of minerals in forages, and feeding options to improve mineral status, among many others.

Dr. Orden and the other book authors, Dr. Emilio M. Cruz, Dr. Maria Excelsis M. Orden, and Dr. Tsutomu Fujihara, were very thankful for the NAST recognition and for giving importance to the book, specifically in the field of agricultural science.

Annually, NAST gives recognition to books and/or monographs written by Filipino authors and published in the Philippines that are adjudged to be outstanding in the fields of agricultural sciences; biological sciences; chemical, mathematical, and physical sciences; engineering sciences and technology; health sciences; and social sciences. Books and/or monographs are judged based on the quality and originality of content, contribution to science and technology, clarity of presentation, and thoroughness of documentation.

Eleazar recognized as a SciCom champion

Dr. Nicomedes P. Eleazar, director of BAR, was recognized as one of the Science Communication Champions by the Department of Science Communication, College of Development Communication of the University of the Philippines Los Baños. The award was given during the 3rd Science Communication Roundtable Discussion held at Ramada Manila Central in Binondo on November 21, 2016. Dr. Eleazar received the award "for democratizing farmers' access to agricultural technologies through science communication".

As one of the SciCom champions, Dr. Eleazar served as one of the plenary speakers, sharing his perspectives and vision for science communication in the Philippines–particularly in the agri-fishery sector. According to him, being in the field of research and development (R&D), practicing science communication is an important part of the job.

The Bureau chief then drew the audience's attention to the BAR-UPLB project on Technology Commercialization on Wheels (TCOW), an innovation in communication that brings technologies and knowledge products to areas that need them the most through a mobile exhibit truck.

With the theme, "Perspectives and Practices of SciCom in the Philippines: Meeting Today's Development Challenges", the event was attended by researchers, educators, practitioners, policymakers, and advocates of science communication. It sought to determine and analyze the emerging perspectives and practices of the field in the country.

Present during the event were Dr. Ma. Theresa Velasco, dean of the UPLB-CDC and Dr. Cleofe Torres, former dean of UPLB-CDC.

BAR-PhilMech supported agri-entrepreneur receives TOFARM

Gadmer "Mer" Layson, one of the successful soybean agri-entrepreneurs supported by BAR and the Philippine Center for Postharvest Development and Mechanization (PhilMech), received "The Outstanding Farmers of The Philippines (TOFARM) 2016 Special Citation Award" under the agri-entrepreneur category. The awarding ceremony was held at the Makati Shangri-La Hotel, Makati City on November 15, 2016.

Launched by the Junior Chamber International Philippines (JCIP) and Universal Harvester, Inc., TOFARM is a search and award program anchored on promoting farming in the youth sector of all classes. It gives recognition to the resiliency, ingenuity, and the strength of hardworking Filipino farmers.

A former reporter of Pilipino Star Ngayon of the Star Group of Publication, Mer is now the hardworking owner of KKK Enterprises named after his three children: Kyla, Kyle, and Kevin. A soybean producer and processor for four years now, Mer first heard about the National Soybean Program of the Department of Agriculture (DA) from a radio announcement on a three-day seminar on soybean production and processing.

Under the High Value Crops Development Program, the DA and BAR, along with their partner agencies, have intensified the implementation of the National Soybean Program in the Philippines which aims to further promote the production, processing, utilization, and marketing of soybean in the country towards building a competitive soybean industry.

Under the project, "Pilot Testing of Integrated Soybean Production-Processing Technologies towards Accelerating the Development of the Local Soybean Industry in the Philippines," being implemented by PhilMech, in coordination with BAR, various machineries that aid in improving soybean postharvest and processing systems were identified. One of the beneficiaries of the project was the Golden Beans and Grains Producers Cooperative which Mer is a member of. Under the project, the coop received soybean seeds for planting and Mer was among those who obtained viable seeds from his harvest being used for processing. These interventions allowed the coop to process and produce more soybeans.

BAR recognized as one of BIOTECH's partner agencies in research and technology commercialization

BAR was one of the agencies that was given recognition during the 36th anniversary celebration of the National Institute of Molecular Biology and Biotechnology (BIOTECH) held on February 9-12, 2016 at the University of the Philippines Los Baños, College, Laguna.

In the opening program, BIOTECH recognized its donors and partner agencies that have supported the institution in undertaking research and technology commercialization. Among them were BAR and Biotechnology Program Office under the Department of Agriculture; and Philippine Council for Industry, Energy and Emerging Technology Research and Development, and Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development under the Department of Science and Technology.

BAR's Program Development Division Head Joell H. Lales received the Plaque of Recognition on behalf of the DA.

The partnership among BAR, Biotechnology Program Office, and BIOTECH gives high importance to the role of biotechnology in addressing issues concerning Philippine agriculture. This led to the implementation of various projects involving the development of science-based protocol in the formulation of liquid organic fertilizers from plant and fruit extracts; development of package of technologies to harness the health-benefitting potentials of Philippine endemic orchids; technology promotion of Vesicular Arbuscular Mychorrizal Root Inoculant (VAMRI) in different cropping and plantation systems; biotechnological production of high-value products from mango wastes; and turning banana peduncle into valuable products, among many others.

Tilapia ice cream wins in 2016 SIAL Exhibition

Central Luzon State University's tilapia ice cream delighted the judges and thousands of participants as it won a gold medal as the Innovation World Winner Awardee during the Salon International de l'Agroalimentaire (SIAL) Asean Manila 2016 held on 30 May-2 June 2016 at the World Trade Center, Manila.

Surprised with the award, Prof. Vera Cruz shared that they prepared 350 cups of tilapia ice cream displayed and tasted by a lot of exhibitors and walk-in visitors that delighted food tasters with the absence of aftertaste.

BAR, under its NTCP, supported the technology enhancement and commercialization of tilapia ice cream along with the developed tilapia cookies which are optimally aligned to consumer preferences. Varieties include tilapia ice cream with tilapia praline, tilapia ice cream sansrival, and tilapia ice cream with tilapia cookies. On the other hand, tilapia cookies are available in thin plain tilapia cookies, tilapia cookies with tomato jam, and tilapia hermits dipped in lemongrass-pandan chocolate.

Dedicated to the food industry, the SIAL network brings together 14,000 exhibitors from 194 countries. This 2016, it was participated in by 350 exhibitors from 25 countries.

Annex

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
	AFMA = 32	
1	Integrating native pig and chicken in the production system of upland organic rice farmers	Bicolandia Greenfields Development Organization Inc
2	Phenotyping and morphological evaluation of durian cultivars in the Philippines	USM
3	Creating climate disaster resiliency in Calamianes group of islands	De La Salle Araneta University
4	Field trial and technology piloting of new prsv - tolerant papaya f1 hybrids	UPLBFI
5	Performance evaluation of upgraded goats supplemented with Indigofera sp. Under organic practice and evaluation of chevon quality	BAI
6	Resource assessment, biological evaluation and phytochemical screening of economically important seaweeds of Ilocos region	MMSU
7	Community based participatory action research (CPAR) improvement of cacao production in bgy Sirib and Bgy. Subasta, Calinan District Davao City	DA-RFO 11
8	CPAR on off season onion production and enterprise development in rice based areas in Aritao, Nueva Vizcaya	DA-RFO 2
9	Community based participatory action research (CPAR) on breeder goat production in Sta. Maria, Ilocos Sur	DA-RFO 1
10	Formulation of Research and Development, Extension Agenda and Programs (RDEAP) 2016-2022 in Support to A Sustainable Agriculture and Fishery Sector	SEARCA
11	Dissemination of edible landscaping technology road to self sufficiency	PARRFI
12	Establishment of demo gardens utilizing the edible landscaping technology at different sites in Sorsogon, Philippines	UPLBFI
13	Technology Commercialization of Local Soybean Texturized Vegetable Protein (TVP) in Region 2	DA-RFO 2 CVRC
14	Assessment of the feasibility and design of a technology business incubator program (TBIP)	WorldFish
15	An assessment and documentation of the major accomplishments of the Department of Agriculture from July 2010 to June 2016	PARRFI
16	Commercial production of soft, semi and hard cheeses from goat, buffalo and cows milk	UPLB
17	Development and promotion of beekeeping technologies in coconut plantation in the province of Quezon	SLSU
18	Phylogenetic characterization and detection using dry format RT-LAMP of the emergent Newcastle disease virus in the Philippines	CLSU
19	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Sultan Kudarat	Sultan Kudarat State University
20	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Southern Leyte	SLSU

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
21	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Cotabato province	USM
22	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Leyte	VSU
23	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Bataan	BPSU
24	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Albay	Bicol University
25	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Cagayan Province	Cagayan State University
26	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Misamis Occidental	Misamis State University - Naawan
27	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Negros Oriental	Negros Oriental State University
28	Suitability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in Nueva Ecija"	CLSU
29	Breeding and hatchery management and broodstock development of Pigek (Mesopristes cancellatus)	Mindanao State University - Naawan
30	Environmental and anthropogenic stressors affecting the biology, ecology and fishery potential of Glossogobius giurius (Hamilton 1882) in Lake Mainit, Northeastern Mindanao, Philippines	Mindanao State University - Naawan
31	Pilot testing of coconut water processing enterprise in selected areas of the Philippines (Phase I)	PhilMECH
32	Community-based Participatory Action Research (CPAR) on Breeder Goat Production in San Jacinto, Pangasinan	DA-RFO 1

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
	BIOTECH = 15	
1	Molecular characterization and gene expression of tlr and mhc II drb3 gene in lactating water buffaloes and goats	CLSU
2	Genome-wide association (GWA) mapping of selected Philippine Rice germplasm for root plasticity alleles	PhilRice
3	Development of Candidate Gene Sequence-Specific DNA Markets to Fastrack Bacterial Wilt Resistance Breeding in Tomato	UPLB
4	FishTRACE: monitoring and identification of commercial fishery products for export using DNA barcodes	NFRDI
5	Understanding the biochemistry of Monoterpene octopamine receptor interactions for the selection of potential pest control bioactives	UP Diliman
6	Development of provitamin A-enriched and disease-resistant rice line through marker assissted breeding	PhilRice
7	Molecular detection and mapping of common gastrointestinal parasites of ruminants in Region 2	DA-RFO 2
8	Establishment of Southern Mindanao Integrated Agricultural Laboratory (SoMinAl) in Mamambulan Tugbok District Davao City, Moblization, construction of building foundation	DA-RFO 11
9	Genetic and phytochemical characterization of pigmented rice accession in Philrice genebank	PhilRice
10	Development of genomic resources for insect pests of corn and rice: transcriptome sequencing and rapid development of single nucleotide polymorphism (SNP) markers for the Asiatic corn borer, Ostrinia furnacalis(Guenee) and the white stemborer,Scirpophaga innotata(Walker)	UP Diliman, NIMBB
11	DA Biotech Program Scholarship Grant to USM Undergraduate Students Pursuing Agri-Biotechnology and Related Fields	USM
12	Biotechnology Research, Development, and Extension Agenda Implementation and Coordination	ISAAA
13	Increasing Partnership on Agricultural Biotechnology Applications	BCP
14	Phenotypic Characterization and Genetic Diversity Analysis of Local Cattle in Lanao del Sur, Philippines Using SSR Markers	MSU
15	#KnowTheScience: Breaking the Biotech Barrier	ISAAA

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
	CLIMATE CHANGE/AMIA = 34	
1	Climate risk vulnerability assessment (CRVA) to support region level targeting and planning for the adoption and mitigation initiative in agriculture (AMIA)	International Center for Tropical Agriculture
2	Developing a decision support platform for climate resilient agri-fisheries (CRA) investment prioritization in the Philippines	International Center for Tropical Agriculture
3	Building community based models for climate resilient agriculture and fisheries across landscape within the municipality of Ivisan, Capiz	International Institute of Rural Reconstruction
4	Building community based models for climate resilient agriculture and fisheries across landscape within the municipality of Guinayangan, Quezon	International Institute of Rural Reconstruction
5	Climate information services (CIS) provisioning in the agriculture sector	UPLBFI
6	AMIA knowledge management research program on building climate resilient livelihoods and communities	UPLBFI
7	Climate change impacts on value chains of Siganid and tilapia in vulnerable regions in Luzon, Philippines	WorldFish
8	Sustainability assessment and mapping to support development of resilient communities and livelihoods in selected vulnerable communities in the Philippines	WorldFish
9	Enhancing sustainability of upland village farming in Benguet through vulnerability assessment, policy analysis and natural resources conservation education	UPLBFI
10	Community based adaptation: enhancing climate change resilience of communities and ecosystems through participatory watershed management	UPLBFI
11	Climate resilient agri fisheries (CRA) assessment, targeting & prioritization for the adaption and mitigation initiative (AMIA) phase 2 in Iloilo	Iloilo State College of Fisheries (ISCOF-Tiwi)
12	Regional climate resilient agri-fisheries (CRA) assessment, targeting and prioritization for the adaptation and mitigation initiatives in agriculture (AMIA2) phase 2 in Isabela of Cagayan Valley Region (Region 02)	ISU
13	Regional climate resilient agri-fisheries (CRA) assessment, targeting and prioritization in region 1 for the adapatation and mitigation initiative in Agriculture (AMIA) phase 2	MMSU
14	Climate resilient agri-fisheries (CRA) assessment, targeting and prioritization for the adaptation and mitigation initiative for Tarlac province	TAU
15	Region 10 climate resilient agri-fisheries (CRA) assessment, targeting & prioritization for the adaptation and mitigation initiative (AMIA) phase 2: focus on Bukidnon province	CMU

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
16	Regional climate resilient agri fisheries (CRA) assessment, targeting and prioritization for the adaption and mitigation initiative (AMIA) phase 2 (CALABARZON region)	SLSU
17	Regional climate resilient agrifisheries (CRA) assessment, targeting and prioritization for the adaption and mitigation initiative (AMIA) phase 2, Region V (Bicol) - Camarines Sur	PSU
18	Assessing Potentials of DA Institutional and Policy Innovations for Agriculture and Mitigation in Agriculture (AMIA) Program Management	UPLBFI
19	Regional climate-resilient agrifisheris (CRA) assessment, targeting and prioritization for the adaptation and mitigation initiative (AMIA) phase 2 in (North Cotabato province	USM
20	Region XI climate resilient agri fisheries (CRA) assessment, Targeting & prioritization for the adaptation and mitigation initiative (AMIA) phase 2	University of Southeastern Philippines (USEP)
21	Region XI climate resilient agri fisheries (CRA) assessment, Targeting & prioritization in Negros Island Region for the adaptation and mitigation Initiative (AMIA) phase 2	VSU
22	Community-Based Action Research for Climate-Resilient Agriculture (CRA) in Region I	DA-RFO 1
23	Community-Based Action Research for Climate Resilient Agriculture (CRA) in Cagayan Valley	DA-RFO 2
24	Community-Based Action Research for Climate-Resilient Agriculture (CRA) in Region 3	DA-RFO 3
25	Community-based Action Research for Climate-Resilient Agriculture (CRA) in CALABARZON Region (Region IV-A)	DA-RFO 4A
26	Community-based Action Research for Climate-Resilient Agriculture (CRA) in Region 5	DA-RFO 5
27	Community Based Action Research for Climate-Resilient Agriculture (CRA) in Region 6	DA-RFO 6
28	Community-Based Action Research for Climate-Resilient Agriculture and Fishery (CRA) in Northern Mindanao	DA-RFO 10
29	Community-based Action Research for Climate-Resilient Agriculture (CRA) in Region XI	DA-RFO 11
30	Community Based Action Research for Climate-Resilient Agriculture (CRA) in Region 12	DA-RFO 12
31	Community-Based Action Research for Climate-Resilient Agriculture (CRA) in Region XVIII	DA-RFO 18
32	Documentation and assessment of local/indigenous knowledge (link) for climate change adaptation of agri-fisheries	UPLBFI
33	Production and testing of biochar organic fertilizer blends/mixes as soil amendment for the enhancement of soil health and an avenue for carbon sequestration	UPLB
34	Developing strategies towards more resilient fishing communities amidst climate change: The case of major lake in Luzon	UPLBFI

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
	RICE = 50	
1	Identification and selection of transgressive segregants in Philippine release hybrid rice varieties - Year 3	PhilRice
2	Rice Yield gap and economic efficiency in the Philippines	PhilRice
3	Analysis of cropping system in relation to pest profile and crop yields in asynchronus rice production of Nueva Vizcaya - Year 1	PhilRice
4	Mechanism of rice insect pest and disease resistance in traditional rice varieties and development of genetic stocks with novel sources of resistance genes	PhilRice
5	Varietal mixtures of rice to enhance yield and mitigate effects of climate change in stress prone areas - Year 2	PhilRice
6	Development of an integrated and mechanized system of handling and drying for fast processing of typhoon affected palay - Year 1	PhilRice
7	Rice Crop Manager Phase II: Part A: Research to develop and target location specific rice farming practices in a changing climate in the Philippines - year 1 (PhilRice component)	PhilRice
8	Raising productivity and enriching the legacy of heirloom/traditional rice through empowering communities in unfavorable rice-based ecosystems (heirloom rice) - Year 3 (PhilRice component)	PhilRice
9	Value chain analysis of the rice industry in the Philippines (year 2)	PhilRice
10	PRISM - Philippine rice information system management - an operational system for rice monitoring to support decision making toward increased rice production in the Philippines - year 3 (PhilRice component)	PhilRice
11	Accelerating the development and adoption of next generation (next-gen) rice varieties for the major ecosystems in the Philippines - Year 3 (PhilRice component)	PhilRice
12	Profiling and seed multiplication/purification of selected traditional rice varieties in support of DA's initiative on rice exportation (Year 3)	PhilRice
13	Collection and evaluation of farmer's rice lines in irrigated and rainfed lowland in the Philippines - Year 1	PhilRice
14	Accelerating the development and dissemination of associated rice production technologies that are resource-use efficient - Year 4 (PhilRice component)	PhilRice
15	Improving Technology Promotion and Delivery through Capability Enhancement of the Next Generation of Rice Extension Professionals and Farmer Intermedials (IpaD)-Year 3 (PhilRice Component)	PhilRice
16	Mapping and monitoring of rice areas to assess the effects of El Nino on rice crop production in the Philippines year 2	IRRI
17	Strengthening implementation of rice crop manager dissemination, monitoring, geo-referencing and evaluation in Negros Island region	DA-Negros Island Region
18	Evaluation and comparison of different lignocellulosic sugarcane wastes and by products as substrates for optimum production of different strains of oyster mushroom under Negros Island Region (NIR) condition	DA-Negros Island Region
19	Acceleration the development and adoption of next generation (Next-Gen) rice varieties for the major ecosystems in the Negros Island Region (NIR) through participatory variety selection (PVS)	DA-Negros Island Region
20	Improving crop productivity in drought prone rainfed lowlands in the Philippines with mechanized direct seeding technology (IRRI and PhilRice)	IRRI and PhilRice
21	Identifying suitable sites for small scale irrigation projects in Region 2 through GIS based water resources assessment	ISU
22	Assessing the production and marketing of Philippine specialty rice - Year 1 (PhilRice and IRRI)	IRRI and PhilRice
23	Identifying suitable sites for small scale irrigation projects in Region 1 through GIS based water resources assessment	MMSU
24	Identifying suitable sites for small scale irrigation projects in Region 12 through GIS based water resources assessment	USM
25	The 5th round of the regular monitoring of rice based farm households in the Philippines	PhilRice

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
26	Evaluation and adaptation of rice integrated crop management technologies to enhance yield and reduce input costs in irrigated lowland - Year 1	PhilRice
27	Assessment of farming systems in the rice based communities and development of Payamanan plus model - Year 1	PhilRice
28	Cotabato special rice: A participatory approach in building a community rice based enterprise	PhilRice
29	Identifying suitable sites for small scale irrigation projects in Bicol region through GIS based water resources assessment	CBSUA
30	CPAR model on rainfed rice based farming systems and utilization of upland areas in Pande Azucar Islan, Concepcion, Iloilo	DA-RFO 6
31	CPAR on rainfed rice based farming system (rice mungbean + vegetable) in San Miguel, Iloilo	DA-RFO 6
32	Philippine rice information system (PRISM) - an operational system for rice monitoring to support decision making towards increased rice production in the autonomous region in Muslim Mindanao DS 2016	DAF-ARMM
33	Accelerating the development and adoption of next generation rice varieties for the major ecosystems in the autonomous region in Muslim Mindanao DS 2016	DAF-ARMM
34	Identifying suitable sites for small scale irrigation projects in Davao region through GIS based water resources assessment	SPAMAST
35	CPAR on rice + gabi + sili farming systems in Camalig, Albay	DA-RFO 5
36	Identifying suitable sites for small scale irrigation projects in cordillera administrative Region through GIS based water resources assessment	IfSU
37	Rice crop manager (RCM) a comprehensive decision support tool for increasing yields and income of farmers in the Autonomous Region in Muslim Mindanao, Dry season 2016-2017	DAF-ARMM
38	Benchmarking the research and development capacity of the regional rice and rice based research and development network (BR4D)	IRRI
39	National Multi-Environment testing (NMET) of drought prone direct seeded rainfed lowland rice lines	UPLB
40	Mapping and assessment of salinity in Agricultural areas and coastal communities in selected provinces in the Philippines	BSWM
41	Development and promotion of community based mushroom production of shiitake (Lenticus edodes) and other high end mushroom species in the heirloom rice areas for increased productivity and food sufficiency	DA-RFO CAR
42	Development of an integrated crop management package for rice in saline prone areas for increased productivity	PhilRice
43	CPAR Model Showcasing Mungbean GAP-Based for Improved Rice Productivity in Lowland Rice-based Areas of Culing Cluster, Cabanatuan, Isabela	DA-RFO 2
44	Field Assessment of Actinomycete Inoculant for Enhancing the Growth and Yield of Rainfed Lowland and Upland Rice	PhilRice
45	Enhancing the Production Capacity of Community Mushroom Growers through the Mechanized Production of Pasteurized Substrate	BPI
46	Water-efficient and risk mitigation technologies for enhancing rice production in irrigated and rainfed environments (WATERice)	IRRI and PhilRice
47	Automated text messaging for rice farmers: Identify cost-effective options for large-scale deployment through Rice Crop Manager	IRRI and PhilRice
48	R4D and Rice Security: 29th National Rice R&D Conference	PhilRice
49	Assessment and Regional Testing of the Improved Training Curriculum for AgRiDOCs: A New Breed of Agricultural Development Officers of the Community, for its Sustained Roll-out	ATI
50	Development of Agriculture TecVoc High Schools Offering Crops Production as Key Information Hubs on Climate Change-Ready Rice Production Technologies for Improved Agricultural Productivity	PhilRice

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
	CORN and CASSAVA = 56	
1	Site specific nutrient management for cassava production in the DA RFO XI	DA-RFO 11
2	On farm participatory evaluation in Region XI: Nutrient expert for maize Philippines	DA-RFO 11
3	On farm participatory evaluation in Region XIII: nutrient expert for maize - Philippines	DA-RFO 13
4	Site Specific nutrient management for cassava production in the DA RFO XIII	DA-RFO 13
5	On farm participatory evaluation in Region 1: nutrient expert for maize Philippines	DA-RFO 1
6	Site specific nutrient management for cassava production in the autonomous region in Muslim Mindanao	DAF-ARMM
7	On farm participatory evaluation in Muslim Mindanao: nutrient expert for maize Philippines	DAF-ARMM
8	Site specific nutrient management for white corn production in Quezon province farmers participatory evaluation	DA-RFO 4A - STIARC
9	Site Specific nutrient management for cassava production in region 2	DA-RFO 2 CVRC
10	On-farm participatory evaluation in Region 3: nutrient expert for maize-Philippines	DA-RFO 3
11	Phenotypic and genotypic pathogen evaluation and assessment of native corn varieties for resistance to downy mildew, bacterial stalk rot and fusarium ear rot (year 2 and year 3)	UPLBFI
12	Safeguarding the Philippine corn genetic diversity through strengthened and expanded corn germplasm conservation and management system: year 2 - year3	UPLBFI
13	Creating useful heterotic groups for Philippine native corn varieties: an initial strategy for native corn germplasm improvement (year 2 - year 3)	UPLBFI
14	Molecular characterization of native maize populations (year 2)	UPLBFI
15	Evaluation of Philippine corn germplasm collection for tolerance to selected abiotic stresses (years 2 and 3)	UPLBFI
16	Nationwide survey and early warning on cassava arthropod pests and diseases in the Philippines	BPI
17	Development of breeding populations as sources of resistance to different biotic and abiotic stress in corn (year 2 and year 3)	UPLBFI
18	Establishment of physiocochemical and biological indicators of soil health for cassava	UPLBFI
19	Native corn as source of resistance to the Asian corn borer, Ostrinia furnacalis (guenee) and corn weevil, Sitophilus zeamais (motchulsky) for crop improvement and pest management options (year 2 - year 3)	UPLBFI
20	Varietal improvement and yield trials of water stress tolerant corn	UPLBFI
21	Development of lateral flow immunosorbent asay (LFIA) detection kit for phytoplasma in Cassava	VSU
22	On Farm Participatory Evaluation in Northern Mindanao: Nutrient Expert for Corn in the Philippines	DA-RFO 10

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
23	Conservation and Management of Philippine Traditional Corn Germplasm in Region 5	DA-RFO 5
24	Field Evaluation of Nutrient Expert for Maize - Philippines in ARMM for Yellow Corn Hybrids	DAF - ARMMIARC
25	Conservation and Management of Different Traditional Corn Germplasm in the Autonomous Region in Muslim Mindanao	DAF-ARMMIARC
26	Field Evaluation of Nutrient Expert for Maize - Philippines (NEM-PH) Software for Yellow Corn Hybrids in Region 4A	DA-RFO 4A STIARC
27	Enhancement of Developed Food Products from CVRC Open-pollinated White and Pigmented Corn in Region 2	DA-RFO 2 - CVRC
28	Field Evaluation of Nutrient Expert for Maize-Phils in Region 12 for Yellow Corn Hybrids	DA-RFO 12
29	Conservation and Management of Philippine Traditional Corn Germplasm in the Region 1	DA-RFO 1
30	Conservation and Management of Philippine Traditional Corn Germplasm in the Region IVB	DA-RFO 4B
31	Conservation and Management of Philippine Traditional Corn Germplasm in the Region IX	DA-RFO 9 - ZAMPIARC
32	Conservation and Management of Philippine Traditional Corn Germplasm in the Region 12	DA-RFO 12
33	Conservation and Management of Philippine Traditional Corn Germplasm in the Region IVA	DA-RFO 4A
34	CPAR on Sustainable Corn Production in Sloping Areas (SCoPSA) in Corn-based Hilly Areas in Maddela, Quirino	DA-RFO 2
35	Field Evaluation of Nutrient Expert for Maize Philippines in Region XI for Yellow Corn Hybrids	DA-RFO 11
36	CPAR on Corn-based Integrated Farming System in Riverflood Plains in Alcala, Cagayan	DA-RFO 2
37	CPAR on Enhancing White/Purple Corn Productivity under River Flood and Drought Prone Areas of Enrile,Cagayan	DA-RFO 2
38	Conservation and Management of Philippine Traditional Corn Germplasm in Region XI	DA-RFO 11
39	Survey and Early Warning on Cassava Arthropod Pests and Diseases in Region IV-A	DA-RFO 4A STIARC
40	Survey and Early Warning on Cassava Arthropod Pests and Diseases in the Philippines (Region IVB)	DA-RFO 4B
41	Survey and Early Warning on Cassava Arthropod Pests and Diseases in the Philippines (Region 5)	DA-RFO 5
42	Survey and Early Warning on Cassava Arthropod Pests and Diseases in Northern Mindanao	DA-RFO 10
43	Survey and Early Warning on Cassava Arthropod Pests and Diseases in the Autonomous Region in Muslim Mindanao	DAF-ARMMIARC
44	Survey and Early Warning on Cassava Arthropod Pests and Diseases in the Philippines (Region VI)	DA-RFO 6

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
45	Survey and Early Warning on Cassava Arthropod Pests and Diseases in the Philippines (Cordillera Administrative Region)	DA-RFO CAR
46	Survey and Early Warning on Cassava Arthropod pest and diseases in the Philippines (Region 3)	DA-RFO 3
47	Survey and early warning on cassava arthropods pest and disease in the Philippines (Region XII)	DA-RFO 12
48	Survey and Early Warning on Cassava Arthropods Pest and Disease in the Philippines (Region XI)	DA-RFO 11
49	Survey and early warning on cassava arthropod pest and disease in the Philippines (Region VII)	DA-RFO 7
50	Survey and Early Warning on Cassava Arthropod Pest and Diseases in the Philippines (Region 8)	DA-RFO 8
51	Survey and early warning on cassava arthropod pests and diseases in the Philippines (Region 1)	DA-RFO 1
52	Survey and early warning on cassava arthropod pests and diseases in the Philippines (CARAGA Region)	DA-CARAGA
53	Survey and early warnings on cassava arthropod pests and diseases in the Philippines (Region 2)	DA-RFO 2
54	Conservation and management of traditional corn germplasm in Eastern Visayas	DA-RFO 8
55	Field evaluation of nutrient expert for maize philippines in Region 2 for yellow corn hybrids	DA- RFO 2 CVRC
56	Conservation and management of philippine corn germplasm in Region 2	DA-RFO 2 CVRC

List of 2016 BAR Newly-Funded Projects (according to fund source)

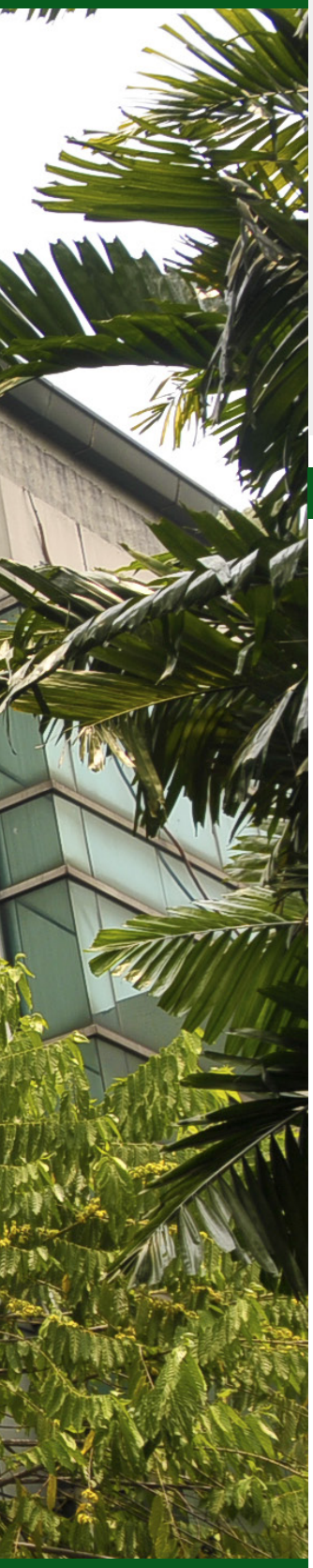
	Title of Projects	Lead Implementing Agency
	HVCDP = 46	
1	Institutional development support for upgrading of citrus indexing laboratory	BPI - DNCRDPSC
2	Establishment of food processing research center	Marinduque State College
3	Adaptability and Marketability of Blueberries in the Philippines	BPI-BNCRDPSC
4	Etiology, physiological characterization and molecular detection of *Gibbrellin* and *Fumonisin* and management *of Gibberella moniliformis* wineland causing "Twister Disease" of onions in the Philippines	CLSU
5	Technology promotion and commercialization in improved integrated pest management strategy on mango in Region 3	RMTU
6	Production, utilization and conservation of kalumpit (*Terminalia macrocarpa*)	SLSU
7	Promotion of generated cacao technologies and development of new products towards improved livelihood	ISU
8	Product Improvement and Marketing Plan for Dalanghita Nectar	SLSU
9	Upgrading and improvement of mushroom research and development facilities of DA-RFO IVB experiment stations in Oriental Mindoro, Occidental Mindoro and Palawan	DA-RFO 4B
10	Traditional seed storage practices of vegetable growing communities in cagayan valley: An assessment	DA-RFO 2 SCRC
11	Technology piloting of soybean production in lahar laden soil and soybean utilization	DA-RFO 3

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
12	Enhancing the mushroom production in region 1 as regional mushroom center in Dingras, Ilocos Norte	DA-RFO 1
13	Establishment of mushroom house at DA-INREC Batac, Ilocos Norte	DA-RFO 1
14	Commercial of developed processing technologies for Nipa-based product in Infanta, Quezon	DA-RFO 4A QAES
15	Soybean technology promotion and utilization product development in Region 6	DA-RFO 6 WESVIARC
16	Boosting farmers income through an integrated soybean production for food and fuel: An environmental assessment, technical and economic studies	UPLB
17	Promotion and enhancement of developed processing technologies of pigeon pea (*Canjanus cajan* (L) Millsp)Food Products	CBSUA
18	Quality systems improvement of dragon fruit, soursoup (guyabano) and apple guava through value chain analysis and management	UPLB
19	Establishment of Amas Research and Experiment Station Mushroom Laboratory	DA-RFO 12
20	Varietal evaluation, multiplication and promotion of selected indigenous vegetables	UPLB
21	Enhancing Mungbean Adaptation to Climate Change: Varietal Improvement of Flooding Tolerance	UPLB
22	Varietal development and improvement of shallot towards high yielding, pest and diseases resistant/tolerant and longer shelf life varieties	UPLB
23	Community-based climate change adaptation strategies for enhancing resilience in coffee and cacao production	PARRFI
24	Technology adaption and evaluation of community based edible landscaped	PARRFI
25	Utilization of neglected underutilized tropical fruits for the development of high value products	PARRFI
26	Production, promotion and commercialization of coconut sap sugar in the Province of Quezon	MLGU Quezon
27	Product development and promotion of Nipa by-products in Bicol Region	DA-RFO 5
28	Financial viability and profitability analysis of new technologies and enterprises under high value crops development program	SEARCA
29	Upgrading of R&D laboratory for mushroom culture and production in Mindoro State College of Agriculture and Technology	MinSCAT
30	Land resources evaluation and suitability assessment of strategic production areas for major crops/commodities	BSWM
31	Enhancing commercial adlay (*Coix lacrima-jobi* L.) production, promotion and utilization for food in Region 10	DA-RFO 10
32	Upgrading of the BPI DNCRDPSC tissue culture and indexing laboratories for increased production of disease free Saba/Cardaba plantlets	BPI-DNCRDPSC
33	Effects of pests, diseases, biocontrol and weather on the phytochemical production of coffee and cacao in Mindanao	USM
34	Nutritional analysis of indigenous vegetables and wild edible fungi as affected by occurrence of pest, diseases, and weather factors	USM

List of 2016 BAR Newly-Funded Projects (according to fund source)

	Title of Projects	Lead Implementing Agency
35	Establishment of mushroom development R&D center at DA-RCPC Ilagan	DA-RFO 2 CVIARC
36	Establishment of plant genetic resources center in Cagayan Valley	DA RFO 2
37	Enhancement of laboratory and facilities of rfo 10 for efficient and effective mushroom R&D technology	DA-RFO 10 NOMIARC
38	Establishment of plant genetic resources center in CALABARZON Region	DA-RFO 4A
39	Establishment of plant genetic resources center in Bicol Region	DA-RFO 5
40	Enhancement of production support of the tissue culture laboratory at DA Region 5 Central Bicol Experiment Station	DA-RFO 5
41	Maintenance of seed production of recommended soybean varieties	CLSU
42	Soybean community based sustainable production and utilization in Northern Mindanao	DA RFO 10 - NOMIARC
43	Commercialization of shitake production and product development technology in Nueva Vizcaya	NVSU
44	Commercialization and Marketing of Sweet Potato, Adlay, Soybean and Roselle Products and By Products in Region 10	DA RFO 10 - NOMIARC
45	Development of mangifera liquer towards commercialization	CLSU
46	Soybean utilization and product development	CLSU
	ORGANIC AGRICULTURE = 4	
1	Value chain analysis of native lechon in Visayas, Philippine	CELPA, Inc
2	Evaluation of aquaculture farms and practices in Region 1: bridging the gap to organic agriculture	MMSU
3	Development of microbial inoculants for the production of improved fermented biological extracts (Phase II)	UPLBFI
4	Technology development and promotion for the conservation, production and commercialization of indigenous organic upland rice in selected areas in the Bicol region	Bicol University College of Agriculture
	TOTAL = 237	



About BAR

The Bureau of Agricultural Research (BAR) is a staff bureau of the Department of Agriculture (DA) tasked to coordinate agriculture and fisheries research and development and ensure the application of its full potential to improving the sector. It was created in 1987 through Executive Order 116 to ensure that agricultural research is coordinated and undertaken for maximum utility to agriculture. It is mandated to tap farmers, farmers' organizations, and research institutions, including state universities and colleges in the conduct of research for the use of the DA, particularly the farmers and fisherfolk.

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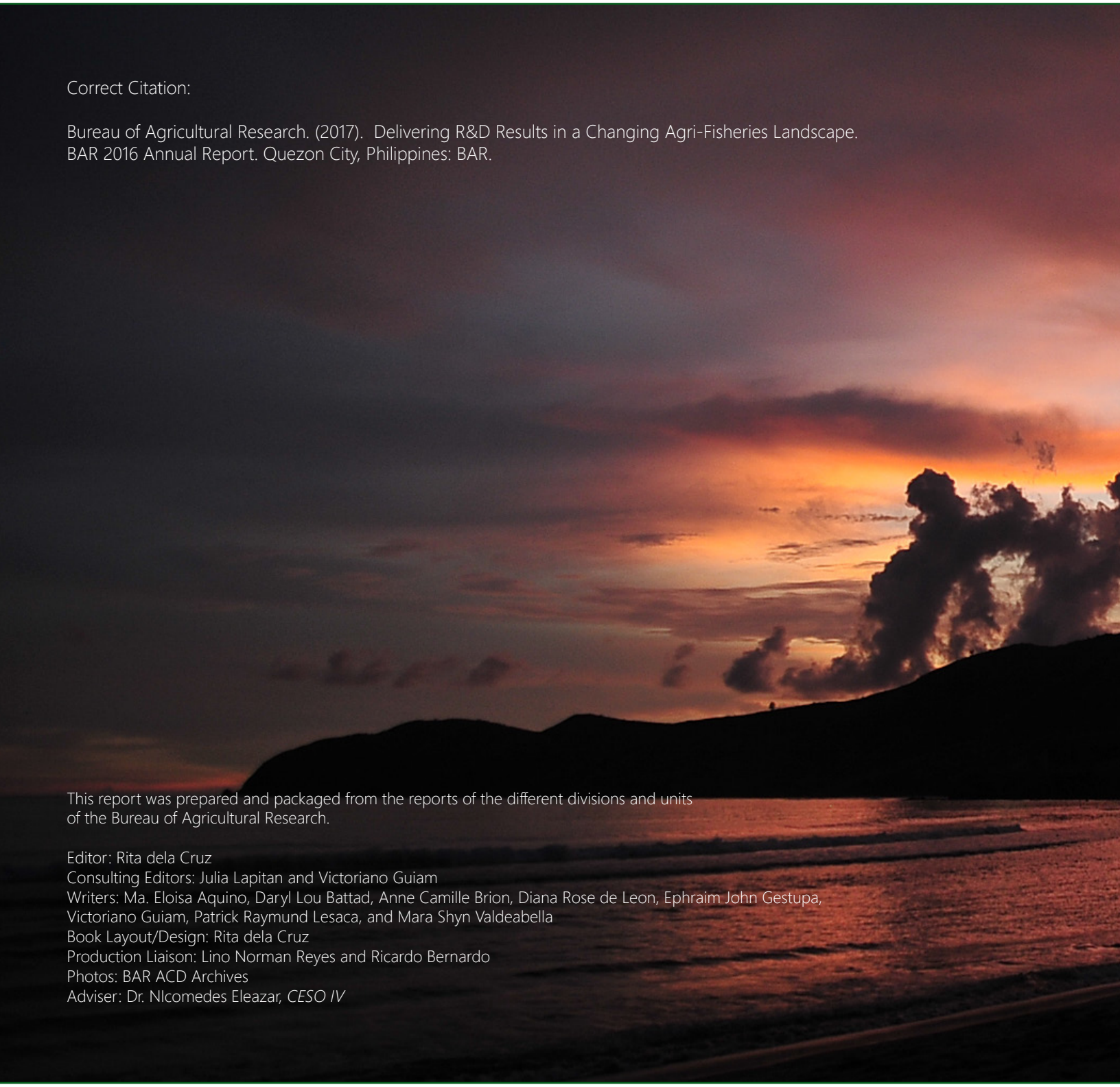

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