Compendium of BAR-Funded Projects under the National Organic Agriculture Program 2011 – 2016
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BAR-Funded
Projects under the
National Organic
Agriculture Program

2011 – 2016
Republic Act 10068 or Organic Agriculture (OA) Act of 2010 provides for the policy of the state to promote, propagate, develop further, and implement the practice of OA in the country that will cumulatively condition and enrich the fertility of the soil; increase farm productivity; reduce pollution and destruction of the environment, prevent the depletion of natural resources; further protect the health of farmers, consumers and the general public; and save program for the promotion of community-based organic agriculture systems which include, among others, farmer-produced purely organic fertilizers such as compost, pesticides; and other farm inputs, together with a nationwide educational and promotional campaign for their use and processing as well as adoption of OA.

Section 5 of RA10068 envisions the institutionalization of a comprehensive OA program with research and development (R&D) as one of its component to maintain continuous improvement in the areas of production, technology support, development of organic market industry, and delivery of support services, capability programs implementation, and farmers’ participation/involvement in research activities.

To attain the objectives of improving OA R&D (for continuing research and upgrading of relevant technologies), the following must be provided with emphasis in the implementation of organic agriculture program:

a) R&D centers organized and established
b) New technologies disseminated and adopted by farmers
c) User-friendly database and information system on OA in place and accessible to all OA stakeholders
d) Information, Education and Public Awareness Program on completed research and Continuing Activities
e) Completion of national survey of organic production by 2012 and Updating by 2015
f) Indigenous knowledge compiled in 2013 and disseminated continuously thereafter
g) Strengthened and supported private sector participation in research activities
h) Existing farms of organic practitioners tapped as learning and research centers for participatory activities by 2014.

The role of the Bureau of Agricultural Research (BAR) is defined under Section 20 Research, Development and Extension (RD&E), wherein it is designated as the lead agency to coordinate with other agencies of the DA, DAR, DOST, DepEd, DILG, SUCs, including private organizations, to develop, enhance, support and consolidate activities and related technologies for the formulation and implementation of a unified and integrated OA plans and programs from the national level down to field level.
The Bureau is mandated by law to create and/or strengthen a unit that will handle the overall planning, coordination, implementation, and monitoring of OA research programs; establish and maintain a database and information system on OA R&D program; and create and chair an inter-agency committee to oversee and monitor national RDE programs.

In compliance to this, an ad hoc OA R&D Unit was established at BAR through an Office Order No. 101 Series of 2011 issued in August 2011 composed of no less than Director Dr. Nicomedes P. Eleazar as chairperson with key officials and selected technical staff.

In addition to this, BAR under Section 21 has to organize an OA RDE network composed of research and educational institutions, LGUs, non-government agencies (NGA) and recognized associations.

In order to ensure BAR’s effectiveness in managing the Organic Agriculture RDE Program, a pool of experts coming from various institutions, which incidentally are members of the established OA R&D network was created to provide technical assistance in planning, evaluation, review and monitoring of OA projects.

To carry out the policy and the program provided in the Act, the National Organic Agriculture Board (NOAB) was created as per Section 6 of the RA 10068 Implementing Rules and Regulations (IRR). The NOAB is the policy making body and shall provide direction and general guidelines for the implementation of the National Organic Agriculture Program (NOAP).

BAR has developed technologies from applied researches. The funded researches include studies on organic seed production, organic soil amendments, pest and disease management, soil management, livestock and poultry, and policy and economic analysis to serve as a tool guide for the enhancement of the program implementation. In addition, several production and post-production related technologies were commercialized, which focuses on the development of enterprises and improvement of agriculture and fisheries related industries for OA. These are the development and promotion of products from organically produce crops such as coffee, nipa palm sugar, sweet sorghum, arius fruit, native cattle, native pig, native chicken; and promotion of different cropping intervention and technologies. The Bureau also funded RD&E facilities, which are strategically situated nationwide to cater organic farmers and increase awareness of the importance of OA in each of the identified area.

These OA projects are being implemented by the DA, DA-Regional Field Offices, Bureaus, and Attached Agencies, various State Universities and Colleges, and selected Non-Government Organizations.
Bureau of Agricultural Research

The Bureau of Agricultural Research (BAR) is an attached agency 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.

Vision

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

Mission

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

R&D Thrust

- Food security
- Increased productivity and profitability
- Poverty eradication and people empowerment
- Sustainable agricultural development
- Global competitiveness

Strategic Approaches

- Relevant and innovative technology and information generation
- Community-based technology development and validation
- Responsive technology commercialization
- Agribusiness development
- Public-private partnership
- Institutional development
- Local and international linkaging
- Information communication technology management
- Knowledge management
- Provision of favorable research policy environment
The National Organic Agriculture Program (NOAP) is a collaborative document spearheaded by the National Organic Agriculture Board (NOAB) through the cooperation of various stakeholders of the organic industry, relevant national government agencies, non-government organisations, civil society and people's organisations. The program serves as the guide for the implementation of Organic Agriculture activities under the Department of Agriculture and its implementing units. The NOAP also includes a system for evaluation and monitoring as one of the components and implementing strategies.

Following the signing of the Organic Agriculture Act of 2010 (R.A. 10068), a series of activities were undertaken by the NOAB in order to craft the National Organic Agriculture Program which was approved January of 2012. These activities were crucial in developing a holistic, comprehensive, and rolling six-year program for the OA in the country. The NOAP 2012–2016 envisions the organic agriculture sector contributing to the country's over-all agricultural growth and development, in terms of sustainability, competitiveness and food security, where at least 5% of the Philippine agricultural land practice organic farming; and, where consumers both national and international increasingly support Philippine organic food products.

Essentially, the program aims to promote, propagate, further develop and implement the practice of OA in the Philippines towards a competitive and sustainable OA industry that contributes to:

a. Better farm incomes and sustainable livelihood. Increased farm productivity, reduced expenses on external farm inputs, better incomes for farmers and reduction of poverty in the rural sector;

b. Improved health. Protected health of farmers, consumers, and the public in general;

c. Environmental protection. Enhanced soil fertility and farm biodiversity, reduced pollution and destruction of the environment as well as prevention of further depletion of natural resources;

d. Disaster risk reduction and resilience to climate change. Improved resiliency to disaster risks and climate change vulnerabilities caused by human interventions and naturally induced hazards; and

e. Social justice. Meeting the basic material needs and improving standard of living for all, upholding human rights, gender equality, labor standards, and the right to self-determination.

Much is expected from the Organic Agriculture Act of 2010. As a landmark reform initiative for the country's agriculture sector, a systematic development intervention is needed to address the challenges and issues facing the sector including positively contributing to the overall equitable growth and development of the country.
At this time when the nation’s leadership continues to pursue its call for change and renewal in all aspects of national development, I welcome the publication of this Organic Agriculture Compendium by the Bureau of Agricultural Research as an earnest effort of the DA to provide our farmers technology choices and innovations that will help fulfill our pledge of ensuring sufficient, affordable and accessible food for every Filipino family.

The power of organic agriculture to enrich the soil and the environment, reduce soil, water and air pollution, restore farm productivity and promote wellness and health cannot be overemphasized. An agricultural production system that promotes healthy, safe and sustainable food production without the use of harmful chemicals, additives and GMOs, organic agriculture truly deserves everyone’s support.

Still in its embryonic phase, organic agriculture in the Philippines is, however, fast gaining a beach head and is steadily growing. As of now, the country’s organic market is best described as a niche market. But this should not douse the enthusiasm of organic farmers because, as top marketing experts have predicted, it is in the niche markets where one rakes in huge profits.

Convinced of the huge potentials of organic agriculture as the safer, healthier, more sustainable and more financially rewarding food wave of the future, the DA has increased its support to OA from ₱500 million to ₱800 million in 2017 to help more organic producers in the country. One of the DA regional field offices has allotted ₱25 million for organic rice production. This signifies our seriousness in supporting initiatives that will help organic farmer-producers, processors and other stakeholders of the industry link to bigger market opportunities.

I must commend the Bureau of Agricultural Research for fully supporting these efforts by providing all the DA regional offices funds for putting up their respective Organic Agriculture R&D Centers, the first of which was established in the Bicol region. This is in line with the thrust of organic agriculture research and development to identify, prioritize and implement research projects and activities that will provide our farmers technology options in organic agriculture.
This book, Organic Agriculture Compendium, properly highlights DA-BAR's continuing support for organic agriculture. Packed with many ground-breaking discoveries and useful information generated by DA-BAR-funded research, this book has been designed as a friendly reference material, guide, and inspiration for our agricultural researchers, farmers, agribusiness investors as well as policy makers and LGU officials.

By using this book, you have joined our renewed crusade to fully develop organic agriculture not only as an alternative business for increased rural jobs and incomes, but also as a way of farming and living that protects the environment and promotes safe, nutritious, sufficient and affordable food for all.

EMMANUEL F. PIÑOL
Secretary
Congratulations to the Bureau of Agricultural Research for undertaking the publication of this noteworthy book, Organic Agriculture Compendium. Its appearance is indeed timely as we plan out the country’s course in organic agriculture.

As we all know, the concept of organic agriculture started with the clamor from farmers for ways to reduce the harmful effects of chemical-based fertilizers. It has since come to be accepted as a healthier alternative to conventional farming as it does not make use of dangerous chemical farm inputs.

The global market for organic products continues to show strong growth. As cited by the International Federation for Organic Agriculture Movement or IFOAM, this has reached the level of US$100 billion annually. This phenomenon is attributed to the growing awareness and demand of consumers worldwide for safer food.

With the increasing number of organic producers, practitioners, and consumers, the Department of Agriculture (DA) has stepped up its support to organic agriculture in the country. Through the National Organic Agriculture Program or NOAP, the DA and its frontline agencies and partners have been promoting, propagating, and developing further the practice of organic agriculture as a viable and sustainable contributor to the growth of Philippine agriculture.

One of the major instructions of Agriculture Secretary Emmanuel Piñol is the creation of more markets for local organic products. We are constantly on the lookout for opportunities to showcase Philippine organic products in the foreign as well as local markets. With stable demand, more farmers will be encouraged to produce organic products. In this, the role of agricultural research in providing the know-how and the know-what for our organic agriculture producers to enable them to be more adaptive and innovative is recognized.

The cooperation of various stakeholders of the organic industry, the relevant government and non-government organizations, civil society, and consumers’ organizations is vital. For us to communicate with all these players in organic agriculture, communication of ideas is important. The coming out of this book neatly jives with this need and I encourage everyone who has an interest in organic agriculture to make use of this publication as it is an excellent reference.

Once again, my congratulations to the Bureau of Agricultural Research!

BERNADETTE ROMULO-PUYAT
Undersecretary
Agribusiness and Marketing, and Regional Engagement
Department of Agriculture
Organic Agriculture is one of the priority research and development (R&D) thrusts of the Bureau of Agricultural Research (BAR) given its importance in achieving both agricultural production and nature conservation. Consistent with the directions of the National Organic Agriculture Program (NOAP) and adhering to the mandate as stated in the Republic Act 10068 (Organic Agriculture Act of 2010), BAR has been funding the implementation of significant organic agriculture R&D projects to promote and strengthen organic farming in the country.

As the focal agency for organic agriculture R&D, BAR has been specifically tasked to consolidate, strengthen, and develop the agriculture and fisheries R&D system to improve its effectiveness and efficiency, ensure customer satisfaction, and sustain improvement through work excellence, teamwork and networking, accountability, and innovation.

Given this, we are proud to present the publication of this compendium featuring BAR-funded projects on organic agriculture from 2011 to 2016. These projects include applied researches which are specifically focused on organic seed production, pest and disease management, crop production and soil management, and post-production. Technologies for commercialization are on promotion and adoption of organic farming practices and techniques. Also included are R&D facilities and infrastructures necessary for the implementation and practice of organic agriculture in various DA-Regional Field Offices and selected state universities and colleges.

We hope that this compendium provides not only a wider perspective and understanding on the importance of organic agriculture as an industry in the context of food production, but more importantly, for the public to be aware of the latest practices, technologies and techniques that the farmers can use to boost their production and sustain the organic farming sector in the Philippines as a whole.

My gratitude and congratulations to all the people who have made the production of this compendium possible. This is a concrete accomplishment of what we have been doing and what we will be doing to strengthen the organic agriculture R&D sector.

May this publication truly serve its ultimate purpose. Thank you and Mabuhay!

NICOMEDES P. ELEAZAR, CESO IV
Director
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Value Chain Analysis of Selected Products (in transition to organic) in Region 2

Bio-Enterprise Development in Organic Agriculture Sector Through Public-Private Partnership

Policy Support to Organic Agriculture: Rice and Vegetables In selected Areas, Philippines

TECHNOLOGIES COMMERCIALIZED

Commercialization of Vermiculite-based Low-spaced Soilless Growing Medium in the Promotion of Urban Organic Gardening for Primary and Secondary Public Schools

Development of Organic Feeds for Broiler Chicken and Duck Layer in Region 3

Production, Processing and Marketing of Herbs and Spices

Community-based Organic Agriculture/Agroforestry

Promotion of Organic farming and Protective Structure Technology for High Value Vegetable Production

Adoption and Utilization of Organic Arabica Coffee Coconut Intercropping Technology (ACCIT) in the Municipality of San Teodoro, Oriental Mindoro

Development of Organic Upland Rice-based Farming Systems in Laguna Sierra Madre

Processing Technology Development and Utilization for Organically Grown Aniu Fruits

Site-specific Evaluation of Sweet Sorghum Organic Production for Food, Feed and Fiber

Technology Utilization of Fermented Coconut Coir Dust Silage for Fattening Heifers and Steers

Developing the Potential of Native Pigs for Organic Meat Production

Adoption and Utilization of Nipa Palm Sugar Processing Technology (NPSPT) in the Municipality of Lanuza, Surigao del Sur
R&D FACILITIES DEVELOPMENT GRANT PROJECTS

Upgrading of the Existing Bio-Organic Fertilizer R&D and Production Facility

Construction of the Cagayan Valley Integrated Agricultural Laboratory Services

Upgrading of Existing Bio-organic Fertilizer Demonstration Farm and Productivity Facility

Establishment of a Research and Development Center for Heirloom Rice in Mountain Province

Establishment of Bio-organic Fertilizer Demonstration Farm and Production Facility

Intensifying the Solid Waste Management Project in Support to Organic Farming in Quirino

Upscaling NVSU Regional Vermicomposting and Vermimeal Production Center (RV2PC)

Establishment of an Integrated Organically Grown Crops and Livestock (A Techno Demo)

Improvement of the STIARC’s Vermicomposting Facility in Support of Organic Agriculture Program

Upgrading of Organic Vegetable Research Facilities

Establishment of RM-CARES Organic Farming Training Center

Establishment of Mushroom R&D Technology Center in Support to Organic Agriculture in Central Luzon

Development of R&D Facility for Quality Organic Fertilizer

Upgrading and Expansion of the PAC Microbiology Room into Biotechnology Laboratory in Support to Organic Agriculture

Establishment of an Organic Agriculture Training Center

Establishment of Vermicomposting Facility in Butuan City

Establishment of R&D Center for Organic Agriculture in CALABARZON Region

Establishment of the Regional R&D Center for Organic Agriculture in Region 8
Establishment of R&D Center for Organic Agriculture in Region I

Establishment of R&D Center and Demo Farm for Organic Agriculture at DA-RFU IX/ZAMPIARC

Establishment of Apiculture Processing Center in Support to Organic Agriculture

Establishment of the Organic Agriculture R&D Center in Region 10 (Malaybalay City, Bukidnon)

Establishment of an Organic Agriculture R&D Center in Region CAR

Establishment of R&D Center for Organic Agriculture in Bangsamoro

Establishment of Organic Agriculture R&D Center for Bicol Region

Establishment of R&D Facility in Support to Organic Agriculture
Protocol Improvement and Product Development of Liquid Organic Fertilizers from Fermented Plant Extract

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Mannix Pedro
Contact Details: mannix23ph@yahoo.com

Result Summary:
1. Under the FPE, DGGE band pattern obtained at days 0, 15, and 30, were not significantly different between the uninoculated and inoculated samples. However, differences on the band thickness or density were significantly different indicating a marked change in the population level of the microorganisms involved. Among the inoculated samples, there were no significant changes in the band pattern from days 0 to 30, which seemingly indicate a more stable community. The microbial community based on the DGGE profile was composed of *Weisella sp.*, *Chryseobacterium sp.*, *Lactococcus sp.*, *Lactobacillus*, *Pseudomonas*, and an uncultured bacterium. At earlier stages, the non-lactic acid bacteria seemed to predominate while the lactic acid bacteria group predominated towards the end of the

Figure 1. (A) Fermentation of FPE using madre de cacao leaves. (B) Ground leaves of madre de cacao.

Figure 2. (A) Fermentation of FFE using banana peelings (B) that were cut into pieces.
fermentation period in both inoculated and uninoculated set-ups.

2. In the fermentation of IMO, the microbial community involved was of the bacillus group, *Sphingomonas sp.*, and lactic acid bacteria group. The use of 100% and 20% molasses seemed to affect the component of the microbial community. Using a 100% molasses, the most predominant microbe was of the bacillus group while reducing the molasses concentration to 20% favored the growth of the lactics. In the production of IMO, farmer's usual practice baits their fungal inoculums using cooked rice. Accordingly, a fungi characterized merely by a white mycelium that grew on the cooked rice was the proper starter inocula. Based on the DGGE results, the predominant fungal species were identified as *Kazachstania naganishii*, *Monascus purpureus*, and uncultured *Candida*.

3. Culture-dependent or culturable microbes showed that in general, the FPE, FFE, or IMO microbial counts using some medium showed that the bacterial group predominated in all trials, followed by the yeast, lactic acid bacteria, and finally the molds group. Modifying the current mixing protocol by dissolving the sugar first in water before adding to the madre de cacao leaves relatively resulted in higher microbial counts in inoculated set-up as compared to the inoculated ones. Likewise, the chemical analysis also showed positive improvements on most of the microelements but did not much have significant effect on N-P-K content.

4. Culturable microorganisms were isolated,
characterized, and identified. Most of the isolates were identified as Bacillus sp., Staphylococcus sp., Enterococcus sp., and Stenotrophomonas sp., Pantoea sp., Sphingomonas sp., Pseudomonas sp., Roseomonas sp., Enterobacter sp., Vibrio sp., Streptococcus sp., and Serratia sp. using the VITEK II compact or VITEK MS Systems. All of the isolates were preserved by liquid-drying and were accessioned at the Philippine National Collection of Microorganisms (PNCM).

5. A total of 191 isolates were obtained during the fermentation of different biological extracts and analyzed for their functional attributes. Among the FPE isolates, 62.1% were nitrogen fixers (NF); 17.2% were potassium solubilizers (PS); and no phosphorus solubilizers (KS) were detected. In IMO isolates, the NF were 82%; no PS; and KS were 8.7%. A high percentage of the isolates also exhibited IAA equivalents in FPE, FFE, and IMO as follows, 77.6%, 73.6%, and 65.2%, respectively. Moreover, IAA equivalent noted on the biological extracts were as follows, inoculated FPE inoculum: 3.22 µg/ml; FFE with IMO inoculum: 2.08 µg/ml; IMO (10% molasses): 6.54 µg/ml; and IMO (20% molasses): 7.21 µg/ml.

6. Some of the strains obtained from the improved protocol include the following microbes, Bacillus megaterium, Bacillus circulans, Stenotrophomonas maltophilia, Pseudomonas geniculata, Bacillus tequilensis, Bacillus altitudinis, Sphingomonas sp., Staphylococcus sp., and Lysinibacillus sp., which seemingly can be used as potential component of the fermenting biological extracts. Using 16S rDNA sequencing, fungal isolates were identified as Rhizopus oryzae, Monascus purpureus, Aspergillus oryzae, Aspergillus fumigates, and Aspergillus niger.

Technology(ies) Developed:
- Developed formulation of liquid biofertilizers for commercialization
- Improved protocol for production of liquid biofertilizer

Brief Description of the Technology(ies):
Evaluated the microbial and chemical properties of different botanical concoctions and identified the culture of microbes, which influences the high production of enzymes and hormones in FPJs, FPEs, FFJs, FAAs, and compost tea. Developed protocol in the formulation of high-quality botanical/biological extracts to be used as liquid fertilizers to help the farmers standardized their own biological extracts.
Efficient Management and Utilization of Agricultural Wastes for the Production of Quality And Nutrient-enriched Organic Fertilizer

Implementing Agency: Isabela State University
Project Leader: Dr. Artemio A. Martin Jr.
Contact Details: jhun_6273@yahoo.com

Result Summary:
1. The ratio of substrate combinations for quality organic fertilizer was formulated.
2. A techno guide for organic fertilizer production was developed and distributed to interested clients. The guide can also be used during training courses.
3. The rate of organic fertilizer application for the different test crops used in the field trials was established and formed part of the technology component on organic-based vegetable production.
4. Continuous application of organic fertilizer showed increasing trend in improving soil quality (organic matter content, bulk density) and generally maintained N, P, and K soil contents.
FIELD EVALUATION OF ORGANIC FERTILIZER FROM DIFFERENT SUBSTRATES

EFFECT OF NUTRIENT-ENRICHED ORGANIC FERTILIZER ON GLUTINOUS CORN

Repin 1

Repin 4

Repin 3

Repin 2

Repin 5

Repin 7

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5. The volume of biodegradable wastes brought to the university dumpsite was reduced by almost 60%.
6. Additional income was generated for the operation of the project.
Technology(ies) Developed:
- Techno Guide for organic fertilizer production
- Formulated ratio substrate combination for organic fertilizer

Brief Description of the Technology(ies):
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.
Management, Utilization, and Value Adding of Animal Waste to Reduce Environmental Liabilities and for the Improvement of Degraded Soils

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Gina Villegas-Pangga
Contact Details: gpangga@yahoo.com

Result Summary:
The swine and poultry sub-sectors are among the top economic contributors of the agriculture industry in the Philippines. As such, the wastes generated from these animals and the potential damaging effects to the environment should be given priority considerations. Efficient utilization of the by-products of animal production as organic fertilizer, and compost/soil conditioners will improve input use efficiency and environmental liability and improve the quality of soil for a better and sustainable crop yields.

Animal manures in farms are often regarded as waste and its effluent evidently runs through nature, either be it on land, water or air. These wastes can be converted and used in compost or fertilizer for crop production that alters the use of chemical fertilizers. Manure is a useful source of plant nutrients but the levels can vary according to the type of animal, the system, the animal ration and the percentage of bedding that is included. In comparison to chemical fertilizers, the composted manure is very bulky. The nutrient value is low and highly variable especially with some animal manure like swine and poultry.

Philippine agricultural sector remains conservative in accepting and practicing manure composting due to slow soil recovery and the culture itself. An effective solution is to apply densification technology. Densification of compost or pelleting could reduce the costs of transportation. Handling and storage and adjusting the nutrient content by adding required materials. Pellet fertilizer provided also a gradual nutrient supply for a long period of time, which improves N fertilizer use efficiency and reduce N leaching losses. The effects of slow release from mixed pellets in the test crop used were also observed. Pellet processing can be used as a method for slow release of N fertilizer that reduces leaching losses and enhanced nitrogen uptake, as well as positive effects on both health and soil nutrient levels.

The complete lists of registered commercial hog and poultry raisers were requested from the provincial offices of Laguna, Batangas, and Quezon. After the consultative meeting made with collaborating agencies and local government officials, an exploratory survey on each of these sites was
conducted for the description and initial diagnosis of the farms. Prospective project sites in a municipality, as well as the identified farms in respective community (Baraga) were assessed on the basis of the collected relevant data on production/process, water sources and waste streams, facultative lagoons and general facilities. The project arrived with six barangay sites in the Municipalities of Lucban, Quezon; Liliw-Nagcarlan-Calauan, Laguna; and Lipa, Batangas.

Documentation of facilities and interviews on farm personnel were done. Farm processes and clean-up operations were observed from material receiving through manure storage and disposal. In addition, other factors influencing the environment fate of the manure such as methods of collecting, storing, handling, treating, transporting; and applying the waste by-products to the receiving land were included. Fresh and dried manure was estimated based on Philippine Agricultural Engineering Standard on Agricultural Structures- Waste Management Structures. The recommendations from solid waste experts were discussed with each prospective and participant farmer.

Management of livestock and poultry manure during and after production must be performed in a responsible manner. Animal manures from selected farms were randomly sampled and analyzed in the laboratory. The nutrient composition of sampled manure is presented in the reports. Results showed that the manures differed in nutrient content. This variation is expected because they came from different farms with different diet/food supplements and management. They vary according to the season, storage and other factors.

Moreover, it was confirmed that the changes in the chemical composition of animal manures depends on class of animal, kind of feed consumed, kind of bedding used, method of handling, rate and method of application and kind of soil and crops on which it is used.

Composting in piles and bid containers was done in the ASC composting site. The berkley rapid composting method was adopted but then modified to suit the requirement of the project. Different raw materials were added into the swine and poultry-based compost, thus, organic fertilizers were prepared in batches. The pH, moisture and temperature of the composts were monitored weekly. Composts were monitored weekly. Periodic checking of compost quality has been given priority specifically the nutrient composition, moisture content and aggregate stability. Compost samples were also submitted to the ASC Laboratory for chemical analysis. The raw materials tested as ingredients to compost gave the pellets enough strength to maintain its form in storage and application.

The compost/organic fertilizer developed has assured nutrient concentration conforming to the Philippine National Standards for
Organic Fertilizers regulate by DA-Bureau of Agriculture and Fisheries Product Standards (BAFPS). Production of organic fertilizers required 2-3 months (depending in the materials used) and another month for curing. The matured compost/organic fertilizers were placed to the molding machine and shaped into pellets.

Maturity is the degree or level of completeness of the composting process. The pelletized compost was also tested for aggregate stability at the Soil Physical Laboratory, UP Los Baños. A total of seven batches of organic fertilizers are risk-free of the above mentioned pathogens.

To test the efficacy of the prepared organic fertilizers/soil conditioners both in powder and pelletized forms, series of pot and plot experiments were set-up in the ASC composting and Demonstration Area, Pill Drive, UPLB. The developed organic fertilizers were tested on different soil conditions (Lipa Clay Loam, Sariaya Sandy Loam, Alipit Clay, Binangonan Clay and Ibaan Clay Loam). On-station field experiment at UPLB Central Experiment Station was also conducted using corn as the test crop. Detailed experimental results are discussed in the Annual and Completion Reports.

1. Result of the series of experiments suggest that manure-based fertilizers may be used as alternative to mineral commercial fertilizers when the latter is not available. The cumulative agronomic value of organic manure applied to agricultural soils could be more than five times greater in the post-application period than the value realized during the year of application. On the other hand, although synthetic chemical fertilization is able to stimulate high short-term yields, it will not be able to support sustainable crop productivity, crop health, soil health over longer time periods.

2. Organic fertilizer treatments resulted in high yields and increased soil chemical properties after subsequent cropping, while chemical fertilizer produced only high yields but gradually downgraded soil chemical properties. Although improvement in organic matter and cation exchange capacity in organic amendments was marginal, but compared to chemical fertilizer, the results of the latter were consistently lowest. Positive residual soil nutrient impacts of organic fertilizers were evident in the trend of crop yield of chemical fertilizer after subsequent cropping.

3. In the long term, fertilizer applications from animal manures have shown positive effects on soil properties. When manure is added in the soil, the beneficial consequences include increased carbon sequestration, higher cation exchange capacity, lower bulk density, and increased levels of organic matter. These benefits contribute to water and air movements in soils which helped enhance crop growth. Efficient utilization of the by-products of animal production as organic fertilizer, compost/soil conditioners and energy source will improve input use efficiency and environmental liability and improve the quality of soil for a better and sustainable crop yields.

**Technology(ies) Developed:**

- Protocol on the improvement of livestock and poultry waste management system
- Fertilizer and soil conditioners from livestock and poultry wastes which are safe for agricultural use

**Brief Description of the Technology(ies):**

Production of fertilizer and soil conditioners through the utilization of livestock and poultry wastes; a comprehensive guideline to improve the waste management system of livestock and poultry
Technology Promotion of Vesicular Arbuscular Mycorrhizal Root Inoculant (VAMRI) in Region IVA-IVB

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Marilyn Brown
Contact Details: dmmbrown@yahoo.com.ph

Result Summary:
1. The socio-economic profile of the communities and the baseline practices of farmers with regards to the utilization of biofertilizer were determined. Only 1 out of 10 farmers have knowledge on biofertilizer and only minimum numbers of farmers are using it.
2. Farmer-managed (FMD) and research-managed (RMD) set-ups were established to showcase the effectiveness of VAMRI and its combination with BOF and Nitroplus. Field days on which the growth performance and yield increment due to VAMRI and BOF were shown to participants to increase their awareness about the technology. On the other hand, yield data were documented for Fertilizer and Pesticide Authority (FPA) licensing.
3. Seminar-workshops with topics related to biotechnology and biofertilizers were also conducted. However, the discussion focused mainly on VAMRI and composting. Biofertilizer products together with pamphlets/brochures and handouts were
also distributed to participants. Training and demonstration on the application techniques of VAMRI in combination with other BIOTECH products such as BIOGREEN and NITROPlus were done. Three trainors' training on composting and mycorrhiza technology was conducted in cooperation with Mycological Society of the Philippines Inc. and Asian Food and Agriculture Cooperative initiative. Also, cost-and-benefit study on application of VAMRI and preparation of business plan is being conducted primarily for prospective investors.

Technology(ies) Developed:

- Information on the promotion of VAMRI technology in different cropping and plantation systems

Brief Description of the Technology(ies):
Promotion of the use of VAMRI to substitute or reduce famers' use of chemical fertilizers by 50—80% in certain vegetables, fruit trees, and ornamental crops in Regions IV A and IV B
Biofertilizer for Sustainable Agriculture and Technology Promotion of Vesicular Arbuscular Mycorrhizal Root Inoculant (VAMRI) in Different Cropping and Plantation Systems

Goal(s):

A. The overall goal of the project is to improve the productivity and achieve sustainable production of quality corn and legumes in selected areas through the use of different biofertilizers (Rhizobia, Mycorrhiza and Compost Inoculants) and other high value crops in different cropping and plantation systems.

B. To conduct rural appraisal.

Dr. MARILYN B. BROWN
Program Leader

Dr. ROSARIO G. MONSALUD
Dr. MANNIX S. PEDRO
Dr. CRISTOPHER S. ESCANO
Dr. SEVERINA B. EXCONDE
Ms. LUZ B. OPEÑA
Mr. RONNIE P. VIOLANTA
Ms. LOVELY B. WILLAUER
Ms. JULIE ROSE CANIAGO
Mr. BRYAN DEVANADERA
Mr. NICK TABAO
Ms. ARMA CREENCIA
Ms. NOEL. TAN QANA
Ms. ADORA M. DE CASTRO
Ms. CELCIA S. GANO
Ms. MARIA.V. JAVIER
Ms. WILFREDO C. LAPTAN
Participatory Breeding and Seed Production on Organic Vegetables

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Rodel Maghirang
Contact Details: rgmaghr@yahoo.com
Commodity: Lowland Vegetables

Result Summary:
1. The project focused on landraces found in regions 4A, 4B, 8, and 12, which were collected and maintained by farmer-cooperators. Also, other foci of the project were the breeding lines relevant in the regions, breeding materials from organic breeding projects, and materials from

10506-1

10509-1-1

HP 10509-1-2

HP 10506-5
organic breeding projects and potential varieties developed by the proponents. These were evaluated through on-station and on-farm trials, and selection through participatory process and eventually selection from relatively stable and advanced lines.

2. Farmer-cooperators were also trained on selection process and seed production using low input organic cultivation. All selections were further purified by breeders and farmer-participants as well.

Technology(ies) Developed:
- Organically grown vegetable seeds
- Development of organic vegetable varieties
Brief Description of the Technology(ies):
Selected farmer-beneficiaries were trained on the development of different organic varieties of vegetables and the production of organic vegetable seeds of the developed varieties through participatory breeding.
Variety Evaluation: On-Farm Trials and Seed Production of Organic Vegetables in Ilocos Region

Implementing Agency: DA-Ilocos Integrated Agricultural Research Center
Project Leader: Ms. Wilhelmina Castañeda
Contact Details: Free5race@yahoo.com
Commodity: Eggplant, tomato, pepper, bittersgourd (ampalaya), and squash

Result Summary:
The study was conducted to enhance organic vegetable production in the Ilocos through identification of varieties suitable for organic farming system and to encourage organic vegetable production in the region by making available high quality organically produced vegetable seeds.

The varieties that proved promising under these trials were then seed produced also under organic condition. From this experience, package of technology for organic vegetable production was crafted.

1. The results indicated that eggplant variety Eg 12-
007-12, tomato variety Tm 12-002, sweet pepper variety Sp 12-009, hot pepper variety Hp 12-007, bittergourd (ampalaya) varieties AmL12-001 (long type) and AmR12-003 (small, round, pinakbet type) and squash varieties Sq 12-007 (round type) and Sq 12-014 (cacao type/oblate) were suited for organic production in the Ilocos. Technology guides on organic production of eggplant, tomato, pepper, bittergourd (ampalaya) and squash were crafted.

2. Component 1 involved the evaluation of eggplant, tomato, pepper (sweet and hot), long bitter gourd (ampalaya), and squash (round and cocoa type). Vegetable varieties were collected from the Institute of Plant Breeding at University of the Philippines Los Baños, farmers’ fields and local markets. A total of 110 vegetables varieties (21 eggplant, 39 tomato, 9 sweet pepper, 13 hot pepper, 10 bittergourd/ampalaya and 18 squash) were collected.

The collected varieties were planted from December 2012 to April 2013 in Batac City, Ilocos Norte. From these, potential varieties were selected and evaluated during the succeeding wet and dry Seasons. In both seasons, the trial was laid out in Randomized Complete Block (RCBD) design with three replications. Each plot measured 1 m x 5 m for tomato, pepper and eggplant while for ampalaya and squash, each plot measured 3 m x 10 m. Planting distance was 0.5 m between hills in all crops.

3. Component 2. On-Farm Trials of Selected Vegetable Varieties in Commercial Organic Gardens

The selected varieties in Component 1 were evaluated under organic gardens in two locations. The farmers were given the choice on which among the identified priority crops they would grow. Through the assistance of the LGU technicians, the farmer-cooperators were selected based on the following criteria:
1. Knowledgeable about the concepts of organic farming;
2. Willingness to be trained on organic farming; and
3. Willingness to practice organic farming in his farm.

These farmer co-operators were given a briefing on organic vegetable seed production. The production area also serves as learning field for the farmer-cooperator and other interested individuals. The farmer-cooperators were required to produce seeds of the selected varieties.

4. Component 3. Organic Seed Production of Vegetable Varieties

Seed quality is one of the factors that affect yield and quality of organic vegetables. Moreover, organically grown seed is one of the problems besetting organic farming. Seeds are not commercially available for organic vegetable production, hence, the problem on organic seed source.

Seed production for eggplant, tomato, pepper, squash and ampalaya was undertaken. Activities like extraction, fermentation, drying, and weighing were employed. A minimum of 100 m² was used for each selected entries per crop.
Cost-and-return analysis of organic seed production were computed for each commodity. Breeder and stock seeds of the selected varieties were also produced to be used for the subsequent trials in organic farms in the region.

To avoid cross-pollination and maintain purity among varieties, bagging was done, placing of nets on individual plants for selfing.

The package of technology implemented in component 1 for replication was used in this component.

The top performing vegetable varieties were planted in an area with a minimum size of 100 m². extraction, fermentation, drying, and weighing were employed. To avoid cross-pollination and maintain the purity of the vegetable varieties, bagging or netting was implemented. The economics of organic seed production was also determined as an input in the crafting of the organic vegetable production technology guide.

5. Crop management under organic condition crop management included thorough preparation of the area, vine training, and pollination among others. For pepper, eggplant, and tomato, transplanting was done at 20-25 days after sowing (DAS) while for long bittergourd (amplaya) and squash, it was at 10-12 DAS. Vermicompost at the rate of 2 kg/m² was applied.

Organic foliar fertilizers such as fermented fruit juice (FFJ), fermented plant juice (FPJ), vermitea were used as nutrient supplement to the plants (Figure 3). Spraying of hot pepper extract, planting of insect-repelling plants such as lemon grass and marigold in and around the plots and application of biological control agents (BCAs) that included earwigs, Nuclear Polyhedrosis Virus (NPV) and metarrizhium among others were employed to control pest and diseases.

6. Harvesting, seed extraction, washing, and drying were done as required for each vegetable commodity. For eggplant, the fruits were harvested at physiological maturity or when ripe (yellow in color). The fruits were beaten until soft and the seeds were extracted in containers with water. The seed were washed and impurities were removed and dried under the sun for two hours and air-dried for the following days. For tomato, the fruits were harvested at full ripe maturity or red orange stage. Fruits were cut equatorially and squeezed in container. The seeds were fermented for 1-2 days. Seeds were washed in a series of sieves and spread in fine
screen then sun-dried for two hours wherein the seeds were turned occasionally then air-dried for the following days. For pepper, seeds from ripe fruits were extracted manually. The seeds were then placed in screen for drying under the shade. For long bitter gourd (ampalaya), seeds from ripe fruits were also extracted manually and immature seeds were discarded. Plump seeds were sun-dried for two hours then air dried the following day.

7. For squash, after extracting from ripe fruits, the seeds were fermented overnight; washed; and dried the following day. Immature seeds were removed and discarded. The vegetable seeds produced were packed in sealed plastic container and kept under cold storage.

8. The results indicated that eggplant variety Eg 12-007-12, tomato variety Tm 12-002, sweet pepper variety Sp 12-009, hot pepper variety Hp 12-007, bittergourd/ampalaya varieties AmL 12-001 (long type) and AmR 12-003 (small, round, pinakbet type) and squash varieties Sq 12-007 (round type) and Sq 12-014 (cacao type/oblate) were suited for organic production in the Ilocos.

The study allowed the crafting of technology guides on organic production of eggplant, tomato, pepper, bittergourd (ampalaya), and squash

**Technology(ies) Developed:**
- Identified and selected lines/varieties which are comparable or if not better than the existing OPV varieties and can out yield existing varieties that can help increase farmer's income.
- Selected a total of 9 vegetable lines of priority crops for Region 1.
  - eggplant - 1
  - tomato - 2
  - pepper - 2
  - ampalaya - 1
  - 2 squash

**Brief Description of the Technology(ies):**
- Recommend at least 1 variety/line per commodity
- Organically produced seeds of selected priority crops suited for Ilocos condition
- Used of organically prepared organic fertilizers, liquid foliar and pesticides sprays and BCAs

POT for organic production and seed production for eggplant, tomato, pepper, ampalaya, and squash for Ilocos
### Growth performance of Rc160, JM2, MS16, Blond Red and Basmati 370 at PDCI planted last August 2012.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Plant Height (cm)</th>
<th>Productive Tillers</th>
<th>Unproductive Tillers</th>
<th>Panicle Length</th>
<th>Filled Grains</th>
<th>Unfilled Grains</th>
<th>Weight of 1000 Grains</th>
<th>Computed Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 DAP</td>
<td>60 DAP</td>
<td>At Harvest</td>
<td>No.</td>
<td>No.</td>
<td>cm</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>Rc 160</td>
<td>36.00</td>
<td>78.00</td>
<td>97.00</td>
<td>21</td>
<td>4</td>
<td>26.00</td>
<td>205</td>
<td>55</td>
</tr>
<tr>
<td>Basmati 370</td>
<td>38.00</td>
<td>73.00</td>
<td>100.00</td>
<td>13</td>
<td>7</td>
<td>28.00</td>
<td>89</td>
<td>107</td>
</tr>
<tr>
<td>JM 2</td>
<td>36.00</td>
<td>61.00</td>
<td>112.00</td>
<td>9</td>
<td>11</td>
<td>23.00</td>
<td>76</td>
<td>97</td>
</tr>
<tr>
<td>MS 16</td>
<td>48.00</td>
<td>86.00</td>
<td>102.00</td>
<td>11</td>
<td>10</td>
<td>25.00</td>
<td>75</td>
<td>118</td>
</tr>
<tr>
<td>Blond Red</td>
<td>43.00</td>
<td>78.00</td>
<td>105.00</td>
<td>24</td>
<td>2</td>
<td>24.00</td>
<td>248</td>
<td>36</td>
</tr>
</tbody>
</table>

### Growth performance of Rc 222, Rc160 and Basmati 370 at CLSU-RM CARES, Nueva Ecija planted last February 2013.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Plant Height (cm)</th>
<th>Productive Tillers</th>
<th>Unproductive Tillers</th>
<th>Panicle Length</th>
<th>Filled Grains</th>
<th>Unfilled Grains</th>
<th>Weight of 1000 Grains</th>
<th>Computed Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 DAP</td>
<td>45 DAP</td>
<td>60 DAP</td>
<td>At Harvest</td>
<td>No.</td>
<td>No.</td>
<td>cm</td>
<td>No.</td>
</tr>
<tr>
<td>Rc 222</td>
<td>42.50</td>
<td>54.69</td>
<td>101.85</td>
<td>193.29</td>
<td>10.00</td>
<td>0.33</td>
<td>19.47</td>
<td>73.00</td>
</tr>
<tr>
<td>Rc 160</td>
<td>38.14</td>
<td>62.23</td>
<td>100.67</td>
<td>223.39</td>
<td>11.00</td>
<td>0.00</td>
<td>22.13</td>
<td>79.00</td>
</tr>
<tr>
<td>Basmati 370</td>
<td>48.47</td>
<td>66.08</td>
<td>103.34</td>
<td>184.74</td>
<td>10.00</td>
<td>0.00</td>
<td>21.90</td>
<td>76.00</td>
</tr>
</tbody>
</table>

by collaborators in seed and rice production and disseminated the same through the internet and training supported by the project.

5. Facilities and equipment at the BPI-CPD in Manila were upgraded to cater and strengthen the services to the organic seed production stakeholders.

**Technology(ies) Developed:**
- Organically produced rice seeds
- Identification of rice variety suitable for organic rice seed production

**Brief Description of the Technology(ies):**
Production of organic rice seeds under organic condition through the use of organic fertilizers such as vermicast, compost, and fermented plant solutions as well as implementation of farm practices suited under organic condition; Identified rice variety suitable for organic seed production (NSIC Rc 160 and PSB Rc 18)
Strengthening the National Organic Rice Seed Production Systems

Implementing Agency: Bureau of Plant Industry - Los Baños National Crop Research, Development and Production Support Center
Project Leader: Dr. Dante Fidel, Dr. Herminigilda A. Gabertan
Contact Details: bpi_lbnordc@yahoo.com; gildagabetan@yahoo.com
Commodity: Rice

Result Summary:
1. The project established 10 ha of organic rice seed farms in five strategic locations in the country. About 8,500 kg of high quality organic rice seeds were acquired and distributed to 854 organic farmers covering 213 ha.
2. The project showed that yield performance of modern varieties (PSB Rc 18 and NSIC Rc 160) in OA is comparable to their expected yield under non-organic cultivation. NSIC Rc 160 produced 5.2 t/ha to 5.7 t/ha, while PSB Rc 18 had 5.8 t/ha. Their expected yield in non-organic conditions is 5.6 tons/ha and 5.1 tons/ha, respectively. The highest grain yield of Philippine aromatic variety belonging to Basmati 370 strain was 5.4 t/ha followed by 2.4 t/ha compared to its expected production of 1.6 t/ha.
3. The project initiated the engagement of five organic collaborators in the seed business. Project collaborators voiced out their need for further training on seed production technologies, especially in postharvest processing to ensure high seed quality.
4. The project also documented technologies used

Growth performance of Rc 18, Rc160 and Basmati 370 at KRFI, Lipa City, Batangas planted last September 2012.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Plant Height (cm)</th>
<th>Productive Tiller</th>
<th>Unproductive Tiller</th>
<th>Panicle Length</th>
<th>Filled Grains</th>
<th>Unfilled Grains</th>
<th>Weight of 1000 Grains</th>
<th>Computed Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 DAP 45 DAP 60 DAP At Harvest No. No. cm No. No. grams mt/ha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rc 18</td>
<td>91.44 13.00 11.59 31.00 5.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rc 160</td>
<td>99.06 10.00 10.07 26.67 5.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basmati 370</td>
<td>115.15 16.67 20.33 20.33 5.47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Growth performance of Rc160, Basmati 370 and Milagrosa at NIRD, Kanaon, Negros Occidental planted last January to February 2013.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Plant Height (cm)</th>
<th>Productive Tillers</th>
<th>Unproductive Tillers</th>
<th>Panicle Length</th>
<th>Filled Grains</th>
<th>Unfilled Grains</th>
<th>Weight of 1000 Grains</th>
<th>Computed Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 DAP</td>
<td>45 DAP</td>
<td>60 DAP</td>
<td>At Harvest</td>
<td>No.</td>
<td>No.</td>
<td>cm</td>
<td>No.</td>
</tr>
<tr>
<td>Rc 160</td>
<td>61</td>
<td>72</td>
<td>85</td>
<td>85</td>
<td>21</td>
<td>7</td>
<td>28</td>
<td>210</td>
</tr>
<tr>
<td>Basmati 370</td>
<td>58</td>
<td>65</td>
<td>83</td>
<td>83</td>
<td>15</td>
<td>3</td>
<td>27</td>
<td>156</td>
</tr>
<tr>
<td>Milagrosa</td>
<td>34</td>
<td>38</td>
<td>62</td>
<td>80</td>
<td>20</td>
<td>5</td>
<td>28</td>
<td>195</td>
</tr>
</tbody>
</table>

## Growth performance of Rc160, Basmati 370 and RV8 at Don Bosco MPC, Mlang, North Cotabato planted last January 2013.

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Plant Height (cm)</th>
<th>Productive Tillers</th>
<th>Unproductive Tillers</th>
<th>Panicle Length</th>
<th>Filled Grains</th>
<th>Unfilled Grains</th>
<th>Weight of 1000 Grains</th>
<th>Computed Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 DAP</td>
<td>45 DAP</td>
<td>60 DAP</td>
<td>At Harvest</td>
<td>No.</td>
<td>No.</td>
<td>cm</td>
<td>No.</td>
</tr>
<tr>
<td>Basmati 370</td>
<td>45.95</td>
<td>83.21</td>
<td>89.20</td>
<td>14.25</td>
<td>6.67</td>
<td>26.49</td>
<td>89.75</td>
<td>29.91</td>
</tr>
<tr>
<td>Rc 160</td>
<td>48.11</td>
<td>80.90</td>
<td>98.31</td>
<td>11.01</td>
<td>6.72</td>
<td>27.47</td>
<td>73.65</td>
<td>33.96</td>
</tr>
<tr>
<td>RV 8</td>
<td>53.11</td>
<td>97.12</td>
<td>115.48</td>
<td>14.25</td>
<td>5.68</td>
<td>26.74</td>
<td>101.51</td>
<td>43.84</td>
</tr>
</tbody>
</table>

*Don Bosco MPC - Magsaysay St., Mlang, North Cotabato (GPS)*

*Negros Institute for Rural Development - Kanaon, Negros Oriental*
Development of Organic Seed Production Systems for Semi-Temperate Crops in CAR

Implementing Agency: Bureau of Plant Industry–Baguio National Crop Research and Development Center
Project Leader: Dr. Jesus R. Aspuria
Contact Details: aspuriabpi@yahoo.com
Commodity: potato, garden pea, strawberry, and coffee

Result Summary:
1. As a result of the project, a 1-ha area for organic seed production was established at Buguias Seed Farm, Lam-ayan, Buguias, Benguet. Initially, 471 kg of organic potato and 20 kg of garden pea seeds were produced. Two organic farming practitioners were provided with initial potato seeds of 1,800 pieces each for further multiplication in their respective organic farms. A total of 810 runners of strawberry were produced and were also used for further runner production. For coffee, 2,000 were planted along the periphery and are still in their vegetative stage.
2. One-season trials were conducted to validate various technologies on organic seed production: 3 variety evaluation trials (potato, garden pea, and strawberry) and 2 protection studies.
3. Several seed production support facilities were repaired or improved. This includes the water system (dam/reservoir), storage/working shed,
staff cottage, vermicompost facility, and office. A 125-m² plastic house was also constructed for strawberry runner production.

4. As a result of the verification trials, four potential potato varieties were identified to be promising under organic environment. These varieties are Watwat, Tawid, Signal, and Solibao. Oil sprays were also found to be promising for the control of lepidopterous on garden peas.

5. The documents for organic certification are still being prepared for submission to the Organic Certification Center of the Philippines (OCCP).

Technology(ies) Developed:
- Organically produced semi-temperate crop seeds of potato, strawberry, garden pea, and coffee
- A developed organic seed production system for semi-temperate crops such as potato, strawberry, garden pea, and coffee under organic condition

Brief Description of the Technology(ies):
Production of semi-temperate crop seeds under organic condition through the use of organic fertilizers such as vermicast, compost, and fermented plant solutions as well as implementation of farm practices suited under organic condition (potato, strawberry, garden pea, and coffee)
Development of Organic Seed Production Systems for Field Legumes and Lowland Vegetables
(RFU IVA, IVB, & V)

Implementing Agency: Bureau of Plant Industry–Los Baños National Crop Research, Development and Production Support Center
Project Leader: Dr. Herminigilda A. Gabertan
Contact Details: bpi_lbnrcdc@yahoo.com; gildagabertan@yahoo.com
Commodity: Cowpea, pole sitao, and mungbean

Result Summary:
1. A 1.5-ha hectare organic seed production area was established in the center. Existing practices used in organic crop production (including organic pesticides and nutrient supplements used) adopted by BPI-LBNCRDC were found to help in supplying nutrients to crop and in minimizing insect pests and disease occurrence. However, there is a need to do a more detailed study on the effectiveness of these practices.
2. Evaluation of seed yield performance of different varieties of crops grown was done. Highest yielders were BPI-Cp3 (1.05 t/ha) in cowpea; PSB Ps2 (1.54 t/ha) and NSIC Ps5 (1.4 t/ha) in pole sitao; NSIC Mg 14 (0.88 t/ha) in mungbean; and BPI-Tm9 (0.057 t/ha) in tomato. Performance of crops grown organically in terms of some horticultural characteristics was also evaluated and analyzed.

3. Positive return-on-investment (ROI) was obtained by the highest yielder varieties of cowpea, pole sitao, mungbean, and tomato. In cowpea, BPI-Cp3 had 154.3195 ROI; in pole sitao, PSB Ps2 had 334.91% ROI; while NSIC Ps5 had 295.379% in mungbean; NSIC Mg14 had 6.70% ROI; and in tomato, BPI-Tm9 had 63.390% ROI.

4. Organic certification was granted by OCCP to the Center on June 24, 2013. A total of 1.28 ha and 657 kg organic seeds were certified as organic by the certifying body. The OCCP seal allowed for use by the Center is “Organic-in-Transition”.

5. The project had established partnership with the Organization for Industrial, Spiritual, and Cultural Advancement in Quezon; the Madrigal Foundation, Inc., and Christ Life Community in Camarines Sur. It has also partnered with the
Department of Agriculture-Palawan Agricultural Experiment Station (DA-PAES). Harvest festivals and trainings were conducted in these areas. A total of 211 training participants attended and these activities were documented in Quezon, Bicol Region, and Palawan.

Technology(ies) Developed:
- Organically produced vegetable seeds and planting materials of cowpea, pole sitao, and mungbean
- New varieties of vegetables

Brief Description of the Technology(ies):
Production of field legumes and lowland vegetable seeds under organic condition through the use of organic fertilizers such as vermicast, compost, and fermented plant solutions as well as implementation of farm practices suited under organic condition; Identified best performing varieties for organic farming in terms of yield: cowpea (BPI-Cp3), pole sitao (PSB Ps2), tomato (BPI-Tm9)
Development of Organic Seed Production Systems for Selected Upland Crops in Visayas Area

Implementing Agency: Bureau of Plant Industry–La Granja National Crop Research and Development Center
Project Leader: Dr. Milagros Abaquita
Contact Details: igncrdc_lagranja@yahoo.com
Commodity: Peanut (Legumes)

Result Summary:
1. Two organic sites (at the Center’s research area [site 1] and Jalandon production area [site 2]) were developed following the organic agriculture practices such as green manuring, liming, establishment of buffer zone and hedgerows, application of organic fertilizer, crop rotation, and improvement of drainage canal and water system.
2. A research component on the development of POT on organic seed production technology for peanut with solid organic fertilizers such as commercial organic fertilizer, vermicast, and decomposed carabao manure in combination with naturally fermented solutions (NFS) such as malunggay, saluyot, bamboo shoot, and kulitis was explored. However, only two cropping season trials were implemented.

3. Upgrading of facilities to sustain organic seed production was implemented. The vermicast composting facility was expanded from 3 beds to 9 beds resulting to increase production of vermicast totaling 13,389 t just for the first 7 months of 2013. Utilization of the vermicast was mostly for the implementation of the organic seed production of the center. Another facility rehabilitated was the Trichogramma production lab resulting to the production of 3,555 strips for the first semester of 2013. Moreover, assassin bug production was also intensified to address the crop protection of the legume and vegetable seed production projects. The NFS production lab was established in support to the organic program of BPI La Granja. Different NFS were produced which have different uses. The domestic water system and water tank was rehabilitated. A water settling tank was also constructed in site 1. 4. Organic gardens for herbs and spices were established consisting of 31 herbs and 7 spice accessions. From 2012 to
2013, 2,172 herb planting materials were propagated from which 464 were distributed to 129 clientele. Four hundred twenty-eight spice planting materials were propagated while 23 were distributed. While the organic farm sites of BPI La Granja was still in conversion, organically grown crop seeds totaled 3,829 kg with distribution of 2,437 kg to 87 clientele and beneficiaries served. Also, 79,810 seed pieces of root crops, consisting of cassava and sweet potato, were produced. Of which, 50,000 and 18,000 pieces were given for the Ilocos Region and Cavite, respectively.

**Technology(ies) Developed:**
- POT on organic peanut seed production (currently being developed)
- Organically produced seeds and planting materials of selected crops

**Brief Description of the Technology(ies):**
Production of upland vegetable seeds under organic condition through the use of organic fertilizers such as vermicast, compost, and fermented plant solutions as well as implementation of farm practices suited under organic condition.
Development of Organic Seed Production Systems for Tropical Fruits and Plantation Crop in Mindanao Island

Implementing Agency: Bureau of Plant Industry–Davao National Crop Research and Development Center
Project Leader: Dr. Lorna Herradura
Contact Details: lorna_herradura@yahoo.com
Commodity: durian, banana, pummelo, and cacao

Result Summary:
1. Field maintenance in organic production areas consisted of under brushing using grass cutter, mulching, and application of vermicast. Intercropping with banana and vegetables were done. For banana organic production, hilling-up and pseudostem cutting at 2 m from the ground increased bunch weight and sucker production. Monocropping of single durian variety (Puyat) increased susceptibility to attack by fruit borer particularly during peak season (August) with 20% damage, while no damage was observed during lean season (March).
2. From February to August in 2012, a total of 2,660 kg vermicompost were harvested. A total of 1,900 asexually propagated durian and 2,100 sexually propagated (rootstock) cacao were produced and maintained inside the greenhouse.
3. Application for certification of Center’s production areas to the OCCP is still on process.
4. Mr. Benjamin Lao, a farmer practicing OA from Imam, Bansalan, Davao del Sur, was identified as the collaborator of the project and was
provided an initial support of planting materials consisting of 300 and 100 asexually propagated seedlings of cacao and durian, respectively, and 1,000 tissue-cultured Lakatan banana plantlets.

**Technology(ies) Developed:**
- Organically produced seeds of durian, banana pummelo, and cacao
- Verified organic seed and plant material production technologies on durian, banana, pummelo, and cacao

**Brief Description of the Technology(ies):**
Production of tropical fruits plantation crop seeds under organic condition through the use of organic fertilizers such as vermicast, compost, and fermented plant solutions as well as implementation of farm practices suited under organic condition; Study on cultural management practices (field maintenance) including proper planting distance, use of mulch and biofungicides, and other farm practices necessary during transition period from conventional to organic farming.
Development of Mungbean Organic Fertilization Technology for Enhanced Productivity in Region 2

Implementing Agency: Department of Agriculture-Cagayan Valley Integrated Agricultural Research Center
Project Leader: Ms. Rose Mary Aquino
Contact Details: roseaquino@yahoo.com
Commodity: Mungbean

Result Summary:
1. The application of organic solid fertilizers and seed inoculant using bradyrhizobium-bacteria and basal application of 10 bags/ha organic fertilizer significantly increased yield by 5—10%.
2. The use of bradyrhizobium seed inoculant was found the most economical, capable of supplying the nutrient requirements of the crop thereby significantly increasing mungbean yield and income as indicated by 10—28% MBCR (on-station trials) and 4—10% MBCR (on-farm trials). National Seed Industry Council (NSIC) Mg 15
and Pagasa 7 were among the improved varieties that exhibited good yield response to yield-enhancing organic solid fertilizers/seed inoculants.

3. Foliar fertilizer of vermitea, humic acid, and nutriplant AG increased yield by 4—5%. Vermitea was best applied at vegetative and pod formation, humic acid at flowering, and nutriplant AG at pod-formation stage.

1. Vermitea and humic acid were used to increase income having 5—12% MBCR and 6—14% MBCR, respectively.

2. In general, all tested organic foliar fertilizers improved yield when applied at pod-formation stage. Also, good fodder yield was observed when the foliar fertilizers (vermitea and AMWAY Nutriplant AG) were sprayed at vegetative and pod-formation stage.

Technology(ies) Developed:
- Development of organic fertilization technology for enhanced mungbean production
Brief Description of the Technology(ies):
Application of different organic fertilizers such as organic solid fertilizer/seed ameliorants and organic foliar fertilizers for enhancing the growth and yield response of mungbean increased productivity as well as income of farmers in areas of Region 2.
Developing Organic Farming Technologies for Sugarcane Production in the Province of Tarlac

Implementing Agency: Tarlac College of Agriculture
Project Leader: Dr. Manuel Agsaoay
Dr. Cielito Beltran
Contact Details: manny_agsaoay@yahoo.com
Commodity: Sugarcane
Result Summary:
1. Sugarcane variety VMC1 significantly responded with applied bionutrient in terms of height, cane node, cane weight, and sugar yield. Results of cost analysis show no difference in terms of ROI and profit margin ratio (PMR).
2. Physico-chemical properties before and after application of biofertilizer showed long-term effect as to integrated nutrient management.
3. NPV has exhibited effectiveness for the control of cutworm and other lepidopterous insect 30 g/L with virus concentration of 3.42 x7.
4. Prey-predator interaction showed appreciable reduction of mealy bug with 47%, cumulative at harvest of sugarcane; aphid with 50% cumulative at harvest; while sugarcane borer and cutworm were undetected.
5. Bio-compounds such blumea wettable powder and fermented calotropis extract has significantly reduced cutworm population and sugarcane rust six days after application.
Technology(ies) Developed:
- Formulated organic biounitient sources
- Pest Management Guide for Okra applied to sugarcane.

Brief Description of the Technology(ies):
- Formulated organic biounitient sources
- Pest Management Guide for Okra applied to Sugarcane.

A. Organic fertilizer - 100% sugarcane trashes, 100% legume leaves, 3 parts sugarcane trashes + 1 part animal manure, 3 parts legumes + 1 part animal manure, 3 parts mixture of sugarcane trashes and legume leaves + 1 part animal manure, 100% animal manure

B. NPV wettable powder formulated with powdered Proen-K and protected half-life using activated carbon - formulated blumea wettable powder against cutworm and lepidopterous insects; 1 kg blumea, fermented with 1 L of lambanog, added with 25 parts of bentonite and 25 parts of activated carbon
Upland Rice-based Organic Agriculture Project

Implementing Agency: Bicolandia Greenfields Dev't Organization Inc.
Project Leader: Mr. Joseph A. Cruz
Contact Details: bigfis_inc@yahoo.com
Commodity: Rice

Result Summary:
1. A combined land area of 20 ha was utilized for organic upland rice production and organic vegetable production.
2. The farmer-cooperators were organized and assisted to avail of agriculture-related services like farm inputs from the DA, Philippine Rice Research Institute (PhilRice), and Agricultural Training Institute. Further, they were trained on organic upland rice production and organic fertilizer production.
3. Organic fertilizer production facilities were established to provide for the needs of the production farms in the communities. Moreover, opportunities for marketing vermicompost to neighboring communities were also considered. As such, the farmer-cooperators came up with a business plan relative to commercialization of vermicompost.
4. The organized farmer-cooperators entered into an institutional marketing agreement with PhilRice whereby the Institute will buy their organic upland rice produce for distribution to other upland farmers under the Upland Rice Development Program.

Technology(ies) Developed:
- Promotion of enhanced organic farming system in the upland areas of Camarines Sur

Brief Description of the Technology(ies):
Enhanced organic-based farming system to optimize the utilization and value of upland areas and provide livelihood opportunities; Utilization of idle upland areas and income-generating project
Development and Validation of Organic-based Production and Pest Management of Selected Vegetables

Implementing Agency: Philippine Agriculture and Resources Research Foundation, Inc.
Project Leader: Dr. Renato Mabesa, Dr. Candida Adalla
Contact Details: aydsadalla@yahoo.com
Commodity: eggplant, beans, and crucifers

Result Summary:
1. Pole sitao responded very well under the organic production system for both the dry and wet seasons, with the use of *Trichogramma* and Earwig plus botanical spray and application of turmeric/Acapulco powder working together to protect the crop from pests and bacterial wilt infection.

2. Tomato showed good performance under the organic production system but only during the dry season. This was attributed to the good moisture retention of rice straw mulch compared to plastic mulch done in the traditional farmers' practice and the conventional commercial practice.
3. Ampalaya may not be suitable for organic production in Malvar because this crop is highly susceptible to drought (dry season) and excessive rainfall (wet season), hence, water management is key for its optimum yield performance. Moreover, organic solution to fruit fly infestation in ampalaya has yet to be developed and bagging was not effective under very high fruit fly population.

4. Bacterial wilt disease was managed with the use of turmeric and Acapulco powder and the lepidopterous pests of string beans and tomatoes were managed by *Trichogramma* and Earwigs. It’s very important that appropriate timing of *Trichogramma* releases is done to coincide with the correct stage (egg stage) of the target pest. For the fruit flies of ampalaya, bagging is still the best option and use of paper bags is still the most promising option to minimize fruit fly damage. This practice, however, has an implication on the acceptable fruit color by the consuming public. The pale color of the fruit due to reduce exposure to sunlight is not very acceptable to the buying public.
Technology(ies) Developed:
- Agricultural technologies specifically organic fertilizer and pest management for selected vegetable crops

Brief Description of the Technology(ies):
Validated organic fertilization and pest management inputs used by practitioners and advocates are showcased in an NGO demo farm in Malvar, Batangas. The organic fertilizer includes FPA-approved fertilizer and foliar spray while the pest management inputs includes botanicals and natural enemies like Trichogramma and earwig and a cultural management practice of bagging to protect the ampalaya fruit.
Utilization of Rice Straw, Un-composted and Composted Swine Manure to Suppress Soilborne Pathogens in Selected Cucurbits and Cruciferous Vegetables in Nueva Ecija

Implementing Agency: Central Luzon State University
Project Leader: Dr. Ronaldo T. Alberto
Contact Details: bertxl1275@hotmail.com
Commodity: Crucifers (pechay and mustard), cucurbits (squash, melon, and watermelon)

Result Summary:
1. Treatments were based on the presence or absence of rice straw in combination with composed and uncomposted swine manure. Plots were artificially infested with Sclerotium sp. and Fusarium sp. Disease incidences as well as yields were assessed at weekly intervals.
2. In melon, watermelon, squash, and cucumber, lowest incidence of damping-off occurred in plots incorporated with rice straw + compost swine manure. The highest incidence of damping-off occurred in plots without rice straw and swine manure. Highest yield was obtained in plots incorporated with rice straw + composed swine manure and in plots where only rice straw was amended.

Figure 1. Pot experiment set up

Figure 2. (a) growth response of squash in Sclerotium sp. inoculated soil on three different levels of composted swine manure and un-composted swine manure; (b) pot experiment set up and (c) wilted squash in the control pot
Figure 3. (a) growth response of cucumber in Sclerotium sp. inoculated soil on three different levels of composted swine manure and un-composted swine manure; (b) pot experiment set up and (c) wilted cucumber in the control pot

Figure 5. (a) growth response of watermelon in Sclerotium sp. inoculated soil on three different levels of composted swine manure and un-composted swine manure; (b) pot experiment set up and (c) wilted watermelon in the control

Figure 4. (a) growth response of melon in Sclerotium sp. inoculated soil on three different levels of composted swine manure and un-composted swine manure; (b) pot experiment set up and (c) wilted melon in the control

Figure 7. (a) growth response of squash in Fusarium sp. inoculated soil on three different levels of composted swine manure and un-composted swine manure; (b) pot experiment set up and (c) wilted squash in the control

Growth of Fusarium sp. inoculated radish grown in plot (a) without rice straw and swine manure and (b) with rice straw only
(a) Pot experiment set up (b) wilted pechay in the control pot (c) growth response of pechay in Sclerotium rolfsii inoculated soil on three levels of composted swine manure and uncomposted swine manure.

(a) Response of pechay in Fusarium sp. inoculated soil on three of composted swine manure and in uncomposted swine manure. (b) pechay grown in 5 months composted swine manure (c) growth in uncomposted swine manure and control pot.

Growth of Fusarium sp. inoculated radish grown in plot with (a) combination of rice straw and 5 month composted swine manure and (b) Captan treated radish

(a) Response of mustard in Fusarium sp. inoculated soil on three levels of composted swine manure and in uncomposted swine manure. (b) mustard grown in 5 months composted swine manure (c) growth of mustard in uncomposted swine manure (d) mustard in control pot

Technology(ies) Developed:
- Use of rice straws, composted and uncomposted swine manures to lower the incidence and severity of soilborne diseases on crucifers and cucurbits

Brief Description of the Technology(ies):
An effective way of utilizing rice straw and swine manure (considered as wastes) in lowering the incidence and severity of soilborne diseases in selected crucifers and cucurbits
Implementing Agency: DA-Northern Mindanao Integrated Agricultural Research Center
Project Leader: Ms. Berly F. Tatoy
Contact Details: berly.tatoy@yahoo.com.ph
Commodity: Vegetables (pole beans, cabbage, carrots, eggplant, cucumber, tomato, and sweet pepper)

Result Summary:
Based on the result of the series of trials conducted, there were four strategies identified in order to produce quality and profitable organic vegetables. These packaged of technologies includes the integration of good agricultural practices, fertilizer management, and integrated pest management for production as follows:

1. Soil treatment: Control for the soilborne diseases thru biofumigation using wild sunflower at the rate of 2.5 kg/m² in the furrow, covered with soil and left for 15 days before planting.
2. Raising of healthy and vigorous seedling: Seedlings were grown in a pot lets with 4 parts garden soil and 1 part of vermicast, sterilized with hot water, enclosed with net, sprayed with biofertilizer IMO, NOMSHO and biopesticides

NCF and MSP at weekly interval for 30 days.
3. Good land preparation: The area was thoroughly prepared by 3 plowing, 3 harrowing, and uprooting of weeds for one month.
4. Integration of fertilizer management and
integrated pest management for production.

These strategies were packaged and recommended to verify in the farmer’s field under their management.

**Technology(ies) Developed:**
- Development of different organic pest management approaches (techno guide) for growing organic vegetables

**Brief Description of the Technology(ies):**
Developed pest management strategies that were verified in the farmer’s field specific for pole beans, cabbage, carrots, eggplant, cucumber, tomato, and sweet pepper

Pest management technology includes the integration of different methods of control (biofumigation, raising of healthy seedlings and good land preparation, plastic mulch, diversified cropping, alternate planting of different types of vegetables,
planting of flowering plants, application of biopesticides & biofertilizers, biocontrol agents (Trichogrammacherionis, lacewings, and lady beetle), physical control through bagging of fruits (eggplant and cucumber), trimming of damaged fruits (eggplant) pods (string beans), and use of screen for tomato and sweet pepper
Evaluation of Pest Management Strategies for Organic Strawberry and Citrus Production in the Cordillera

Implementing Agency: Bureau of Plant Industry-Baguio National Crop Research and Development Center
Project Leader: Ms. Maritess A. Alimurung
Contact Details: tess_alimurung@yahoo.com.ph
Commodity: Strawberry and citrus

Result Summary:
Strawberry and citrus are important fruit crops in the highland areas of the Cordillera. Organic production is presently being promoted and management of major pests like snout beetle (Metapocyrtus) (Trachycyrinus spp), two spotted mites (Tetranychus urticae Koch) and citrus red mites (Panonychus citri) using different strategies is needed for better fruit and plant material production. The use of fungi as biological control agent, agricultural oil spray, wood vinegar and 8 different plant extracts were evaluated.
and their effect on the population and damage of snout beetle, two spotted mites and red mites on strawberry and citrus were determined. The different evaluation trials on strawberry and citrus were conducted from August 2013 to April 2016 at the Bureau of Plant Industry-Baguio National Crop Research, Development and Production Support Center (BPI-BNCRDPS) located at Guisad, Baguio City.

1. *Entomogenous* fungi *Beauveria bassiana* and *Metarhizium anisopliae* using 4 isolates were evaluated against white grubs of snout beetle (*Metapocyrtus* (*Trachycyrtus*) *spp*) which feeds on the root system of strawberry and citrus. *Beauveria* and *Metarhizium* isolates MA-RB and MA-RBB were found effective biological control agent against the pest and soil application of the fungi 1 week before transplanting and follow-up application 1 month after transplanting significantly reduced population and damage of white grubs on the roots of strawberry and citrus. Both fungi were also effective against two spotted mites (*Tetranychus urticae Koch*) on strawberry and citrus red mites (*Panonychus citri*). Spraying of these fungi using 300 to 400 g fungus grown in cracked corn mixed in 16 L water significantly reduced mites population 2 to 3 weeks after application.
2. Agricultural oil sprays, wood vinegar and plant extracts also significantly reduced the population and damage of two spotted mites (*Tetranychus urticae Koch*) on strawberry and red mites (*Panonychus citri*) on citrus. Mineral oil at 1-1.5% rate of application and plant extracts from fresh and dried hot pepper at 30 - 40 mL per L water sprayed on the plants every 1-2 weeks effectively controlled build-up of mites population resulting to significantly lower damage on strawberry and citrus and higher marketable yield on strawberry. Wood vinegar also reduced population and results are comparable with vegetable oil.

Integrating the evaluated strategies could result to P43,325.00 net income with ROCE of 88.77% from 500 m² area of strawberry and P43,250.00 net income with ROCE of 154% for one cycle production of 1000 citrus quality planting materials.

**Technology(ies) Developed:**
- Use of biological agents like *Metarrhizium* and *Beauvaria*, botanical pesticides like hot pepper and ginger, agricultural oil spray and wood vinegar can help in the organic pest management and production of strawberry and citrus.

**Brief Description of the Technology(ies):**
Biocon agents like *Metarrhizium* and *Beauvaria* effectively control snoutbeetle population. Soil application before transplanting and follow-up drenching one month after transplanting affects/controls the immature stage or white grubs. Plants like hot pepper and ginger, mineral oil, and wood vinegar effectively reduce population of whitegrubs and mites attacking strawberry and citrus. Early application results to lower damage and higher yield (strawberry).
Potential of Compost Tea for Managing Fungal and Bacterial Disease in Four Selected Vegetables

Implementing Agency: University of the Philippines Los Baños
Project Leader: Mr. Melvin D. Ebuenga
Contact Details: melvinebuenga@yahoo.com
Commodity: eggplant, cabbage, squash, and string beans (pole sitao)

Result Summary:
1. Laboratory test showed that compost tea preparations have inhibitory properties against Pythium and Rhizoctonia. Under greenhouse condition, garbage compost is the best root weight enhancer against Rhizoctonia. All treatments showed better Pythium damping-off
control and higher root weight compared with untreated.

2. For field trials, all treatments delivered effective damping-off control. No effective reduction of aphid and bean fly infestation was observed in compost tea treatments. Bacterial and fungal species analysis showed diverse species in each compost tea preparation. Based on Dominant Index values, no dominant species was observed in all the tea or fermented juice preparations. Chemical analysis identified specific macro- and microelements; however, traces of heavy metals like Cd, Pb, Hg, and As were observed in some preparations. Longevity studies results suggested that brewed compost tea preparations could be effective up to a month.

3. Results of the project can be used for more efficient integrated pest management of vegetable crops. No major problems were encountered so far. Further tests are needed and must be done to elucidate the extent of the teas’ potential in managing other pathogens or pests especially that efficacy varied depending on compost source, crop, and brewing time.
Some microscopic images of fungal species observed from left clockwise: Penicillum sp., Curvularia sp., Trichoderma sp., Fusarium sp., Cladosporium sp. And Aspergillus sp.

Technology(ies) Developed:
- Compost tea technology

Brief Description of the Technology(ies):
Using local compost materials, compost tea can be brewed in 24—48 hours by adding water to the compost and applied either as soil drench or spraying just like conventional fungicides. It is effective against soilborne diseases.

Greenhouse experimental lay-out of different treatments of seedlings.
Technology Demonstration on Integrated Pest Management in Organic Eggplant Production with Emphasis on the Use of Biological Control Agents, Compost Tea, Cultural and other Non-chemical Methods

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Pablo Gonzales
Contact Details: pggonzales_ncpc@yahoo.com
Commodity: Eggplant

Result Summary:
Technology demonstration on organic eggplant production combining the use of rice straw mulch with various pest management tactics (biological and cultural approaches) were conducted to assess its impact on pest populations build-up, fruit damage and yield of eggplant. The regular season (wet season) techno demo was conducted in Tiaong, Quezon and San Antonio, Quezon on July-October, 2016 using farmer's practice as the basis for comparison.
1. The 2016 wet season results showed that the leafhopper infestation on organic eggplant plot was higher than the farmer's practice plot except in one site. Other sucking insects like whiteflies and the most destructive one, \textit{L. orbonalis} were generally lower in organic plot. This is true for both on-farm demonstration trials in San Antonio and Tiaong, Quezon.

2. Percent fruit borer damage was lower in organically treated plot than in farmers practice plot. This is manifested by the higher yield obtained from this treatment compared with farmer's practice plot. The two releases of earwig at 2 earwig/m$^2$, every 2 weeks removal of damaged shoots (2X) and every 2 weeks spraying of BT directed to the flowers of eggplant helped in reducing damaged due to \textit{L. orbonalis}.

3. The use of rice straw mulch greatly reduced the incidence of \textit{Pythophora} fruit rot on the techno demonstration on both sites.
4. The use of biological control agents (BT earwigs) and integrating this with some cultural approaches (trap cropping with okra for leafhoppers and sanitation for shoot and fruit borer) have shown promise in the management of some insect pests of eggplant especially in organic way of production.

5. Expansion of the techno demonstration areas is very important to showcase the use of non-chemical methods in pest management in organic eggplant production.
INSECT PESTS OF EGGPLANT

A. INSECT PESTS OF EGGPLANT

VEGETABLE LEAF MINER

DESCRIPTION

- Small white larvae
- Feeds on leaves and stems
- Total developmental period: 7-10 days

HABITAT OF DAMAGE

- Leaves and stems
- Eggs are laid on the underside of the leaf

MANAGEMENT OPTIONS

- Handpicking larvae
- Insecticides: Bacillus thuringiensis (B.t.)

BEETLE MOTHLER

DESCRIPTION

- Black and white striped
- Feeds on leaves and stems
- Total developmental period: 30-35 days

HABITAT OF DAMAGE

- Leaves and stems
- Eggs are laid on the underside of the leaf

MANAGEMENT OPTIONS

- Handpicking larvae
- Insecticides: Pyrethrin

Eggplant Borer

DESCRIPTION

- Larva is green with a yellow head
- Feeds on the stem and leaves
- Total developmental period: 25 days

HABITAT OF DAMAGE

- Stems and leaves
- Eggs are laid on the underside of the leaf

MANAGEMENT OPTIONS

- Handpicking larvae
- Insecticides: Deltamethrin

INSECT PEST IN ORGANIC PRODUCTION

- Fewer pests due to natural controls
- Handpicking is more effective

INSECT PESTS IN CONVENTIONAL PRODUCTION

- More pests due to use of chemicals
- Insecticides are used extensively

MANAGEMENT OPTIONS

- Handpicking
- Insecticides: Pyrethrin

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INSECT PESTS IN CONVENTIONAL PRODUCTION

- More pests due to use of chemicals
- Insecticides are used extensively

MANAGEMENT OPTIONS

- Handpicking
- Insecticides: Pyrethrin
Food Quality and Safety Evaluation of Organically Grown Crops versus Conventionally Grown Crops in Two Types of Soil

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Lorele C. Trinidad
Contact Details: lct_emsl@yahoo.comCommodity

Result Summary:
1. In general, the supply/value chain for organically grown fruits and vegetables is very simple, characterized by a short chain with few players. Except for seeds (mostly highland vegetables) and the greenhouse or plastic house supplies, which were sourced out from commercial input suppliers, the rest of the inputs utilized in organic farming such as biofertilizer and biopesticides were prepared or concocted by the growers themselves. The cultural management practices were more or less similar in all the project sites.
2. Postharvest and marketing practices were also very simple. Growers and grower-traders do minimal sorting, trimming and packaging, and, marketing is direct to customers or final consumers. The latter is done at the farm or during a weekend or in organic specialty markets or channeled to retailers such as supermarkets or wet market stallholders.
3. A survey of consumer preferences was the next activity after the supply chain documentation. This was done to ensure that the improvements made would address consumer or market needs and wants. Consumers perceived organic produce as safe to eat, free from pesticides, and nutritious too. The qualities looked for when
buying fresh produce are freshness, cleanliness, and the absence of damage either physical, mechanical injuries, or decay. Postharvest technology researches therefore focused on a) determining safety of the produce from microbial contaminants (determination of chemical or pesticide contaminants was not included) along the various points in the supply chain; b) physico-chemical characterization and determination of quality changes of organically grown produce, which were also compared with conventionally grown counterparts; c) maintaining the freshness of the produce and extending shelf life (MAP, organic acids for disease control, packaging, ripening); and d) minimizing postharvest disease.

4. The results in the form of new information or technology protocol(s), which were generated from the above researches were then translated to Information Education and Communication materials and disseminated or shared with the actors, both the direct and indirect players of the organic fruit and vegetables supply chain namely, the growers or organic practitioners, agricultural technicians, fellow researchers, and other industry players.

5. Four technical papers were presented as oral papers in three scientific conferences, 2 local and 1 international. One was published in an international journal as proceedings. Three
poster papers were also presented in scientific conferences here and abroad. One technical bulletin on postharvest handling techniques for organic fruits and vegetables, and two extension flyers on evaporative cooling were also prepared and printed for dissemination to industry stakeholders. An additional two technical papers were prepared and presented in the ISAAS International Congress in November 5—7, 2016 in Hanoi, Vietnam.

6. Eight awareness trainings on postharvest handling of organically grown fruits and vegetables were provided to organic practitioners in response to the need of the industry. A training manual was also prepared based on the training programs conducted.

7. Evaporative cooler crates and an upscale design were provided by the project to selected vegetable producers and traders, and growers’ association, who also served as cooperators of the project.

Technology(ies) Developed:
- Information on food quality and safety of organically grown crops and conventionally grown crops in two types of soil

Brief Description of the Technology(ies):
Assessment on food safety and quality of organically versus conventionally grown crops through determination of presence of chemical contaminants such as nitrates, heavy metals and pesticides; presence of microbial pathogens; uptake level of heavy metals; and the effects of management practices.
Postharvest Quality and Safety Management of Organically Grown Fruits and Vegetables

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Dormita Del Carmen
Contact Details: drdcarmen@yahoo.com

Result Summary:
1. Consumers prefer organic produce because it is safe, chemical-free, and nutritious. Freshness, cleanliness, and no physical damage or decay are the criteria in buying organic produce. Interventions in the value chain must address these concerns, but consumers must also be educated on the limitation of organic production.
2. The critical control points in the fresh value chain were during trimming, washing, drying, and retail display where produce come in contact with other objects. Disinfection of tools and equipment as well as washing with clean water is recommended to minimize microbial load.
3. The physico–chemical characteristics (like TSS, pH, firmness rating, pH) of organically grown fruits and vegetables are not significantly different, but most organic produce have higher
6. Other than the use of squash peel, madre de cacao (gliricidia), and camias (Balimbi) fruit in ripening bananas, other bioethylene sources like rain tree leaves enhanced ripening of Saba and Latundan bananas.
7. Use of evaporative cooler and modified atmosphere packaging extended/doubled the storage/shelf life of organic produce.
8. Eight training programs for organic practitioners (farmers, traders, LGU, extension workers) were conducted. One technical bulletin and two flyers or circulars on evaporative cooling were prepared for printing and dissemination. Four technical oral papers and 3 poster papers were presented in various scientific conferences. One research paper was published in international journal.

Technology(ies) Developed:
- Evaporative cooling technique (single-crate, 4-crate collapsible) for temporary storage, quality maintenance, and shelf-life extension
- MAP of organic ‘Balangon’ banana for shelf life extension and crown rot control
- Organic-based disinfectants for disease control (calamansi juice, lemon juice vinegar, baking soda, chlorine, chlorine dioxide, hot water treatment)
- Bioethylene sources for ripening induction
- Retail packaging for shelf life extension and enhancing marketability
- Package of technology and information for dissemination

**Brief Description of the Technology(ies):**
1. Evaporative cooling technique (single-crane, 4-crane collapsible) for temporary storage, quality maintenance, and shelf-life extension
   - Evaporative cooler using wet cloth and jute sack bring down air temperature, maintained freshness, and doubled the shelf life of fresh produce.

2. MAP of organic 'Balangon' banana for shelf life extension and crown rot control
   - MAP in the form of vacuum-packing of Balangon bananas prevented crown rot and early ripening during simulated regular and delayed export shipment to Japan

3. Organic-based disinfectants for disease control (calamansi juice, lemon juice vinegar, baking soda, chlorine, chlorine dioxide, hot water treatment)
plastic bags, and trays extended shelf life of selected organic produce such as bitter gourd, broccoli, cabbage, lettuce, snap beans, carrots, cherry tomatoes, and strawberries by 2 days - 2 weeks.

6. Package of technology and information for dissemination
   - Eight training programs on postharvest handling conducted. One technical bulletin and 2 flyers or circulars prepared for printing. Four oral papers and 4 poster papers were presented in various scientific conferences. One research paper was published in international journal.

- 50% calamansi juice, 100 ppm chlorine controlled disease in lettuce; Chlorine (100 ppm) and chorine dioxide (OraCare pure) in wrap prevented disease occurrence and extend shelf life of eggplant for 9 - 10 days at ambient

4. Bioethylene sources for ripening induction
   - Saba and Latundan bananas fully ripened after one day by enclosing in 10% w/w rain tree leaves (Acacia) for 2 days

5. Retail packaging for shelf life extension and enhancing marketability
   - Packaging in LDPE cling film, polypropylene
Sustainable Community-based Commercialization of Organic Vegetable while Promoting Food Security and Safety

Implementing Agency: University of the Philippines
Los Baños
Project Leader: Dr. Blesilda Calub
Contact Details: bmcalub@gmail.com
Result Summary:

1. The volume of production and year-round availability of organic vegetables increased using protected culture techniques. This enabled partner farmer organizations to sell their harvest directly to villagers within their respective barangays or in their regular market.

2. To address the constraints of third party certification, the Participatory Guarantee System (PGS) was established in Quezon in collaboration with OPA and MASIPAG making Quezon the first to install a PGS at the provincial level.

3. Vermicomposting was scaled up by organizing barangay agriculture councilors for the communal and individual production of vermicompost.

4. To further protect organic farmers from fraudulent organic claims, the UPLB rapid test kit for pesticides was modified to become farmer-friendly and more accurate.

5. Capability enhancement and knowledge building
among farmer organizations, local agriculture staff, and other project partners consisted of training series, seminars, and workshops, cross-

farm visits, exposure field trips, training of farmer trainers, participatory project planning, and others.

6. IEC materials were produced including brochures, leaflets, handbooks, tarpaulin flip charts, powerpoint presentations, and a video.

7. The major success of the project is due to the strong partnerships built with farmer organizations, LGUs, non-government organizations, private sector, and the loyal customers who patronize organic products from smallholder farmers.

**Technology(ies) Developed:**
- Refined UPLB Rapid Pesticide Test Kit for detection of pesticide residues in vegetables
HAKBANG SA PAGGAWA NG VERMICOMPOST

Ang Vermicompost ay isang organikong pataba mula sa binulok na halaman at dumi ng hayop sa tulong ng bulate na African Night Crawler.

Pagpili ng Lugar:
- Malapat sa pinggulukan ng mga substrate
  (mga natutuluk na materyas sa paggawa ng compost)
- Matatag
- May bulubong

Paghahanda ng substrate
1. Isasalan (alternate layer) ang tinato ng dahon o damo at dumi ng hayop.
2. Diliin mabuti.
3. Takpan ng sako o plastic sa loob ng 2 linggo.
   Hayaang mag-init (55-70°C) upang mamatay ang maaasamang mikrobyo (pathogens) at buto ng damo.
4. Aisain ang takpi pagkaraan ng 2 linggo at pasingawan ng 2-3 araw.

Paghahanda ng Bins:
- Sukat: 1m x 3m x 0.5m
- Labasan ng sarki ang suhag

Paglalagay ng bulate sa bin
5. Layuan ng bulate ang binulok na substrate (1kg bulate sa bawat 3m² bin).
   Huwag paayosang matuyo ang substrate. Diliin kung kinikailangan.

Pag-ani ng vermicompost
6. Anhin ang vermicompost sa ibabaw (5-10cm)
   makinipas ang 30-35 araw mula ng ilagay ang bulate.
7. Patuyuin ang vermicompost (35% moisture content) sa hangin sa loob ng 2-3 araw.
8. Salaan o agin ang vermicompost bago ilagay sa sako.
9. Ilagay sa sako ang naugnay na vermicompost.

Tuluy-tuloy na paggawa ng vermicompost at pagpaparami ng bulate
- Sa araw na maglagay ng bulate sa unang bin dapat
  ay magasimula na ulto maghanap ng panalawang substrate. Ilagay ito sa pangalawang bin.
- Sa huling araw ng pag-ani ng compost mula sa unang bin,
  maasain hang hilipat ang bulate sa hakahandaang pangalawang bin.
Organic Livestock Production: A Comparative Study on the Growth Performance, Carcass Yield, and Characteristics of Selected Breeds of Swine and Chicken Grown Organically in a Coconut-based Production System
Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Mary Jean Bulatao
Contact Details: jeanbulatao@gmail.com
Commodity: Swine and chicken

Result Summary:
The organized effort of the organic farming practitioners and advocates in the Philippines has resulted to a significant step in the growth of the still very young organic farming industry. However, as in any young and growing industry, there are numerous constraints that still have to be dealt with. Initiatives to address these constraints are presently being done by commercial producers, NGOs, government agencies, academe and even individual backyard producers.

There is a growing market demand for organically grown poultry and livestock products. However, there are important information gaps that need to be addressed. This study was conducted on-farm partly to determine if the technologies developed in research stations and used in this study are doable in on-farm situations and thereby attempt to modify the practices for better farm adoption.

This study was conducted in coconut areas because these areas provide space for feed production, animal ranging, and some by-products for feed and house beddings. Moreover, coconut areas offer a variety of sources for swine and chicken feed. This study compared the performance of the locally available breeds/strains of swine and chicken in terms of growth, carcass yield and characteristics, and sensory attributes, when grown organically in a coconut-based production system.
The study was conducted in Magdalena, a 5th class municipality in the Laguna. It is situated at the foot of Mt. Banahaw. Magdalena is located at the western part of the province, approximately 105 kilometers from Manila and 11 kilometers from Sta. Cruz, the provincial capital.

Five farming households were selected for the organic chicken study and another five for the organic swine study.

Before the delivery of animals, several trainings, workshops, and field trips were conducted to expose the farmer-partners and enhance their awareness on and understanding of organic farming and address their needs to have sufficient knowledge in raising organic animals as well as growing alternative feedstuffs for organic farming.

Early preparations also began for the establishment of feed resources to support the organic feed requirements of the animals. The primary source of energy was sakwa, the corn (by-product) of gaging San Fernando (Xanthosoma sagittifolium), and
the primary sources of protein were madre de agua (*Trichantera gigantea*), cowpea (*Vigna unguiculata (L.) Walp.*) and later, organically produced soybean. Herbal plants and other supplementary feed materials were also planted by farmers.

The chicken and swine ration were formulated based on the original plan of using locally produced feed ingredients. Since there was not enough sakwa produced by the farmer-cooperators, raw materials were bought from sakwa gatherers from Bay, Calauan, Dolores, and Nagcarlan. The fresh sakwa were cleaned of soil, chopped very coarsely, shredded, and dried (sundrying/flat bed dryer). The dried sakwa were then milled and stored in sacks ready to be mixed with the other ingredients. Dried cowpea seeds from the UPLB production were likewise milled and stored for
mixing. Trichantera leaves gathered from UPLB and from some of the farmer-cooperators were dried and milled to produce trichantera leaf meal. Since cowpea production was very minimal, organic fullfat soybean from farmers in CARAGA Region was later used. The soybean was roasted in a soybean roaster, milled and then mixed in the ration. Other raw materials were obtained from a nearby feed company. The rations were modified to adjust to the availability of raw materials. The rations primarily composed of milled sakwa, copra meal trichantera meal, Rice Bran d1, molasses, coco, coya, oil, and salt.

Five chicken houses and five swine houses were constructed in the locations jointly identified by the farmers, project proponents, and representatives of the OMA within each of the farmer’s coconut area.

**Chicken**

Day-old chicks were acquired from reputable sources and were brooded for about 21 days, subsequently acclimatized in the range area for one week before feeding trial began. Ninety (90) heads, representing three strains/breeds were raised by each of the five farmer partners in a 1500 m² area under coconut, fenced, and divided into 500 m² paddock for each of the treatment. A simple and low-cost shed was built in the middle of the experimental range areas for the chicken. The range was planted with different forage feeds known to be consumed by chicken. The range were over seeded with legumes such as mungbean, and forage peanut (Arachispintoil), some grasses, and herbs. The establishment of the forage feed and the
subsequent feeding strategy was designed accordingly for all farmer-cooperators to achieve statistical validity. An area of about 2000 m² under coconut was also set aside for the planting of gaging San Fernando of which corm will be used as the main energy feed for the chicken. Supplement feeds of fresh coconut and/or copra and rice bran were offered and formulated accordingly. Known herbal plants as sources of natural antibiotics were planted in the vicinity as well as aloe vera. Aloe vera extract, when mixed with the drinking water, can be a growth enhancer.

Commercial broiler and commercial free range had similar average daily gains (ADG), which were significantly higher than that of the native (Paraoakan). Cost of feed was at P23/kg, comparable, if not lower, than most organic and natural feeds available in the market.

Mortality rate, on the other hand, was highest with the commercial breeds compared to the native. The relatively high mortality rate observed was due mostly to infectious coryza and other respiratory diseases rampant in the area during the period of the study.

The ADG of commercial broiler was highest at 11 grams and lowest in the native at 7.5 grams. Although the native had the lowest harvesting weight at 0.75 kg live weight at 90 days rearing period, compared to 1.0 kg and 1.2 kg for the commercial free range and commercial broiler, respectively, it has the highest dressing percentage at 62.5%. The native and the free range chicken had almost similar proportions of the different cut up parts. The lean and fat yield of native and free range had close values, which are lower than that of the commercial broiler. The sensory characteristics such as flavor, off-flavor, tenderness, juiciness, and general acceptability were similar for all breeds.

Swine

Weanlings were acquired from reputable sources and were slowly introduced to the range area and allowed to acclimatize for two weeks before trial began. Eight heads, representing two breeds were
raised by each of the five farmer partners in a 300-m² area under coconut, fenced and divided into 100 m² paddock for each of the treatment. A simple and low cost shed (deep bed system) were built in the middle of the experimental range area for the animals.

A separate area of 2000 m² for each farmer was planted with different forage feeds primarily root crops (gabi and sweet potato), kangkong, and some leguminous materials. The establishment of the forage feed source and the subsequent feeding strategy was designed accordingly for all farmer partners, in order to achieve statistical validity. Supplement feeds of fresh coconut and or copra and rice bran were likewise offered and formulated accordingly. Known herbal plants as sources of natural antibiotics were planted in the vicinity as well as aloe vera of which extract, when mixed with the drinking water, can be a growth enhancer. The pigs were raised up to 150 days in age. They were fed the formulated ration corresponding to their growth stage and given drinking water with effective microorganism (EM).

The ADG for the hybrid was higher at 0.40 kg than the native's 0.30 kg. Cost of feed was at P19.25/kg, comparable, if not lower, than most organic and natural feed available in the market.

The hybrid pigs finished at an average market weight of 57.7 kg at 150 days old compared with the native which gave an average of 29.0 kg. On the other hand, mortality was very high for the native pigs at 75% compared with the hybrids at 15%. Reasons
for death were primarily respiratory illnesses mostly during the early grower stage. Despite deworming activities, albeit limited, and in accordance with what is allowed by the organic standards, some parasites were observed in the fecal samples that were submitted to the laboratory. Some of these caused diarrhea and subsequent dehydration; This may have also partly caused the slow growth of the animals.

Hybrids have significantly higher slaughter yield, carcass weight, carcass length, and proportion of lean while the native breeds have the highest backfat thickness and proportion of separable fat. Moreover, native breeds had the lowest cooking loss at 20.3%.

The sensory characteristics of the pork were evaluated according to flavor, off-flavor, tenderness, juiciness, and general acceptability. Sample loins from the left carcasses of the native and hybrid animals were compared to store bought pork loins from commercially grown pigs. Results showed that both native and hybrid pork had significantly higher sensory values in terms of flavor,
juiciness, and overall acceptability than the pork bought from the market. All treatments have the same off-flavor values while hybrid pork was the tenderest followed by the native then the market-bought pork. There were no significant differences observed in terms of water holding capacity and firmness.

- Commercial broiler had the highest live weight but very susceptible to environmental challenges
- Native chicken are a slow grower but very resistant to harsh environmental conditions
- Native chicken have higher dressing percentage
- Commercially raised broiler had the highest flavor score but difference is not statistically significant, which attributed to the greater amount of fat underneath the skin.
- Those fats melted and coated the surface of the lean tissue during cooking and contributed to the greater flavor (fat itself is very rich in flavor compounds)
- All three breeds of chicken can survive in organic production system, however, broiler are more susceptible to diseases than the others.
- Broiler tend to deposit more fat and increase weight more than the others.
- No difference in sensory characteristics
- The two breeds of swine can survive in organic production system.
- Hybrids tend to gain more and the natives tend to deposit more fat.
- No difference in sensory characteristics

Technology(ies) Developed:
- Information on suitable breeds for backyard livestock production
- Information on quality of products from backyard organic livestock production using 2 breeds

Brief Description of the Technology(ies):
Baseline information on suitable breeds for backyard livestock production for future organic farmers and reference on/baseline information on quality of animal products from backyard animal production
Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Mary Jean Bulatao
(Dr. Rectorino P. Escobin Jr. + )
Contact Details: mgbulatao@up.edu.ph
Commodity: Chicken

Result Summary:
The Agricultural Systems Institute of the College of Agriculture and Food Science -UPLB implemented a DA-BAR funded project to enhance the organic production of chickens using various breeds in different agro-cosystems in Dolores, Quezon. The objectives of the project were: 1) to evaluate the production performance of Paraoakan (PP), Rhode Island Red (RR) and the cross of Paraoakan x Rhode Island Red (PR) under organic production systems; 2) to determine the influence of various agro-ecosystems on the performance of the organic
chickens; and 3) apply community-based strategies to make organic feeds available to organic producers.

The project selected three barangays in Dolores, Quezon, namely Mangghahan, Cabatang, and Bungoy representing the coconut-based, corn-based and rice-based agroecosystems. Each agroecosystem was composed of six farmers and each farmer was given 100 heads hardened chickens. Materials for the poultry shed were provided by the project while the foundation poles and shed construction were the farmers’ counterpart. Used nets were provided so as to prevent the chickens from roaming too far, and to protect from pilferage and attacks of predators.

The project provided organic seed materials such as cowpea, soybean, and corn in particular, to be produced as their base feeds. Though the project team came up with the recommended rations, the farmers resorted to the use of alternative feed ingredients most available in the farm at the cheapest cost due to insufficient feeds produced in
PRODUCTION OF ORGANIC FEEDS
the farms. These included cassava, corn, coconut, other root crops, and crop by-products that were available at certain times.

The chickens were grown organically until sold as broilers with average live weight of 1 kg. The farmers were allowed to retain about 10 heads: 2 males and 8 females, for breeding purposes.

Results showed that for breed preference, the cross of Paraokan and Rhode Island Red (PR) was the most preferred by farmers. Among the three genotypes, PR performed better in terms of growth rate, feed consumption, and feed conversion. RR was the least performer among the three genotypes particularly in feed conversion and mortality parameters.

In terms of performance in different agroecosystems, PP performed well under corn-based and rice-based areas, while PR showed better performance under coconut based agroecosystem.

The study showed that 100 heads of Paraokan x Rhode island red reared organically for six months gave a net income of P4,057.00. On the other hand, similarly raising either Paraokan or Rhode Island...
Red did not realize income for the farmers. This was mostly due to the high rate of mortality for the Rhode Island Red and the relatively inferior performance of PP and RR in terms of ADG and feed efficiency due to limited availability of good quality organic feeds.

Further studies are needed to improve the performance of chickens raised under backyard organic system, particularly to address the many challenges in producing good quality organic feeds in the farm.

**Technology(ies) Developed:**
- Integrated organic production of chickens and feeds using “Pinoy Big Broiler” or PBB, which is a cross of native chicken and an improved breed.

**Brief Description of the Technology(ies):**
Integrated organic production of chickens and feeds using PBB

PBB is a high-performing grade of native chickens that will acquire the productive performance of the improved parents, while retaining the adaptability of native parents.
Use of Selenium, Probiotics, Prebiotics and their Combinations against Coccidiosis in Free-range Chicken

Based on the gross findings of mortalities from the first and second batches, GUMBORO or infectious bursal disease (IBD) was identified as the cause of deaths. Because of this, the third batch was vaccinated not only of NCD but also of IBD.

Implementing Agency: Central Bicol State University of Agriculture
Project Leader: Dr. Monaliz Nagrampa
Contact Details: www.cbsua.edu.ph
Commodity: Chicken

Result Summary:
1. Cumulative and final body weights were found to be insignificant among treatments.
2. Native chicken are susceptible to infectious bursal disease (IBD) between the 4th weeks and 8th weeks, warranting vaccinations against the disease.
3. Peak oocysts counts were observed between the 4th weeks and 8th weeks.
4. Only conventional anticoccidia had significantly lower oocysts per gram (OPG) counts compared to the negative control in batch 1.
5. Coccidia lesions were generally mild in the intestines.
6. Parameters between the 9th weeks and 12th weeks in the absence of IBD (batch 3).
   a. ADG was found to be significantly higher in birds given maduramicin than the negative control.
   b. FCR was better in birds given anticoccidia, may it be traditional (maduramicin) or alternative (selenium, probiotics, or prebiotics).
   c. However, feed cost to produce 1 kg was improved only with the addition of maduramicin, selenium, and prebiotics and not by probiotics compared to the control.
7. Coccidial infection in Philippine native chicken based on OPG counts and absence of clinical manifestations was subclinical, yet FCR seemed to be affected by the presence of the parasite.
8. Mortality rates were insignificant and were due to infectious bursa disease or Gumboro.
9. FCR is negatively correlated to temperature (between 27.85°C—29.09°C), high relative humidity (average 86%), thick rainfall, and longer sunshine hours.
10. OPG was directly correlated to mortality and RH while oppositely associated to sunshine hours.
11. Mortality was positively related to RH and rainfall and negatively linked with sunshine hours.
12. Vaccinations against NCD and IBD viruses produced antibodies which protected birds from these pathogenic diseases.
Philippine native chicken are affected by coccidiosis subclinically, in that FCR seemed to decrease by the presence of the parasite. The addition of maduramicin, selenium, and prebiotics improved FCR and decreased feed cost to produce 1 kg BW in birds raised in a semi-intensive system.

**Technology(ies) Developed:**
- Addition of organic selenium, probiotics, or prebiotics to the diets of Philippine native chicken to lower the incidence of coccidiosis and improved FCR.

**Brief Description of the Technology(ies):**
1. Occurrence/incidence of coccidiosis in Philippine native chickens decreased after the addition of maduramicin, selenium, and prebiotics.
2. Feed conversion ratio improved as well as decreased the feed cost to produce 1 Kg (body weight) in birds in a semi-intensive system.
Organic Farming as Soil Quality Management Enhancement: An Adaption Strategy to Climate Change and Variability

Implementing Agency: Isabela State University
Project Leader: Dr. Artemio A. Martin, Jr.
Contact Details: jhun_6273@yahoo.com
Commodity: corn, rice, and banana

Result Summary:
A field study was conducted to document the indigenous knowledge, perceptions, and attitudes of farmers towards organic farming as strategy on soil quality management in Cagayan Valley; and examine
the carbon sequestration potentials of the soils under different cropping systems. It was intended to understand farmer’s knowledge of soil quality management to ensure transfer of appropriate technology; and to guide decision makers in the formulation of policy in promoting organic farming as strategy to improve farm productivity to ensure food security and cleaner environment. The methodology employed includes physical observation and questionnaire surveys that consisted of open-ended and close-ended questions addressing the indigenous farm management skills and organic farming practices of farmers, and soil sampling to pre-identified soil series.

1. The farmers have developed certain indigenous knowledge in assessing their fields using soil quality indicators such as crop performance and yield, and soil color and used to establish soil categorized (fertile soil, moderate soil, and poor soil). Farmers developed over the years of their farming experiences their own soil management practices which are not far from scientific practices. There are indigenous practices which are not far from scientific practices. There are indigenous practices representing successful ways by which farmers have dealt with poor soil quality. These practices vary from farmer to farmer, farming system to farming system, from field to field, and even within fields depending on their accessibility and availability of resources.

2. Farmers’ portfolio of soil management practices consist of indigenous knowledge and practices in
the enhancement of the quality of their farms and incorporating it with modern technologies considering its affect on soil and plant. Out of 1,066 farmer-respondents, only 21.5% are adaptors of the organic farming technology in spite of their high level of knowledge on organic farming technology. Farmers are familiar with bio-organic fertilizer, poultry manure, compost humus, vermicompost, and vermicast as organic farm inputs; and organic fertilizer application, animal manure, compost fertilizer; and the practice of crop rotation as organic farming practices. Farmer’s knowledge of the benefits is limited on improvement of soil fertility and on beneficial insects.

3. Policy recommendations emanate from production and improvement of information sources on organic farming, and through the regular sources of information on organic farming.

4. Soil analysis showed that soil reaction ranged from very strongly acidic (pH 4.5) to slightly alkaline (pH 7.4). Nitrogen in soils is very low (0.4 to 3.4 g kg⁻¹), available P varied from very low to high (0.70 to 30.50 mg kg⁻¹) and available K from very low to very high (0.0-1.27 cmol+ kg⁻¹). The crops currently grown are classified as suitable which almost matched with the technical crop-soil suitability analysis.

5. Soil organic matter (SOM) and organic carbon contents (20cm) are moderate with average values of 2.27% and 39.05 Mg ha⁻¹, respectively. SOM and SOC in upland are higher than in lowland soil attributed to differences in soil types, cropping system and agricultural management practices.

6. The significant amount of CO₂ sequestered in upland (150 Mg Co2 ha⁻¹) and lowland soils (126 Mg CO₂ ha⁻¹) confirms that soils in the region has the potential as sink of CO₂ and varies due to the difference in cropping systems. The result proves that diversifying cropping systems is one option for improving soils potential for CO₂ sequestration.

**Brief Description of the Technology(ies):**
An assessment on the awareness and interest of farmers as well as their adoption level on organic farming and on how they manage and enhance the quality of their soils; advocacy and IEC on organic fertilizer production and organic farming as an adaptation strategy for climate change and variability.
Result Summary:
The University of the Philippines Los Banos-Institute of Agroforestry (UPLB-IAF) implemented the project entitled “Scaling-Up Organic Farming and Agroforestry Towards Climate Change Adaptation”, in collaboration with the Makiling Center for Mountain Ecosystems in 2012-2015.

1. This project primarily aimed to develop sustainable farming practices as adaptation strategies to climate change impacts through the adoption of organic farming practices in the existing agroforestry farms in the upland barangays of Sto. Tomas, Batangas, and Los Banos, Laguna. The project developed permanent ecological plots (PEP) in Barangay San Miguel, Sto. Tomas, Batangas and in Barangay Timugan, Los Banos, Laguna. The PEPs served as the on-site demonstration areas where different organic farming practices are being showcased, particularly the establishment of detachable vermicomposting facility, as well as the conduct of fertilization trials to compare the

Implementing Agency: University of the Philippines Los Banos
Project Leader: Dr. Roberto G. Visco
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Commodity: bittergourd, white pumpkin
effects of vermicompost and inorganic fertilizers on the growth and performance of selected crops, and on soil conditions, as well.

2. The on-site trials in Sto. Tomas, Batangas showed that the plots of bittergourd (Momordica charantia L. amargoso) and white pumpkin (Lagenaria siceraria) (upo) treated with vermicompost have greater number of shoots and have longer sizes of shoots as compared to the inorganically fertilized plots. Similarly, plots of
white pumpkin treated with vermicompost had the largest plant collar diameter as compared to those treated with inorganic fertilizer. Furthermore, soil analysis revealed that the topsoil pH of ginger plots applied with vermicompost has improved from being slightly acidic to nearly neutral pH.

3. The tropical plant-based agroforestry system at Timugan, Los Banos, Laguna likewise had significant positive response to vermicompost. On-station concrete vermicompost facility was also established at the UPLB-Institute of Agroforestry’s Learning Laboratory for Agroforestry which provided accessible showcase of the said technology not only to farmers but also to students and researchers.

4. The project has organized cross-farm visits and training programs aimed at enhancing the knowledge and skills of the farmer-cooperators on the use of organic farming practices. These include training on vermicomposting technology, integrated pest management, vulnerability and risk assessment, and agroforestry, and a field exposure to Costales Organic Farm in Majayjay, Laguna.

5. The project team spearheaded the lobbying towards the institutionalization of organic agriculture programs of the local government units in Sto. Tomas, Batangas and in Los Baños, Laguna.

**Technology(ies) Developed:**

- Information on the practice of organic farming in agroforestry as a climate change adaptation strategy

**Brief Description of the Technology(ies):**

Development of sustainable farming practices and building up/scaling up the science of organic farming in agroforestry as a climate change adaptation strategy.
Documentation and Assessment of Socio-Cultural Aspects of Organic Agriculture

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Gloria Luz Nelson
Contact Details: gluznelson2001@yahoo.com.hk

Result Summary:
1. The findings showed that OA in the nine provinces started between 1960 and 1980. It was then known as natural farming. The active promotion of OA was after the promulgation of Republic Act 10068 or "Organic Agriculture Act of the Philippines."
   It was promoted through conduct of trainings, meetings, lectures, farm visits and is centered on the production of organic fertilizers (concoctions), pesticides, and vermicompost. The motivating factor for conversion to OA is mainly for economic, health, and environmental reasons.
2. Organic farming does not involve synthetic or chemical inputs, which is the reason why the fertility of the soils is restored. With continuous practice of can help mitigate the effect of global warming. Furthermore, compared to inorganic farming, there is less expense for farm inputs and yet organic products are even sold at higher price than inorganic.
3. OA was also found to be a family activity where members are involved from land preparation to
marketing. The farmers make their own fertilizers using a variety of techniques such as composting, vermicomposting, bokashi, using microorganisms (IMO, EM), and making concoctions (foliar and liquid fertilizers). There were also some who practiced integrated farming, which involves a combination of crops, vegetables, livestock, and fishpond. The farmers sold a variety of organic products such as rice, vegetables, fruits, herbs, fish and livestock, and vermicast. Organic products are typically sold to farmers’ neighbors, direct buyers, organic farmers’ organization, and middlemen. Some products are also sold to the local public markets and supermarkets.

4. The challenges encountered by organic farmers are related to organic farming operations, government support, and organic certification.

5. Though certification is deemed important to farmers for it guarantees that products are truly organic, they suggest the use of Participatory Guarantee System (PGS) instead of the institutionalized certification.

**Brief Description of the Technology(ies):**
Different socio-cultural aspects of OA assessed and documented based on the data gathered from FG, KII, and survey on the nine provinces of the country. There were 11 focus groups conducted among the representatives of various OA farming organizations, while there were 37 interviews to various experts: farmers, technicians, traders, representatives of NGOs and LGUs. Gender relations, labor dynamics and market systems, perceived attitudes on the social cost and benefits of OA to the farmers were determined based on the survey conducted.
Assessment of the Different Organic Farming Practices of Farmers in the Hilly/Upland Areas in the Philippines

Implementing Agency: Philippines Agroforestry Education and Research Network
Project Leader: Dr. Lulgarda L. Tolentino
Ms. Leila D. Landicho
Contact Details: idlandicho@gmail.com

Result Summary:
1. Results show that the upland farmers engaged in organic farming practices are generally smallholder farmers. Their major source of income is farming with less than P10,000 annual income, and whose farms range from 1 ha to 2 ha only. These farmers are in various stages in the adoption of organic farming practices. Around 44% are new adaptors, while most of them have been engaged in this farming practice for more than five years already. This indicated that farmers observe first the effects of organic farming practices before they fully adopt the practice.
2. Using bit regression analysis, it was found out that water source and income source are the socio-economic variables that are associated with the number of the organic farming practices being employed by the farmers.
3. The farmer-respondents are already realizing the environmental, health, and economic contributions of organic farming practices as indicated by the positive changes in their overall agricultural production.
4. Results also show that there is a market demand for organic food products across the study sites. This market demand is evidenced by the consumers’ awareness about organic food products and the benefits of consuming these products; their willingness to pay for organic food.
products despite the higher prices over the conventional products; and the lack of certification and labeling of organic food products.

**Technology(ies) Developed:**
- Socio-economic characteristics of farmers in hilly/upland area as engaged in organic farming practices
- Organic farming practices being employed
- Problems, constraints, opportunities, and prospects in organic farming
- Observed effects of organic farming practices in agricultural production
- Marketing arrangements and strategies for organic food produce
- Consumers' perceptions about and willingness to purchase organic food products
- Publication entitled “Organic Farming Practices of Smallholder Upland Farmers in the Philippines”

**Brief Description of the Technology(ies):**
1. Highlights the farmers' reasons for their shift to organic farming practices
2. Organic farming practices being employed by the farmers
3. Effects/impact of organic farming practices
4. Farmers' concept and views on organic farming
Development of Strategies and Support Systems for Farmers in Conversion from Conventional to Organic Agriculture

Implementing Agency: University of the Philippines
Los Baños
Project Leader: Dr. Lucille Elna De Guzman,
Dr. Maria Fatima O. Mercado
Contact Details: lpdeguzman1@up.edu.ph

Result Summary:
OA has a strong potential for building resilient food systems through farm diversification and building soil fertility. It offers alternatives to conventional agriculture where energy-intensive production inputs such as synthetic fertilizers and pesticides are applied. OA is also an excellent adaptation, as well as mitigation strategy for climate change. However, many farmers who opted to convert to OA have found conversion to be unsupported, isolating, and stressful experience. Thus, the implementation of a four-year (2012–2016) research project funded by DA-BAR which identified constraints to conversion and developed strategies and support systems for farmers who are converting from conventional to
organic agriculture. The research, which covered the provinces of Camarines Sur, Sorsogon, Benguet, Northern Samar, Leyte, Antique, Iloilo, and Misamis Oriental, had three interrelated activities; i.e., literature review, documentation of farmers’ experiences in conversion, and development of strategies and support systems for farmers in conversion to OA. The literature review on conversion from conventional to OA gave rise to an 84-paged database with 30 entries. Increasing farm productivity and reduction or elimination of expenses for external inputs were the top reasons cited for conversion while OA being labor-intensive/time-consuming/slow process as the main constraints in conversion. The experiences in conversion and organic practices of 24 individual farmers were documented. A total of 26 laws/ordinances on or related to OA were identified, nine of which were approved before 2010 when RA 10068 was signed into law. One-day on-site workshops were conducted with a total of 158 participants and a final workshop-cum-study tour attended by 24 representatives from all research sites was conducted in Laguna. Each research site have different ranking of their identified constraints but in general, lack of capital, lack of support (i.e., inputs, facilities/equipment, technical, marketing) and high cost of certification were the major constraints identified across sites. To achieve the goals of sustainable development, conversion from conventional to OA have to be supported. This can be accomplished through (1) provision of government support (i.e., subsidy and loans; equipment and facilities; inputs like organic seeds and fertilizers; dedicated organic trading posts; etc.); (2) conduct of massive trainings and after training assistance for both farmers and government technicians, including the establishment of technodemo farms; (3) recognition of 1st and 2nd party certification for local and small-scale organic producers and operators; and (4) strict
implementation of RA 10068 and local OA ordinances. Given that capacity building is one of the strategies to increase the number of farmers converting to OA, the research team conducted a two-day training in five out of eight research sites attended by a total of 126 participants. Overall, the identification of constraints to conversion, development and dissemination of strategies and support systems for farmers, and strengthening the knowledge base of farmers will increase the rate of successful conversion to OA.

**Technology(ies) Developed:**
- Database of literature review of farms/farmers who have converted to OA
- Documentation of farmers’ experiences in conversion to OA
- Compilation of existing local and national laws, policies and ordinances related to the conversion to OA
- List of constraints farmers experienced in converting from conventional to OA and List of strategies and support systems to encourage farmers to convert to OA
- Two-day training of farmers on OA

**Brief Description of the Technology(ies):**
1. Database of literature review of farms/farmers who have converted to OA. Eighteen materials were reviewed (i.e., thesis/manuscript, magazine/newsletter, book) containing individual subject and community-wide documentation. Average farm size was 2.1 ha with farmers generally practicing diversified and integrated farming of annual and perennial crops, livestock, and fish, where applicable. All the information

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**Name:** Ursula Sacley  
**Address:** Sitio Tuloden, Cattubo, Atok, Benguet  
**Civil Status:** Married  
**Age:** 33  
**No. of years on OA:** 6  
**Crops planted:** High value crop (vegetables) and ornamental  
**Farm area:** 0.3 ha
Name: Simeon Olivenza Jr.  
Address: Macawayan, Irosin, Sorsogon  
Civil Status: Married  
Age: 42  
No. of years on OA: 6  
Crops planted: Rice and vegetables  
Farm area: 2.9 ha  
Others: Vermicompost

gathered was organized into an 84 paged database that has 30 entries. It contained the following information: reasons, facilitating factors, and benefits of conversion; constraints to conversion; and common practices in OA/sustainable agriculture (SA), among others. The reasons for conversion can be generalized into four categories: increasing total farm productivity, reducing expenses for external input, health/environment protection and preservation, and sheer interest to practice OA/SA with the first two as the top reasons cited both in the individual and community-wide documentation.

2. Documentation of farmers’ experiences in conversion to OA. With the assistance of designated provincial coordinators, three farmers per project site or a total of 24 farmers, 6 females and 18 males with an average age of 55.5 years, were selected for documentation of their experiences in conversion from conventional to OA. The youngest farmer interviewed was 40 years old while the oldest was 71. In terms of educational attainment, 13 are high school level, 10 in the college level, and one finished a vocational course. The general farm area ranged from 0.25 ha to 12 ha and farming experienced was from 1 year to 26 years. Rice is the major crop in 17 of the farms documented while two are mango-based, two are pili- and vegetable-based, and three are upland vegetable-based. Vermicompost is the source of organic fertilizer in almost all farms.

3. Compilation of existing local and national laws, policies and ordinances related to the conversion to OA. Twenty-six laws/ordinances on or related to OA on the national, provincial, and city/municipal levels were identified and either downloaded from the internet or acquired through personal communication. Only one national law, the Republic Act 10068 or the Organic Agriculture Act of 2010 was identified. Of 25 remaining laws/ordinances, 12 were provincial ordinances (or administrative orders) enacted in nine provinces belonging to six regions in the country and one memorandum of agreement between the two Negros Provinces. On the city or municipal level, 13 ordinances or executive orders enacted in 6 municipalities and 5 cities belonging to 9 regions were included. These laws either directly promote OA practices and/or ban the utilization of inputs not conforming to OA practice (e.g., GMO’s) or provide tax incentives or discounts to organic farming practitioners. Nine out of the 25 provincial and city/municipal ordinances
(administrative or executive orders) were approved before 2010, the year RA 10068 was signed into law.

4. List of constraints farmers experienced in converting from conventional to OA and List of strategies and support systems to encourage farmers to convert to OA. One-day workshops were conducted in all research sites, except for Iloilo, where constraints/problems farmers encountered in relation to conversion from conventional to OA were identified. There were a total of 158 participants who were divided into three groups: conventional farmers, farmers in conversion to OA, and organic farmers. A final workshop was also held in Calauan, Laguna participated in by 24 organic farmers from all research sites who were the respondents in documentation part of this research. There were ten or more constraints/problems identified by participants per site with corresponding suggested solutions/strategies/support needed. These constraints were classified into technical, economic, political, and social and then ranked based on priority in terms of support needed.

Each research site has a different ranking of their identified constraints but in general, lack of capital, lack of support (i.e., inputs, facilities/equipment, technical, marketing) and high cost of certification were the major constraints identified across sites. The strategies/support needed by farmers are the following: (1) provision of government support (i.e., subsidy and loans; equipment and facilities; inputs like organic seeds and fertilizers; dedicated organic trading posts; etc.); (2) conduct of massive training and after training assistance for farmers and government technicians, including the establishment of techno-demo farms; (3) recognition of 1st and 2nd party certification for local and small organic operators; and (4) strict implementation of RA 10068 and local OA ordinances.
Implementing Agency: Don Mariano Marcos Memorial State University
Project Leader: Ms. Necitas M. Cabrera
Contact Details: nessgemma2004@yahoo.com

Result Summary:
1. Participant observation and archival research were used to gather data from 38 producers, 11 traders, and 97 consumers in the Cordillera Administrative Region, Region III, and Region IV A. Descriptive statistics, Pearson r correlation, cost-and-return analysis, and efficiency analysis were used to analyze data.
2. The emergence of new breeds of players makes the marketing channel of organic vegetables in the Cordillera more complex compared with the simpler, more modern, and integrated chain in other regions. The six key players involved in the marketing of organic vegetables are the cooperative, assembler-wholesaler-retailer,
assembler-wholesaler, assembler-retailer, retailer, and institutional buyers.

3. Organic temperate vegetable production is both profitable and efficient. Cauliflower, native cucumber, French beans, broccoli, lettuce, New Zealand spinach, and Japanese spinach give higher profits to organic farmers. The organic production of these vegetables requires low capital, labor, and land use intensity indicating high efficiency. Value chain and marketing margin analyses show cost and margin differentials across players and across geographic locations indicating variations in the distribution of benefits among key actors.

4. Intensified and integrated capability building mechanisms particularly on the area of mitigation and improving resiliency of crops are needed to counter the effects of climate change, which affect production.

5. Value-adding activities like vegetable processing could be a remedy for high pull out rates and spoilage when there is oversupply. In marketing, value adding activities also need to be instituted, along with the need to improve product handling and transport.

6. The use of Information and Communication Technology needs to be maximized to address traceability and logistical concerns.

7. Contract-growing arrangement is a documented best practice that is encouraged because it brings mutually beneficial terms and conditions to contracting parties.

8. Length of time being organic consumers, kind of product being consumed, volume of consumption, and age are factors that affect consumers’ attitude and knowledge on organic products.

9. Yield, profitability, and efficiency of organic production are comparable with conventional production making it sustainable in the long run. Stable prices and available unutilized area for expansion of organic production could cope with future demands.

10. GAP certification must be prioritized to respond
to food safety and quality issues, retailers’ and trade requirements, and consumers’ changing priorities and expectations. The government and the private sector need to put their resources and expertise together to address the problems and constraints of the industry.

**Technology(ies) Developed:**
- The composition of the market channel in the supply chain of organic temperate vegetables
- How profitable and efficient is organic temperate vegetable production.
- Marketing functions by each channel and the corresponding costs of each function
- Production and marketing problems encountered by stakeholders
- Best practices of stakeholders
- The overall sustainability of the organic temperate vegetable industry
- Factors which affect the knowledge and attitude of consumers about organic products
- R&D agenda to respond to the problems, challenges, and constraints of the industry

**Brief Description of the Technology(ies):**
The cooperative, assembler-wholesaler-retailer, assembler-wholesaler, assembler-retailer, retailer and institutional buyers are the key players in the marketing of organic vegetables. Organic temperate vegetable production is both profitable and efficient. Cost and margin differentials across players and across geographic locations indicate variations in the distribution of benefits among key players. Intensified and integrated capability building mechanisms on mitigation and improving resiliency of crops are needed to combat the effects of climate change.
change which adversely affects production. In marketing, value-adding activities need to be instituted, along with the need to improve product handling and transport. The use of Information and Communication Technology could address traceability and logistical concerns. Contract-growing arrangement is a documented best practice since it brings mutually beneficial results. Length of time as organic consumer, kind of product being consumed, volume of consumption and age affect consumers’ attitude and knowledge of organic products. Yield, profitability and efficiency of organic production are comparable with conventional production making it sustainable in the long run. Stable prices and available area for expansion of organic production could cope with future demands. GAP certification must be given priority. The government and the private sector need to put their resources and expertise together to address the problems and constraints of the industry.
Value Chain Analysis of Selected Products (in transition to organic) in Region 2

Implementing Agency: Isabela State University
Project Leader: Dr. Nilo E. Padilla
Contact Details: niloepadilla926@yahoo.com
Commodity: Rice, corn, fertilizer, free range chicken, and swine

Result Summary:

a. Rice
The Value Chain analysis of rice (in transition to organic) in Region 2 covers five provinces, namely: Batanes, Cagayan, Isabela, Nueva Vizcaya, and Quirino. There are six sectors covered by the study along the value chain of organic rice such as BDS providers, farm input suppliers, farmer producers, processors, traders/retailers, and consumers.

The study focused on determining and analyzing the awareness, constraints and opportunities, policies and intervention points of organic rice in Region 2. Specifically, it aimed to: determine the awareness of farmers, traders and consumers in organic rice; mapping out the value chain of rice in transition to organic by identifying the processes, actors and their roles from inputs to product consumption; and identify and analyze the constraints and issues affecting production and marketing of rice in transition to organic in Region 2.

Most sectors in the value chain of rice in transition to organic have high level of awareness. However, farm input suppliers, processors, and farmer producers have “fair awareness” to the issues that organic farm inputs cannot pollute the environment; organic processing which is using indigenous knowledge; organic product produced out of organic raw materials, and it is environment friendly; and obtain greater profit due to less cost of production/processing; and it cannot pollute the environment. On the other hand, farmer producers are “unaware” of the issues on RA 10068 of 2010 laying down the implementation of OA in the country. Furthermore, sectors in all provinces in Region 2 have revealed awareness to all issues except for
Nueva Vizcaya that have “fair awareness”.
Organic rice in Region 2 is in infant stage wherein
the different sectors engaged in small or minimal
volume of operation. There are few who have
registered as organic rice producers in the region.
BDS had fulfilled their role as provider of support
services to other sectors in the value chain of rice.
Greater share of value added had been incurred by
processors (millers) and institutionalized
buyers/traders of finish product.

All sectors in different provinces in the region need
support on physical facilities, technological, financial
and market linkage from government and non-
government organizations to strengthen their
operations on production, processing and marketing
of organic rice.

b. Corn

This study was conducted to explore the value chain
of corn (in transition to organic) in Region 2.
Specifically, the study aimed to 1) map the core
processes along the value chain; 2) determine the
key players in and their roles in the chain; 3) value
adding along the chain; 4) identify opportunities and
challenges along the chain; and 5) determine key
players’ awareness of organic agriculture. Focus
group discussions (FGDs), key informant interviews
(KII), and the survey methods were used to gather
data needed in the study. Three distinct value chains
were identified and mapped in the study. These are
the value chain of green corn, the value chain of corn
grains milled for food and the value chain of corn
grains as raw materials in producing cornick.

In the value chain of green corn, the largest value
added was created at the level of green corn
farmers. Processors/retailers ranked second in terms
of value creation while trader-wholesalers
contributed to the lowest share to value creation. In
the value chain of corn grains milled for food, the
largest value added was created at the level of
retailers. Farmers-practitioners ranked second in
terms of value creation whereas village corn millers
contributed the lowest share to value creation. In the
value chain of corn grains as raw material in
processing cornick, the largest value added was
created by cornick processors. Retailers ranked
second in terms of value creation. Corn grain traders
ranked third in terms of value creation. Corn farmers
contributed the lowest share to value creation.

In transition corn farming in Region 2 is confronted
by problems such as limited production; minimal
input supply (i.e., corn varieties suited to organic
farming and other organic inputs); limited
government and private sector support for research,
education, service and product development; lack of
facilities (postharvest, storage, support, transport,
processing) suited for handling organic corn
produce; high production and handling cost; lack of
certified outlets; and absence of price premiums for
organically produced corn to compensate penalties
in production.
c. Chicken

This study assessed the awareness, constraints and opportunities, policies, and interventions points of organic farmers in Region 2. It aimed to 1) Determine the awareness of free-range chicken farmers, traders, and consumers; 2) Map the value chain of organic chicken identifying the processes, actors and their roles from inputs to product consumption; 3) Determine the constraints and issues affecting organic production and marketing; 4) Recommend policy options to improve the production and marketing of the organic products.

Data gathering by municipality in five provinces of Cagayan Valley, assisted by the DA organic focal persons. MAO's and PAO's of the LGU's and other stakeholders have been undertaken.

Majority of the chicken raisers were aware that 1) organic farming practice used indigenous knowledge; 2) they practiced the natural way of farming; 3) synthetic chemical input is prohibited in organic farming; 4) organic farming is environment friendly; 5) organic produce are safe for food for the family and market; 6) there were health benefits gained especially engaging in organic farming; 7) there is an increasing demand due to health considerations and bigger profit attained; 8) it contributed to rehabilitation and restoration; does not pollute the environment, and stabilized the ecosystem; 8) OA was the priority of “Pnoy Administration” laying down the implementation of OA in the country under RA 10068 of 2010; 9) there was an increasing niche market of organic products both in local and international markets and awareness of accreditation as organic producers, processors, and traders; and ready assistance to be provided by the DA, LGUs, and SUCs; and 10) regulations in producing chicken as stipulated in Organic Act of 2010 promoting organically grown chicken.

Most range chickens were found in Cagayan (41.3%), followed by Isabela (28.1%), Nueva Vizcaya (17.4%), Quirino (10.7%), and Batanes (2.5%). These chickens were raised in free range environment. However, the limitations of organic range chicken production and marketing were 1) issues of accreditation, 2) no supplier of quality and volume organic feeds and biologics, 3) inefficient marketing system, 4) limited quality standards, and 5) limited infrastructure support and credit. Moreover, the strict implementation of RA 10068 on accreditation discourages organic farmers to venture in the enterprise.

Majority or 50.8% of the organic chicken raisers were females; 52% of whom were college graduates. There was a significant relationship (0.05 levels) between marriage and ownership of the land on the income derived from raising organic chicken. Moreover, organic chicken raiser's knowledge in management systems and feed resources of organic chicken was significantly correlated (r=0.302). Seventy-eight percent were land owners; 11.9% were lease holders; and 10.20% were shareholders. The mean farm income in 2015 of the chicken raisers was P24,200.00 which ranges from P2000 to P120,004. Of the 59 raisers, 44% had farm income above the mean while 56% had below the mean. Majority of the chicken raisers had low farm income.

The assembler, processors, retailer, and middlemen or traders used traditional vehicles to transport live chickens which were being slaughtered or processed manually to public markets in the cities and towns.

In the value chain of free-range chicken, the largest value added was found at the level of producers the farmers in Cagayan Valley except in province in Nueva Viscaya and Batanes with much more lower value creation. For example, the production cost of raising chicken was found to be similar in Isabela,
Cagayan, and Quirino. The Isabela farmers realized a net margin in value added of 75 or 56%, 30 or 22.22% for the middlemen, and 30 or 22.22% for processor. For Cagayan, the farmer who were input providers and at the same time producers got the highest net margin of P95.00 or 32% value added followed by wholesalers and retailers who realize a value added of P25.00 or 23% and P50.00 or 46%, respectively. Similar findings were found in Quirino. However, the producers in Nueva Vizcaya realized a much lower margin (P45.00 or 32%) compared to the processors/assemblers (P95.00 or 89.30%). Similarly, producers in Batanes capture the value added of P24.00 or 25.90% compared with assemblers/processors with the value added of P50.00 or 37.02%.

The provincial Geographic Information System (GIS) Map of the five provinces of Cagayan Valley showed that most free range chicken raisers were accessible to the LGU’s, national highways and service providers’ (LGUs, DA, SUCs) support such as trainings, seminars, and financial support.

Moreover, the GIS map showed that showed that some organic raisers who were found in the far flung barangays were 1) aware of benefits especially on the impact of health issues; 2) resorted to less cost, natural way of raising chicken as practiced by their elderly farmers, 3) knowledge and competencies had been enhanced by the training and seminars conducted by DA, SUCs and LGUs.

d. Swine

This study investigated the value chains for in-transition to organic swine in Cagayan Valley, with focus on the production, trade and processing of marketable hogs, the actors and their roles in the value chains and their awareness on organic swine raising, as well as the constraints and issues affecting the organic swine industry in the region. The survey method, Focused Group Discussion, and the Key Informant Interview (KII) were used to collect the needed data for the study. The FGD and KII were conducted in each province to gather views, insights and opinions from stakeholders regarding organic swine production and marketing. FGD results were affirmed through validation workshops conducted in each province.

Employing stratified random sampling, with municipal income as the basis, a total of 667 consumers were chosen and interviewed using a semi-structured
questionnaire. For the other stakeholders, considering their small number, purposive sampling was employed. Ten input suppliers, 33 procedures, 8 processors/lechon operators, and twelve intermediaries were interviewed. Information gathered includes information on the stakeholders’ awareness on organic agriculture in general and organic swine production in particular, and actual practices, experiences and problems encountered. Descriptive statistics such as frequency counts, means, percentages and ranking were used in analyzing the data gathered. Cost and returns at each level of the chain were estimated and compared to determine value addition between levels of the chain.

Survey results indicate that swine producers in the region are aware of what organic farming is and of the benefits that can be derived from it. Their awareness of other issues relating to organic farming however rated only “fair” particularly on items like the passage of RA 10068 the growing demand and expanding niche market for organic products as well as the need for accreditation as organic producer, processor, and trader.

The key players or actors in the value chain for organic swine in the region are the: 1) input suppliers, 2) producers, 3) traders, 4) processors, and 5) consumers. Production is undertaken mostly by backyard farms and on a larger scale by farmer cooperatives and educational and research institutions. Among the constraints identified were: 1) limited supply and sources of quality animal stock and organic feed; 2) limited production, processing and entrepreneurial skills among practitioners; 3) absence of specialized loan windows for organic swine farming; 4) inadequate infrastructure and processing facilities. Opportunities in the industry include the growing market for organic meat, availability of technical experts.

e. Fertilizer

This study was conducted to determine the value chain map of organic fertilizer, identify the various stakeholders and their role in the value chain map, measure value-addition along the value chain, identify opportunities and challenges in the value chain map, and determine extent of organic agriculture awareness of stakeholders in the value chain map.

Three approaches were used in gathering data needed in establishing value chain map of organic fertilizer, the actors in the value chain map, opportunities and challenges, and value addition along the chain. These are: (a) focus group discussion (FGD), (b) key informant interview (KII), and (c) survey method.

Organic fertilizer come from input suppliers who are in general animal raisers, the most dominant of which are swine, cattle, and poultry raisers. They are households, commercial raisers, NGOs, or individual animal raisers. Crop residue is the second important input in organic fertilizer production. Corn, banana, and rice crop residues were found to be primary sources of phosphorus and potassium respectively while nitrogen source was animal wastes particularly chicken dung. Processors or producers of organic fertilizer are farmers or farmer groups who produce organic fertilizer for their own consumption. Three farmers’ cooperatives and one private entrepreneur produce organic fertilizer on a commercial scale. Several cooperatives are also engaged in organic fertilizer production but the operations are all at infant stage that needs strong technical and financial support from the government and NGOs.

Values added along the value chain are highest among processors, followed by input providers. This would imply that any intervention or technological
innovations to improve efficiency in organic fertilizer production will benefit most organic fertilizer producers who are the farmers themselves. Opportunities in organic fertilizer production include increase employment and livelihood opportunities in rural communities; increase utilization of crop residues; biodegradable household waste; and market wastes, and less dependence on organic fertilizer. Challenges identified include how to increase the macronutrient content of organic fertilizer, cost-efficient organic fertilizer technology, and quality control process (“certification”) to ensure that the product is “organic” as claimed.

**Technology(ies) Developed:**
- Evaluation and monitoring of actors and key stakeholders in the chain of selected products (in transition to organic) in Region 2 benchmarking
- Strength, Weaknesses, Opportunities and Threats (SWOT) of actors and key stakeholders along the chain for each commodity analyzed
- Value chain map and cost information of selected products (in transition to organic) such as chicken, swine, rice, corn, and organic fertilizer in Region 2 analyzed
- Indigenous technologies have been identified
- Initial GIS developed for tracing out the location of the commodities

**Brief Description of the Technology(ies):**
- Bench marking and monitoring of actors in the chain will generate information about the number of operators, the activities that they are undertaking, and socio-economic condition. Performance of the actors along the chain will be compared by each province.
- SWOT analysis was used to evaluate the strength, weaknesses, opportunities, and threats of actors and key stakeholders along the chain in each commodity. Based from their internal strengths, this will be used to take advantage of the opportunities and minimize the effect of external threats that can limit the activity of the actors and key stakeholders along the chain. On the other hand, weaknesses of actors and key stakeholders that inhibited problems in their operations were addressed by developing working plans and identification of resources.
- The value chain map illustrates the rules/functions and contribution of the different actors and key stakeholders along the chain from production of farm inputs, producers, processors, traders, and consumers of the product. It also showed the value added of cost and percentage contribution from each actor that comprises the price shouldered/paid by the ultimate consumers. Through this, actors and key stakeholders who have the bigger share of profit along the chain can be identified.
- Indigenous technologies have been identified from actors and key stakeholders. The use of these technologies reduces the production cost, making the products more profitable.
- Initial GIS developed for tracing out the location of the commodities clustered within the market centers e.g., cities, municipalities with existing supermarkets
Bio-Enterprise Development in Organic Agriculture Sector Through Public-Private Partnership

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Flordeliza A. Lantican
Dr. Isabelita Paubayon
Contact Details: flantican@yahoo.com, impaubayon@yahoo.com

Result Summary:
Based on the findings of the project through survey of key stakeholders, post-evaluation of cooperative management training, and suggestions made by participants in the policy workshop, the following recommendations are in order:

1. Aggressive information awareness campaign and capacity building for farmers and other stakeholders. Effective and efficient information drive, communication materials, and delivery channels are needed to inform all stakeholders
including the general public and consumers about the environmental, economic, and health benefits of organic farming. Greater awareness provides more support and a wider market base for organic rice.

2. There should be continuing training program on organic farming through the ATI in coordination with the LGUs, NGOs, farmers’ groups, academe, and private sector. More importantly, monitoring and evaluation should be an important component of the training program to serve as feedback mechanism for ensuring the program’s efficiency, effectiveness, and usefulness. While ATI intends to cover more areas of the country, there is a need to provide follow-up activities to previously trained farmers to determine the extent of translation of learnings into actual adoption, commercialization to enable farmers to become entrepreneurs, and address related concerns and problems.

3. Redesign of training program to include entrepreneurship, marketing, and business planning. Business, marketing, and certification are training aspects that are least provided to and attended by farmers. Focus on entrepreneurial and marketing skills and business orientation provides avenues for improving the incentive structure and thus commercialization of organic farming technologies. This requires close coordination with SUCs that offer management, economics, social preparation, and community organizing courses; and successful private organic farms to enhance the training modules of ATI and LGUs. The training modules should also include farm record keeping so that farmers can appreciate the importance of having updated farm records for proper budgeting, profitability analysis, and making sound decision-making in selecting the right commodity to produce and market.

4. Assessment of OA facilities and equipment provided through grants and donations. There is a need to evaluate the facilities provided by various agencies (DA, LGUs, and BSWM) and even NGOs such as shredder machines, composting facilities, techno-demo farms, and trading posts to see whether they are being used or not, what problems are encountered, how they can be used more effectively by the farmers and key market actors, which ones are most successful and those not serving their intended purpose and reasons, and whether these could be models for other areas. Impact indicators could be developed to ensure efficient use of public resources and accountability of program implementers.

5. Sustained support for strengthening cooperatives and farmers’ associations. Organizations such as ILOFA of Tayabas, KAKASA MPC, and other small cooperatives need full support to motivate them to embark on bigger scale of business operations. They require business development services including capital, market links, managerial and entrepreneurial skills, and business advisories, among others.

6. Towards more focused interventions, action-oriented research is necessary to nurture specific cooperatives and farm associations that show considerable promise, motivation, and interest but are constrained by limited material and human resources. An “adopt a cooperative/farm association for OA” program could be supported; for this purpose, one cooperative or association per province could be targeted.

7. Continuing conduct of hands-on training on production and postproduction practices/technologies for farmers/farm workers.

8. Results of the research study showed that many
of raw materials for organic fertilizers. While the PNS on organic fertilizer and the PNS on Organic Agriculture and Processing was clear on specifying inputs allowed, restricted, and prohibited, no separate standards were set for specific types of the least for compost, vermicompost, and vermicast. Having specific inputs, process, and product standards for the aforementioned OFs will minimize the variability of nutrient content (e.g., NPK) and efficacy of OFs available in the market. The standards should clearly specify the allowable raw materials, its close substitutes, and the raw material mix and volumes to achieve desired quality for a specific type of commercially available. If detailed standards are available, the variability and explorative nature of inputs utilization of manufacturers intending to go commercial can be minimized. OFs that failed to meet specified standards should not be allowed to be commercially traded. Likewise, managing raw materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients is necessary. Strict inspection of raw materials during manufacturing of organic fertilizers. Quality control is a must during the manufacturing process, and managing the quality of incoming raw materials can greatly improve operational performance, produce better quality OFs, and increase profitability. Rapid, in-situ, or through traditional analytical laboratory methods in the determination of the constituents and purity of raw materials must be conducted.

Procurement process of manufacturers does not include strict inspection of raw materials which leads to variability in OF produced. It was also observed during the interview that manufacturers do not have a complete audit trail for all organic inputs manufactured to trace any product suspected of contamination from point of origin to end-user. Traceability is one of the requirements for certification.

10. Standardized and monitored production process for organic fertilizers. Compost and vermin- based OFs practices should be described and clearly specified in the manufacturers' operations guide. Certifying bodies may allow the use of
OFs if they review the process and records and are assured that all standard requirements are met. Production records should include the type and source of all raw materials. None of the manufacturers surveyed seemed to be following this procedure. Manufacturers should also maintain temperature monitoring logs and document the practices used to achieve uniform elevated temperatures. The certified operation should also maintain a log of duration of process with a description of the practices used to achieve aerobic conditions and maintain adequate moisture necessary for commercial products. Furthermore, standardized OF production processes should also identify hazards that may arise in the production process in addition to the hazards in the use of final product.

11. Hardline information awareness campaign on product and process standards for commercial use of organic fertilizers. Effective information drive should be conducted for OF manufacturers with commercial intention. Local and international OF products and processes must be communicated to commercial manufacturers to ensure product consistency and quality.

12. Promotion in the use of EM activators and technologies in organic fertilizer production. Standards allow compost activation using appropriate plant-based preparations or use of EM activators to hasten decomposition. The adoption of these technologies, however, seemed to be low to moderate. Effective promotion of these technologies can allow manufacturers to save on production costs due to prolonged decomposition period. Stronger regulatory activities of FPA and BAFPS in the organic fertilizer market. The presence of non-registered producers offering their product in the market should be checked. Many commercial manufacturers seemed to be by-passing the two lead regulatory agencies in participating in the OF market. The FPA and BAFPS as the gatekeepers to the commercial OF market must be aggressive in monitoring the players in the industry, registered or not. If manufacturers are registered, FPA and BAFPS must see to it that registrations or provisional registrations are updated and call the attention of the manufacturer if already expired or expiring. If not registered, the attention of the commercial manufacturer to register and have its operation and product evaluated should be called. Appropriate legal actions must be used to regulate and ease out non-complying commercial manufacturers.

Adoption of PGS/ICS for small scale farmers who cannot afford the cost of certification. Cooperatives and farmers’ associations should continuously be supported and developed so that group certification of OA farmers can be made possible. Capacity building through trainings and access to markets and inputs must be provided to these farmers. For the inputs, strict quality control, monitoring of organic fertilizers and pesticides and development of a protocol for testing the efficacy of organic inputs should be undertaken. Furthermore, an organic seed industry must be developed.

13. Market linking for farmers. LGUs will play an important role to link the OA producers to organic markets. They must exert serious and strong support to OA, thus, the focal persons assigned should be functional and effective in carrying out this task. Furthermore, there should be a budget allotment in pursuing this goal. Strategies should be done to increase consumers’ awareness of organic products through appropriate IEC materials, multimedia promotion, and market testing via free samples. Farmers should also be
provided with support services to go into organic farming and marketing through input subsidy, establishment of a trading center/organic market day in strategic areas and for the DA/LGUs to conduct aggressive market promotion by sponsoring farmer-members of associations/cooperatives in joining trade fairs, exhibits, food caravans and festivals, among others.

Effective information dissemination. OA producers should be provided with information on certification, health and environment, adaptability, cultural practices, and botanical insecticides/pesticides used in organic farming. On the other hand, consumers must be informed where organic markets can be found, the prices, physical appearances of organic products, the health benefit, and how to identify organic products. Appropriate and effective communication strategies will be used to disseminate such information.

Addressing poor consumers' consumption of organic products. LGUs should encourage backyard gardening using the same technologies provided to OA farmers to make organic products available to the poor. The same mode of delivery using the LGUs' capabilities and resources should also be provided to this sector.

Continuous provision of adequate budget for the priority future research areas. The DA-BAR should continue providing financial support in conducting the suggested research areas to provide valuable information to the key stakeholders on how to enhance productivity, profitability and marketability of organic inputs and products in the organic farming sector.

**Technology(ies) Developed:**

- Benchmarks/best practices and value chain studies for organic rice, selected high value vegetables and bio-fertilizer/pesticides.
- Policy studies on issues and requirements relating to certification, labeling, product standards and trade of organic products including policy recommendations brief description of the technology(ies):
  - Documentation of best practices on organic agriculture for selected commodities through socio-economic surveys and review of available studies
  - Analysis of activities, key actors, value added and cost and return chain; constraints, possible interventions
  - Secondary data collection and consolations with private sectors/coops/government agencies/NGOs workshops.
  - Analysis of policy issues and requirements related to certification, labeling and product standard.
  - Formulation of policy recommendations.
Policy Support to Organic Agriculture: Rice and Vegetables in Selected Areas, Philippines

Implementing Agency: University of the Philippines Los Baños
Project Leader: Dr. Agnes Rola
Contact Details: agnesrola08@yahoo.com
Result Summary:
1. Data generated from 295 consumers of both rice and vegetables were knowledge, attitude, practice, perceptions, willingness-to-pay for organic products, and arguments on labeling of organic products. Perceptions and willingness to label their organic products were likewise gathered from farmers and traders.

2. Based on the estimated cost and returns, the pre-conversion farmers posted the highest net farm income followed by the certified organic farmers and then by the in-conversion farmers. There is not much difference between the farm gate prices of organic palay as compared with the farm gate price of conventionally grown rice. However, there is a price difference between the produce of In Conversion farmers which registered a P14/kg farm gate price. This is P3—4 lower than the farm gate price of palay of certified organic and pre-conversion farmers.

3. Farmers are willing to label their produce but they see it as a task that should be delegated to the association or cooperative. Farmer-respondents perceived that other activities related to marketing such as certification is the responsibility of the organization they are affiliated with and not theirs.

4. There was positive savings/cost or value of risk avoided by shifting from conventional farming to organic farming. In both provinces, quantification of the values of these externalities was done. In general, farmers were aware of the changes and the damages brought about by conventional farming but they could not grasp the idea that avoidance of these risks could actually translate to savings on their part or that money could be saved.

5. Overall, the market system for organic rice needs much improvement. Lack of information or awareness on organic products does not hinder potential entrants into organic rice marketing because of the information dissemination efforts of both government and non-government agencies. Barrier to entry remains in the form of certification. The high cost of certification together with the inadequate technical support in terms of having clear user-friendly guidelines on accessing subsidy for certification is major impediment for organic agriculture.

6. Both rice and vegetable consumers of organic products were willing to increase the quantity of organic food consumed as long as their quality improved, assured of no or less chemicals used during production, and with lower price. There were those who were not always available in the locality. Thus when organic rice and vegetables or organic food in general would have cheaper price and made always available in the locality, these non-willing consumers may be inclined to go organic.

7. Findings also showed that the process of certification was a constraining factor, as the certifying bodies are far from the farmers. The process of certification is too expensive and the duration of being certified is too short. It is recommended that a manual of certification be formulated, so farmers will know what data and procedures will be needed in the process. There is a demand for more certifying bodies and strategies or ways to minimize the cost of certification is also needed.

Technology(ies) Developed:
- Policy recommendation to support the adoption of organic farming technologies and consumption of organic products

Brief Description of the Technology(ies):
A strong policy support to understand in more operational terms the policies that may be needed to sustainably support the organic agriculture converts as well as to determine further what needs to be done for farmers to get converted to OA. This will address especially the production, market, and regulatory challenges faced by the organic agriculture sector. These would also be of help to the industry’s stakeholders in responding to the desires and demands of consumers. This will also serve as inputs in the planning and formulation of policies for further development and improvement of the industry.
Gearing Up Sustainable Agriculture with Organic Farming for the Global Market

Organic Farming for Healthy Communities and Environment

The drive towards healthy and environmentally-friendly farm practices protecting human communities and biodiversity will remain an elusive pursuit in sustainable agriculture in the Philippines if not for the intensified advocacy of organic farming through the enactment of Republic Act No. 10068, otherwise known as the Organic Agriculture Act of 2010.

Sustainable agriculture intends to reverse high chemical input agricultural practices to a more natural means that promotes and enhances agro-ecosystems, health, including biological cycles and soil biological activity which organic farming systems can fulfill. Organic farming relies on crop rotations, crop residues, animal manures, legumes, green manures, off-farm wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity, to supply plant nutrients and to minimize insects, weeds.

About the Project

The benefits of organic agriculture are recognized by both the government and farmers, but farmer adoption was seen to be slow due to policy and institutional constraints. These constraints include limited support to organic production inputs, lack of market information, low competencies in organic production, limited knowledge on national regulations, and limited skills on internal quality control systems. This research aimed to understand in more operational terms the policies that may be needed to sustainably support the organic agriculture technology adoption. The results would be useful in addressing production, market and regulatory challenges faced by the organic agriculture sector as well as provide information for industry’s stakeholders in responding to the desires and demands of consumers. Outputs of this research would serve as inputs in the planning and formulation of policies for further development and improvement of the industry.
TECHNOLOGIES COMMERCIALIZED
Commercialization of Vermiculite-based Low-spaced Soilless Growing Medium in the Promotion of Urban Organic Gardening for Primary and Secondary Public Schools

Implementing Agency: Tree Care and Maintenance Services Foundation, Incorporated
Project Leader: Dr. Elpidio L. Rosario
Contact details: (049) 536-0054/ (049) 536-5536
Commodity: Selected vegetables (lettuce, tomatoes) and herbs

Result Summary:
1. Demo and nursery site development which featured the planting modules (structural and container) and a variety of crops (vegetables, herbs, spices, medicinal and flowering plants) located in Los Baños, Laguna
2. Tested and applied the use of five structural
modules such as A-frame, straight layered type, cage type, vertical ladderized type, and top-down type
3. Tested and applied the use of container modules like recycled plastic containers and designed and developed self-watering containers for crop growth
4. Manage and maintained more than 20 different vegetables, herbs, spices, medicinal and flowering plants for distribution and demonstration purposes
5. Completion of 10 collaborative agreements with selected schools in Cavite, Laguna, Batangas, Rizal and Quezon
6. Management and maintenance of pilot 10 school demo sites with appropriate modules installed
7. Training of 45 teacher trainors from collaborative schools
8. Distribution of an initial 500 planting kits for each collaborating school
9. Development of three techno demo guides
that were distributed to schools and other local agencies.
10. Attendance of the project for two successive years (2013 and 2014) in the CALABARZON DepEd program of Brigada Iskwela where the collaborating schools were distributed with (100 kilos each) of the planting media, organic fertilizer, seeds and planting containers
11. Participation to seminars/exhibits sponsored by the government and private agencies and institutions that would enhance the commercialization potential of the project

Technology(ies) Developed:
- Vermiculite-based, low-spaced soil less urban gardening
Brief Description of the Technology(ies):
Promotion of vermiculite-based low-spaced soil less urban gardening as a vehicle for fostering consciousness and active involvement of the primary and secondary public school children in the 'green movement' and promoting healthy eating habits for improve nutrition particularly among the youth in the CALABARZON areas.

Vermiculite has the following benefits in agriculture:

a.) pH is essentially neutral (7.0);

b.) Improves soil aeration and makes a light open compost;

c.) Retains moisture;

d.) Retains added nutrients to feed roots and

e.) Possesses useful cation exchange properties.
Development of Organic Feeds for Broiler Chicken and Duck Layer in Region 3

Implementing Agency: Pampanga Agricultural College
Project Leader: Dr. Norman de Jesus
Contact details: normandejesus2005@yahoo.com.ph / 0928 550 2561
Commodity: Broiler chicken and duck layer

Result Summary:
1. Produced organic feed ingredients
2. Nutrient profile of feed ingredients
3. Formulated rations
4. Prepared organic broiler feed mixture
5. Conducted broiler chicken trial (first phase)
Technology(ies) Developed:
- Organic feeds feeding system for chicken meat and duck egg production

Brief Description of the Technology(ies):
Development of organic feed mixture from organically-produced indigenous feed resources such as adlai, rice bran, sorghum, snail meal, vermin worm meal, azolla meal, malunggay leaf meal, and coco oil.
Implementing Agency: Southern Luzon State University - Judge Guillermo Eleazar
Project Leader: Mr. Cesar L. Nazareno
Contact Details: caringalailyn@gmail.com, cathyfajardo19@yahoo.com
Commodity: herbs and spices

Result Summary:

a. Established demonstration farm and garden for herbs and spices
b. Identified herbs/spices found at market stalls/ households
c. Procured seedlings/ cuttings from Manila Seedling Bank, Quezon City
d. Established herbs/spices in plots/ beds
e. Maintained good growth of herbs/ spices
f. Trained herbal Processor and adopters
g. Developed herbal soap, cream and ointment
h. Linkage with Green Bread Pizza Parlor
i. Demo-Farm become the supplier of herbs/ spices of Green Bread Pizza
j. Increased number of herb/ spices growers
k. Additional information on herbs and marketability of herbs and spices
l. Produced Technoguide
Technology(ies) Developed:
● Production and processing technologies for herbs and spices

Brief description of the Technology(ies):
Production and processing of ready-to-use herb/spices for curing light sickness or ailment as well as for ingredient to process products that could be a source of additional income for those who have adopted the technology.
Implementing Agency: Center for Environmental Law & Policy Advocacy Inc.
Project Leader: Dr. Roberto V. Oliva
Contact Details: celpincorporated@gmail.com
Commodity: varieties of lettuce, cabbage, sweet potato, sayote and radish, lettuce, sitaw, okra, ampalaya, carrots, and kalabasa

Result Summary:
a) Training activities were done for farmer cooperators in Dolores and General Nakar, Quezon regarding Agroforestry.
b) Monitoring and evaluation were done to assess the progress of the project.
c) Farmers remained active in their demo-farms during the first and second cropping seasons.
d) Farmer groups in both sites were able to prepare and apply their own organic inputs using Effective Microorganisms (EM) technology.
e) Farmer cooperators were able to sell their produce to the market and it had increased their income.
f) Farmers from adjacent communities began to recognize shifting to the organic production practices.

Technology(ies) Developed:
● Organic farming/ Agroforestry

Brief Description of the Technology(ies):
Promotion of OA with the use of organic inputs in communities of Quezon and optimization the value of existing idle lands by using them for agricultural or agroforestry purposes to provide livelihood opportunities and promote food security in the community.
Promotion of Organic Farming and Protective Structure Technology for High Value Vegetable Production

Implementing Agency: Center for Environmental Law and Policy Advocacy, Inc.
Project Leader: Dr. Araceli T. Oliva
Contact Detail: celpaincorporated@gmail.com
Commodity: High value vegetables

Result Summary:
1. Assisted farmers in the formulation of their Marketing Plan for their production especially where to channel their products and sell at reasonable prices
2. Ventures with Costales Nature Farms in Majayjay, Laguna and Eaglepoint Resort, Batangas
3. Certification of the project sites by standard certifying entities in organic farming.
4. Investment for additional greenhouses to address weather disturbances and sustain higher yields
5. Assistance in value-adding and processing facility construction to address issues on perishability and over-supply
6. Integrating other farm-based opportunities, e.g., livestock and free-range chicken
Technology(ies) Developed:
- Organic vegetable production

Brief Description of the Technology(ies):
- Use of protective structure technology, organic fertilizers, pesticides and herbicides for organically grown vegetables
Adoption and Utilization of Organic Arabica Coffee-Coconut Intercropping Technology (ACCIT) in the Municipality of San Teodoro, Oriental Mindoro

Implementing Agency: MLGU San Teodoro
Project Leader: Hon. Apollo Feraren
Contact Detail: santeodoro_ormin@yahoo.com.ph
Commodity: Coconut and coffee

Result Summary:
1. Establishment of demo farm for the production of organic Arabica coffee
2. Rehabilitation of coconut farms
3. Capacity building of indigenous peoples and upland farmers
4. Technology promotion and dissemination
Technology(ies) Developed:
- Coconut-coffee production technologies

Brief Description of the Technology(ies):
Rehabilitation of existing coconut farms being managed by IPs/upland farmers and introduction of organic coffee production intercropped with coconut.

Establishment of organic Arabica coffee demo farms in at least 18 hectare-IP communal area in Barangays Calangatan, Caagutayan/Bigaan, and Calsapa
Development of Organic Upland Rice-based Farming Systems in Laguna Sierra Madre

Implementing Agency: Center for Environmental Law & Policy Advocacy, Inc.
Project Leader: Dr. Araceli T. Oliva
Contact Detail: celpaincorporated@gmail.com
Commodity: Rice

Result Summary:
1. Conducted seminars on vermiculture and use of effective microorganisms
2. Conducted variety trial involving 6 native varieties and 3 improved varieties
3. Tested organic fertilizers such as, vermicompost, EM, Oneder N, and combinations thereof and dolomite lime
4. Encouraged farmers in planting upland rice
5. Encouraged formation of farmer cooperatives.
6. Identified best farm management practices for upland rice
7. Established of demo farms showcasing organic upland rice based farming system, including farm trials
8. Constructed of farm sheds which served as venue for farmers meetings, seminars and trainings

**Technology/ies Developed:**
- Upland rice production

**Brief Description of the Technology(ies):**
Development of organic upland rice based farming systems that will formulate, advocate, and implement organic upland agriculture and livelihood activities that will facilitate the transformation of exploitative and extractive land use system into a more permanent, carrying-capacity enhancing and sustainable livelihood system
Processing Technology Development and Utilization for Organically Grown Arius Fruits
Implementing Agency: Batanes State College
Project Leader: Mr. Djovi Durante
Contact Detail: djovi_durante@yahoo.com
Commodity: Arius

Result Summary:
1. Processing materials and equipment including packaging materials are procured
2. Processing of arius products
3. Products’ chemical analysis taken; shelf life duration is taken
4. Marketing of products are determined
5. Housewives are trained to adopt the technologies

Technology(ies) Developed:
- Arius processing production technologies

Brief Description of the Technology(ies):
Development of various product lines (arius wine, pastillas, tart, and jam) from organically grown arius fruits.
Site-specific Evaluation of Sweet Sorghum Organic Production for Food, Feed, and Fiber

Application of vermicompost on the furrows of replication plots

Implementing Agency: University of the Philippines
Los Baños Foundation Inc.
Project Leader: Prof. Rex B. Demafelis
Contact Detail: rbdema@yahoo.com
Commodity: Sweet sorghum

Result Summary:
Organic agriculture has been promoted in the Philippines to provide safe produce for the consumers. It is depicted as a farming system free from the use of inorganic or chemical applications in all production and postharvest activities such as fertilization, pest and disease management, and seed treatments. Sweet sorghum has been known and grown solely for the production of bioethanol however, it is also an excellent crop in an existing farming system. Aside from the economic value
taken from the stalks, the grains from the panicles can be processed as cakes and other food products. The juice can also be processed to become syrup and vinaigrette. As food, feed and fodder, sweet sorghum has been studied for organic production and its management for different farming system.

The project took off from planning workshop to properly layout the conduct of the study. This was attended by the co-operators, LGU’s and the research team which discussed the technical requirements of the trials and laid the procedure for the study. The research protocol and schedules of the activities for each trial site were developed.

The organic sweet sorghum production for monocropping (case study 1) with different soil amendments (Inorganic Recommended Rate, Vermicompost, and Organic Foliar Fertilizer) was conducted in four areas namely: Sagay City, La Carlota City and Kabankalan City in Negros Occidental, and Barotac Viejo in Iloilo. Intercropping for different populations with pigeon pea (case study 2) was conducted in IPB, Laguna. Each area was replicated thrice in Randomized Complete Block Design (RCBD) with a total area of 2,500 sq.m. vegetative and yield data were collated and analyzed using 5% level LSD.

1. Pre-planting activities including land preparation, soil sampling and analysis were performed. Planting in trial sites was conducted in different dates due to the coming of a typhoon. Recommended planting distance and

Preparing the organic foliar fertilizer and spraying using a knapsack sprayer
maintenance practices were properly observed while integrated pest and disease management was implemented through the use of organic and cultural control measures. Harvesting was done manually and data were collected according to the set research protocols from all experimental areas.

2. Organic production was made possible through the help of LGUs, local farmers and collaborators. Plant crude extracts was used to control pests and diseases, and local control to manage bird infestation. However, the full extent of its potential for organic production was limited due to the early onset of summer and passing of typhoons. Plants in Kabankalan City were stunted and flowering started earlier due to short days, thus it cannot proceed to ratoon cropping.

3. Organic fertilizers (compost and foliar) affected the earlier germination of sweet sorghum plants. However, inorganic application affected later stages of the sweet sorghum plants. This result was consistent in all mono-cropping areas.

4. The project provided social development through various local community visits, farm demos and face-to-face interactions with farmers and entrepreneurs. Health and economic appraisals were achieved through the use of sound integrated management practices and postharvest activities.

Technology(ies) Developed:
- Evaluation of the viability of organic sweet sorghum production in three areas.

Brief Description of the Technology(ies):
Conduct of sweet sorghum organic plantation trials and study of the agronomic performance of sweet sorghum using organic inputs in terms of stalk and seed yield and sugar content that will generate additional income for farmers and to contribute to health, social development, and environmental restoration and/or protection.
Technology Utilization of Fermented Coconut Coir Dust Silage for Fattening Heifers and Steers
Implementing Agency: Pangasinan Goat and Sheep Raisers Association
Project Leader: Mr. Edgardo P. Paningbatan
Contact Detail: 0929 780 5991 / 0916 774 6161
Commodity: Cattle

Technology(ies) Developed:
- Coconut coir dust silage as feed

Brief Description of the Technology(ies):
- Combination of coconut coir dust with organic concentrates and then ensiled using probiotic ESILAC to produce high value, palatable, nutritious, and inexpensive organic roughage for cattle.

Result Summary:
1. Production of ensiled roughage and concentrates to fatten feeder cattle organically
2. Commercialization of ESILAC liquid probiotic for feeder cattle ensiled feed
3. Renovation and construction of feedlot facilities for raising organically grown cattle and beef
4. Selection and purchase of cattle feeder stock and monitoring of fattening activities

Technology Management for Competitive Agriculture and Fisheries Sector
Title: TECHNOLOGY UTILIZATION OF FERMENTED COCONUT COIR DUST SILAGE FOR FATTENING HEIFERS AND STEERS
Implementing Agency: ED PAPA FARM, PANGASINAN GOAT AND SHEEP RAISERS ASSOCIATION (PAGSRA)
Location: BAGY, HRALIW NORTE, BAUTISTA, PANGASINAN
Funding/Collaborating Agencies:
- Department of Agriculture—Bureau of Agricultural Research
- National Agricultural and Fishery Council
- Japan Official Development Assistance

(National Technology Commercialization Program)
Developing the Potential of Native Pigs for Organic Meat Production
Implementing Agency: University Of Rizal System
Project Leader: Dr. Virgie Callo-Etis
Contact Detail: vncallo@yahoo.com
Commodity: Native Pig

Result Summary:
1. Establishment feed resource base for native Pigs
2. Evaluation of the feeding value of some local feedstuffs
3. Feeding experiments on native pigs with Trichantera and gabi

Brief Description of the Technology(ies):
Evaluation of local feedstuff and identification of best feeding scheme for native pigs that would give the best quality of organic meat and would have the most efficient return

Technology(ies) Developed:
Adoption and Utilization of Nipa Palm Sugar Processing Technology (NPSPT) in the Municipality of Lanuza Surigao del Sur
Implementing Agency:  Foundation for Rural Enterprise and Ecology Development of Mindanao Inc.

Project Leader:  Mr. Antonio Peralta

Contact Detail:  aperalta38@yahoo.com / aperrta@freedom41ipc.org / 09189656901

Commodity:  Nipa palm

Result Summary:
1. Nipa Palm Sugar samples were produced for content testing with the Department of Science and Technology. This indicated a favorable finding of the physical properties of the samples. Samples were also displayed, demonstrated, and sold during the Davao Agri Trade Expo, which is also the provincial foundation day of Surigao del Sur.

2. The crop technoguide serves as a step by step process on the harvesting of nipa sap and its conversion to nipa syrup and then to nipa palm sugar. This ensures that production standards are observed.

3. The support of the community on the implementation of the project is manifested by the resolutions received from the LGU of Lanuza and Barangay Agsam.

4. The sustainability of the project can be seen with the adoption and implementation of Sitio Ipil Winemakers Association (SIWA) of the trainings imparted to them.

Technology(ies) Developed:
• Nipa palm sugar production

Brief Description of the Technology(ies):

Proper tapping techniques, preparation and handling of nipa sap and nipa syrup conversions, and preparation of nipa palm sugar production, using production standards.
R&D FACILITIES
DEVELOPMENT GRANT
PROJECTS
Upgrading of the Existing Bio-organic Fertilizer R&D and Production Facility
Potia, Alfonso Lista, Ifugao

Proponent Agency: Ifugao State University
Project Leader: Mr. Joseph Ngohayon
Contact Details: (0929) 723-2361 or (0935) 319-8927
Date Started: November 10, 2011
Date of Completion: November 12, 2012

Objectives:
General
To promote organic agriculture in the Cordillera Administrative Region (CAR) and in the central parts of Region 2

Specific
1) To upgrade the existing IFSU bio-organic fertilizer facility;
2) To increase the production facility’s production volume to at least 50%;
3) To increase the number of farmers using bio-organic fertilizer;
4) To serve as venue for instruction, research, and extension of the state universities and colleges (SUCs);
5) To serve as an additional source of income of IFSU; and
6) To create employment opportunities for the community.
Intended Beneficiaries:
- Researchers
- Students
- Local government units (LGUs)
- Farmers

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Students’, farmers’, and other stakeholders’ venue for practicum and field study
   - Promotion of diversified/multiple cropping in Ifugao; bio-organic fertilizers will be provided to farmers to be used in the provided vegetable seeds and fruit tree seedlings so as to ensure good crop standings
   - Fertilizers, seeds, and seedlings will be provided to farmers following repayment schemes
   - Significantly increase production and ensure product availability upon farmers’ demand
Construction of the Cagayan Valley Integrated Agricultural Laboratory Services
Government Center, Carig, Tuguegarao City, Cagayan

Proponent Agency: Department of Agriculture-Regional Field Office II
Cagayan Valley Integrated Agricultural Research Center
Project Leaders: Ms. Lovelyn Gaspar and Engr. Generoso Oli
Contact Details: (0917) 502-7915
Date Started: December 1, 2011
Date of Completion: November 6, 2013

Objectives:

General
To establish a one-stop shop and harmonize laboratory services to increase production and ensure high quality and biosafety of agricultural products in Region 2 for local consumption, processing, and export.

Specific
1) To facilitate the delivery of required diagnostic services, analyses and recommendations to various stakeholders from the crops and livestock industry;
2) To institute a cost efficient agricultural laboratory services to all target clientele; and
3) To strengthen partnership between and among the DA-RFO 02 laboratories, LGUs/SUCs/NGOs, and entrepreneurs/private sector.
Intended Beneficiaries:
- Researchers
- SUCs
- Farmers
- LGUs
- Entrepreneurs/private sector

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
- Integration of the different laboratory services highlights the plans and systematic actions of the DA-RFO II to assert its economic advantage and competitiveness in providing quality assurance and safety on all of the region's agricultural produce for the domestic and international markets.
- Comprehensive and state-of-the-art R&D facility that would mobilize the provision of various diagnostic services, analyses, and recommendations both for plants and animals from pre-production, processing, and marketing to ensure product quality, consumer safety, and environmental protection.
Upgrading of Existing Bio-organic Fertilizer Demonstration Farm and Productivity Facility
Mayon, Castilla, Sorsogon
Proponent Agency: Sorsogon State College
Project Leaders: Dr. Antonio Fuentes, Mr. Miguel Guarin and Engr. Oscar Peter Pascual
Contact Details: (056) 211-1869 or 1845 or (0928) 230-3981/opa_ssc@yahoo.com.ph
Date Started: December 6, 2011
Date of Completion: December 5, 2012

Objectives:

General
To promote climate change mitigation/adaptation through waste recycling by upgrading the capability of SSC-Castilla Campus in promoting organic farming.

Specific
1) To increase local farmers’ awareness on organic farming;
2) To supply the material needs of organic farmers in the area;
3) To help in promoting appropriate waste management practices;
4) To serve as venue for instruction/seminar/training; and
5) To generate technology/guidelines on the utilization of organic fertilizers in major crops in the area.

Intended Beneficiaries:
- Researchers
- Students
- LGUs
- Farmers

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
- The bio-organic fertilizer facility and demo farm will be utilized for production, technology showcasing, and training of students, farmers, and other stakeholders.
Establishment of a Research and Development Center for Heirloom Rice in Mountain Province

Bontoc, Mountain Province

Proponent Agency: Provincial Government of Mountain Province
Project Leaders: Mr. John Likigan and Ms. Jovita Camso
Contact Details: (0930) 277-5356
Date Started: December 13, 2011
Date of Completion: November 30, 2012
Objectives:

General
To establish an R&D center for heirloom rice in Mountain Province to generate specific interventions to help the farmers increase their productivity and income.

Specific
1) To construct a building that will serve as research office, seed bank/storage, and processing center for heirloom rice by 2012;
2) To establish a center and technical working group in the province to closely work with other government/non-government agencies and farmers for the conduct of researches and other production interventions; and
3) To help increase the yield of heirloom rice, from 2.5 t/ha to at least 3.5 t/ha by 2014 and onwards.

Intended Beneficiaries
- Researchers
- Farmers
- LGUs

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - It will help increase the yields of heirloom rice varieties to meet the demand of local and global markets.
Establishment of Bio-organic Fertilizer Demonstration Farm and Production Facility
Salcedo, Eastern Samar

Proponent Agency: Eastern Samar State University
Project Leader: Dr. Apolonio Machica
Contact Details: (0915) 830-3385/essu_salcedo@yahoo.com
Date Started: December 13, 2011
Date of Completion: March 1, 2013

Objectives:

General
To assist the national government in implementing productivity-enhancing programs to propel economic development by alleviating poverty in the countryside

Specific
1) To showcase bio-organic farming in ESSU;
2) To establish a bio-organic production facility in ESSU;
3) To transform farmers, barangay and municipal key officials, and agricultural development key players into advocates and promoters of bio-organic farming to other individuals in their respective barangays or communities by providing them with skills and know-how on soil conversation methods, sustainable production techniques, and soil fertility management through capability-building activities or similar teaching-learning modes;
4) To sustainably produce bio-organic fertilizer and make it available to farmers or consumers at reasonable price; and
5) To create tie-ups with rural farmers, fruit-vegetables producers, barangay and municipal key officials, and agricultural development key players for stronger linkaging activities and cooperative ventures concerning bio-degradable waste management system, bio-organic fertilizer utilization, and marketing.

Intended Beneficiaries:
- Teachers/professors
- Agricultural development key players
- Barangay and municipal key officials
- Students
- General public

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - A half hectare vegetable farm to showcase bio-organic farming technologies to students, farmers, and other stakeholders
   - The bio-organic fertilizer production facility will cater to the needs of the community or province.
   - Capability trainings/workshops on bio-organic fertilizer production, soil conservation and fertility management will be conducted for students, farmers, barangay and municipal key officials, agricultural development key players, and similar beneficiaries in the province.
Intensifying the Solid Waste Management Project in Support to Organic Farming in Quirino
Diffun, Quirino

Proponent Agency: Quirino State College
Project Leaders: Prof. Fredisminda Dolojan and Ms. Marissa Hernandez
Contact Details: (078) 694-7066 or 7060
Date Started: February 1, 2012
Date of Completion: February 6, 2013

Objectives:
General
To intensify the existing solid waste management program and increase the production of organic fertilizer in Diffun, Quirino
Specific
1) To enhance tie-up between the college and municipal LGU on solid waste management and in turn make sustainability of such endeavour possible;
2) To reinforce the holistic and integrated approach through linkage with other solid waste management implementing agencies to address the solid waste management problems in Diffun, Quirino to mobilize the people to engage and promote the hierarchy of waste management-reduce, reuse, recycle, and recover;
3) To disseminate economic and social benefits of utilizing organic fertilizers to students and farmers and to encourage farmers to venture into organic farming to increase their yield;

4) To open an opportunity to townfolk by engaging them in an environment-friendly, income-generating business using waste materials;

5) To secure license from the Fertilizer and Pesticide Authority for the commercial production of organic fertilizer and to increase the local supply of organic fertilizers;

6) To improve the economic status of the province especially its agriculture sector; and

7) To generate additional income for QSC.

**Intended Beneficiaries:**
- Researchers
- Students
- LGUs
- Farmers
- Entrepreneurs

**Contribution to one or all of the following:**

1) R&D System, 2) AF Industry, and 3) AF Modernization

- Provision of researchable areas in organic farming both for students and faculty researchers
- Enhancement of sustainability of the collaborative solid waste management program with the LGUs thus enhancing continuous tangible partnership
- Strengthening the research and extension arm of QSC by generating tangible data and establishing demonstration farms utilizing locally produced organic fertilizer
Upscaling NVSU Regional Vermicomposting and Vermmimeal Production Center (RV²PC)
Bayombong, Nueva Vizcaya

Vermicomposting and Vermmimeal Production Center

Proponent Agency: Nueva Vizcaya State University
Project Leader: Mr. Elmer Castañeto
Contact Details: (078) 321-2112 or (0999) 344-8105/ elmercastaneto@yahoo.com
Date Started: May 1, 2012
Date of Completion: May 8, 2013

Objectives:

General
To strengthen the current capability of the RV²PC through improved research, extension, and production in collaboration with other line agencies of the government

Specific
1) To increase quality production;
2) To acquire multi-purpose shredder;
3) To construct concrete shed;
4) To have product accreditation and certification; and
5) To establish a strong research program on organic fertilizer production and on-farm trials.

Intended Beneficiaries
- Researchers
- Students
- LGUs
- Farmers
- Entrepreneurs

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Techno-demo, training, and information service facility of the region
   - Venue for on-the-job training students
Development of protocol and production technologies (techno guide) on the use of vermi-based fertilizer in rice and vegetable production

Comparison and evaluation of the performance of vermi-based organic fertilizer with the commercially known brands of organic fertilizer in terms of production and profitability

An answer to the rising cost of agricultural inputs and wanton degradation of the environment
Establishment of an Integrated Organically Grown Crops and Livestock (A Techno Demo)
Ampayon, Butuan City, Agusan del Norte

Proponent Agency: Caraga State University
Project Leader: Dr. Tomas Austral
Contact Details: (085) 342-1079
Date Started: May 23, 2012
Date of Completion: June 1, 2013

Objectives:
General
To serve as an OA model farm in support of R&D
Specific
1) To increase the number of faculty members and students conducting research on OA;
2) To produce new technology and farming system approach using organic crops and livestock;
3) To promote and sustain productivity using organic farming system; and
4) To produce organically grown crops and livestock.
Intended Beneficiaries:
- Researchers
- Students
- Faculty members
- LGUs
- Farmers
- Entrepreneurs
- NGOs

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - It will serve as a School for Practical Agriculture (SPA)
   - Promotion of organic farming practices in crops and livestock in Caraga and its neighboring provinces
   - Development and dissemination of IEC materials on OA
   - Generation of researches on organic farming system in terms of experimental, socio-economic, and environmental aspects from faculty members and students
Improvement of the STIARC's Vermicomposting Facility in Support of Organic Agriculture Program
DA-STIARC, Maraouy, Lipa City, Batangas

Proponent Agency: DA-RFO IVA-Southern Tagalog Integrated Agricultural Research Center
Project Leader: Ms. Digna Narvacan
Contact Details: (0917) 836-1958 or (043) 756-4962
Date Started: September 3, 2012
Date of Completion: September 2, 2013

Objectives:
General
To develop and promote OA through vermicomposting.
Specific
1) To recycle plant and animal waste in making vermicompost;
2) To produce purely organic fertilizer from vermiculture; and
3) To promote community-based OA system for use and processing.
Intended Beneficiaries:
- Researchers
- Students
- Farmers
- Extension workers

Contribution to one or all of the following:

1) R&D System, 2) AF Industry, and 3) AF Modernization
- Construction of a 400-m² facility to accommodate composting activities at the Lipa Agricultural Experiment Station (LAES)
- Biodegradable waste materials from LAES and other sources will be composted to provide organic fertilizers for farmers thus reducing the cost of inputs
- Venue for field study of students, farmers, and other stakeholders
Upgrading of Organic Vegetable Research Facilities
Institute of Plant Breeding, UPLB, Los Baños, Laguna

Proponent Agency: University of the Philippines Los Baños Foundation, Inc.
Project Leader: Dr. Rodel Maghirang
Contact Details: (047) 536-5287/rgmaghr@yahoo.com
Date Started: November 21, 2012
Date of Completion: November 22, 2013

Objectives:

General
To increase organic vegetable and seed production and development of low external input production systems

Specific
1) To continue organic vegetable production through varietal selection and seed production for organic growers; and
2) To help the organic growers enhance their capability to produce their own organic vegetables and seeds with low external inputs.

Intended Beneficiaries:
- Researchers
- Students
- Farmers

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   > Concreting of research facilities and construction of greenhouse for the development of organic vegetable seed production in the country
Establishment of RM-CARES Organic Farming Training Center
CLSU Compound, Science City of Muñoz, Nueva Ecija

Proponent Agency: Central Luzon State University
Project Leader: Dr. Fe Porciuncula
Contact Details: (044) 456-7315
Date Started: December 7, 2012
Date of Completion: December 9, 2013

Objectives:
General
To establish an organic farming training center to help build competencies and positive attitude of stakeholders towards organic farming in Nueva Ecija as well as in the Central Luzon Region and to promote organic farming and developing enterprises

Intended Beneficiaries:
- Researchers
- Students
- LGUs
- Farmers
- Extension workers

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
  - Provision of training to all stakeholders in organic farming and enterprise development
Establishment of Mushroom R&D Technology Center in Support to Organic Agriculture at Central Luzon
Paraiso, Tarlac City, Tarlac

Proponent Agency: DA-RFO III-Central Luzon Integrated Agricultural Research Center
Project Leaders: Dr. Irene Adion and Ms. Emily Soriano
Contact Details: (0922) 826-7317 or (0916) 279-1596 or (045) 985-1256
Date Started: February 1, 2013
Date of Completion: February 4, 2014

Objectives:
General
To provide an R&D facility to improve the implementation of regional research, development and extension agenda and programs in Central Luzon
Specific
To establish a state-of-the-art mushroom laboratory with offices, training/audiovisual rooms, and showroom

Intended Beneficiaries:
- Mushroom producers/processors/consumers

Contribution to one or all of the following: 1) R&D System, 2) AF Industry, and 3) AF Modernization
- Establishment of a one-stop shop on mushroom production, processing, and utilization
- Provision of venue for trainings, meetings, and seminars of mushroom enthusiasts
- Provision of planting materials for beginners in mushroom production for demonstration/learning activities
- Accessibility of market information and updates about mushroom and its products
- Establishment of a mushroom product display and mushroom cafe'
Proponent Agency: Isabela State University
Project Leader: Dr. Artemio Martin, Jr.
Contact Details: (078) 305-9219 or (078) 305-9120 or (0926) 324-4297/jhun6273@yahoo.com
Date Started: March 1, 2013
Date of Completion: March 5, 2014

Objectives:
General
To advocate the various researches on efficient utilization and management of agricultural wastes by developing quality and nutrient-enriched organic fertilizers to the farmers to sustain their organic farming activities

Specific
1) Develop quality and nutrient-enriched organic fertilizer using agricultural wastes as major substrates;
2) Evaluate the efficiency of the developed organic fertilizer on various test crops;
3) Assess and monitor the change in the soil properties (physical, chemical, and biological) and organic matter content when applied with the manufactured organic fertilizer;
4) Conduct field demonstrations in various locations in the region using their flagship commodities/crops as experimental plants;
5) Prepare IEC materials and conduct advocacy campaign on organic fertilizer production and organic farming as an adaptation strategy for climate change; and
6) Train farmers on organic fertilizer production using their farm wastes

**Intended Beneficiaries**
- Farmers
- Students
- Faculty members
- Researchers

**Contribution to one or all of the following:**
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Development of quality organic fertilizer for the farmers in the region
   - Enhancement of scientific research capabilities of students, faculty and staff members, and other stakeholders and improvement of the laboratory and sustainable and cost-effective strategy of managing farm and animal wastes while improving soil fertility and enhancing soil productivity
   - Reduction of dependence on chemical fertilizers and improvement of the quality of agricultural products
   - Addresses issues on soil productivity enhancement, food security, and poverty alleviation
Upgrading and Expansion of the PAC Microbiology Room into Biotechnology Laboratory in Support to Organic Agriculture
Magalang, Pampanga

Proponent Agency: Pampanga Agricultural College
Project Leader: Dr. Jacqueline Bagunu
Contact Details: jack_res@yahoo.com
Date Started: March 1, 2013
Date of Completion: March 7, 2014

Objectives:
General
To facilitate the conduct of researches on organic agriculture of faculty members and students that entail basic biotechnology techniques as well as agri-biodiversity procedures

Specific
1) To serve as a service laboratory that caters to the needs of students, faculty members, and researchers from other institutions; and
2) To operate as a self-liquidating, self-sustaining laboratory after some time that it has been established.

Intended Beneficiaries:
- Faculty members
- Students
- Researchers
- Technicians

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
- Utilization of biotechnology tools on agricultural resources
- Upgrading of laboratory services and equipment which are fast and readily available to clientele
- Quality research outputs and products available for R&D/E packaging
- Establishment of a self-sustaining/self-liquidating laboratory catering to the needs of varied academicians, researchers, and technicians
Establishment of an Organic Agriculture Training Center
Ampayon, Butuan City, Agusan del Norte

Proponent Agency: Caraga State University
Project Leader: Dr. Tomas Austral
Contact Details: (085) 342-1079
Date Started: March 12, 2013
Date of Completion: August 30, 2016

Objectives:

General
To produce technological innovation and creative works on OA as support for R&D

Specific
1) To conduct technology transfer and provide information on OA through trainings, seminars and workshop;
2) To provide a venue to showcase (showroom) organic products and market organically grown products; and
3) To provide additional income to the university by renting the said facility for its operation and maintenance.
Intended Beneficiaries:
- Researchers
- Students
- Faculty members
- LGUs
- Farmers
- Entrepreneurs
- NGOs

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Increase the number of trainings/seminars/workshops on OA
   - Agricultural products will be showcased and promoted thru the product showroom/one-stop shop inside the training center
   - Increase the number of private and government sectors practicing OA
   - Increase the number of students exposed to OA principles through the demo farms
Establishment of Vermi Composting Facility in Butuan City
Brgy. Taguibo, Butuan City, Agusan del Norte

Proponent Agency: City Government of Butuan
Project Leader: Ms. Gertrudes Fortun
Contact Details: (085) 341-1085 or (0947) 896-5752
Date Started: May 24, 2013
Date of Completion: May 27, 2014

Objectives:

General
To facilitate the mainstreaming of vermi-composting in the promotion and development of organic agriculture in Butuan City

Specific
1) To empower farming communities through R&D;
2) To strengthen the control of farming communities over resources and technologies such as vermiculture as a means of producing organic fertilizer;
3) To establish a stable and quality source of vermiworms for farmers in Butuan City;
4) To establish a certified and sufficient source of biodegradable materials for vermicomposting of plant origin serving the demand requirements of the vermiculture industry in Butuan City;
5) To link with institutions in other regions with researches on the promotion and development of vermiculture/vermicomposting; and
6) To be able to provide all other project links with ground and homogenously mixed substrates to feed the worms.

Intended Beneficiaries
- LGUs
- Farmers

Contribution to one or all of the following:
1) R&D System, 2) AF Industry; and 3) AF Modernization
   - It will mainstream vermicomposting for the promotion and development of organic agriculture in Butuan City.
Establishment of R&D Center for Organic Agriculture in CALABARZON Region
DA-STIARC, Maraouy, Lipa City, Batangas

Proponent Agency: DA-RFOIVA-Southern Tagalog Integrated Agricultural Research Center
Project Leader: Ms. Digna Narvacan
Contact Details: (0917) 836-1958 or (043) 756-4962
Date Started: August 28, 2013
Date of Completion: September 1, 2014

Objectives:
General
  To establish and operationalize an organic agriculture R&D center in CALABARZON.
Specific
  1) To construct a building for shredding, composting, mixing, drying, sieving, and packaging of natural feeds and fertilizers derived from organic sources;
  2) To integrate aquaculture with crops and livestock; and
  3) To install rainwater harvesting facility.
Intended Beneficiaries

- Farmers
- Students
- OA practitioners
- Extension workers

Contribution to one or all of the following:

1) R&D System, 2) AF Industry, and 3) AF Modernization
   - R&D of organic agriculture technologies
   - Training of OA practitioners and other interested stakeholders
   - Commercialization of OA technologies
Establishment of the Regional R&D Center for Organic Agriculture in Region 8
Main RIARC, Brgy. Bagong Silang, Babat ngon, Leyte

Proponent Agency: D A-RFO VIII-Eastern Visayas Integrated Agricultural Research Center
Project Leaders: Dr. Elvira Torres and Engr. Leonarda Lndina
Contact Details: (0906) 603-9131/lvctorres@yahoo.com or nardslon2004@yahoo.com
Date Started: October 2, 2013
Date of Completion: December 31, 2016
Status: Extended

Objectives:
General
To establish a Regional R&D Center for Agriculture in Region 8, specifically at Main RIARC Babat ngon, Leyte

Intended Beneficiaries:
- Farmers
- R&D community
- OA practitioners
- Extension workers
Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization

→ Increase in the percentage of agricultural lands that converted into organic production and increase in number of farmers adopting organic methodologies of growing crops and livestock and even those fisherfolks embarking on inland fisheries
Establishment of R&D Center for Organic Agriculture in Region I
Integrated Satellite Station 4 (ISS4), Sual, Pangasinan

Proponent Agency: DA-RF I-Ilocos Integrated Agricultural Research Center
Project Leader: Dr. Ma. Remedios Pajatin
Contact Details: (0921) 465-4918
Date Started: October 8, 2013
Date of Completion: October 8, 2014

Objectives:
General
To transform DA-ILIARC-ISS into an OA center and eco-tourism area for Region I

Intended Beneficiaries
- Farmers
- Researchers
- LGUs
- Students

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
- A functional facility for OA production and training
Establishment of R&D Center and Demo Farm for Organic Agriculture at DA-RFU IX/ZAMPIARC
DA-ZAMPIARC Complex, Sanito, Ipil, Zamboanga Sibugay

Proponent Agency: DA-RFO IX-Zamboanga Peninsula Integrated Agricultural Research Center
Project Leaders: Engr. Roger Bagaforo and Ms. Priscilla Jover
Contact Details: (062) 333-2537 or 2877/dawesmiarc@gmail.com or dawesmiarc@yahoo.com
Date Started: October 17, 2013
Date of Completion: June 30, 2016

Objectives:
General
To establish facilities for OA center and demo farms at DA-ZAMPIARC, Ipil, Zamboanga Sibugay to serve as learning farm for interested stakeholders
Specific

1) To construct a multi-purpose building with office, conference/training room, organic display area, dormitory and canteen;
2) To construct organic fertilizer and feed production facility for vermiculture, vermicast, and feed production with shredding area, feed grinding and bagging area, and storage room;
3) To construct pig pen and a swine grazing area with perimeter fence; and
4) To designate techno-demo area for organic livestock, crops and fisheries.

Intended Beneficiaries

- Farmers
- Researchers
- LGUs
- Students

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization

- Increase in the number of RDE activities to focus on OA
- Increase in the number of organic farming practitioners
- Increased awareness of health conscious consumers on the importance of organic products
Establishment of Apiculture Processing Center in Support to Organic Agriculture
Lagalag, Tiaong, Quezon
**Proponent Agency:** Southern Luzon State University

**Project Leaders:** Dr. Cecilia Gascon and Dr. Amalia Almasol

**Contact Details:** (0908) 971-6159 or (033) 329-7328

**Date Started:** October 29, 2013

**Date of Completion:** November 4, 2014

**Objectives:**

**General**
To establish a honey and by-products processing and development center and diagnostic center for honeybee pests and diseases.

**Specific**
1) To provide venue for the beekeepers (those with few colony holdings) for the extraction and processing of their harvest;
2) To provide venue for honey and by-product development training/seminar;
3) To showcase the honey and by-products/display center/store; and
4) To provide assistance to the beekeepers for diagnosing pest and diseases on their apiaries.

**Intended Beneficiaries**
- Beekeepers
- Farmers
- Extension workers
- Organic agriculture practitioners/enthusiasts
- Students
- Researchers

**Contribution to one or all of the following:**
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Conduct of R&D activities on pests and diseases of bees and apiculture for OA
   - Training of bee farmers, extension workers, researchers, students, and other interested stakeholders
Establishment of the Organic Agriculture R&D Center in Region 10
DA-NOMIARC, Dalwangan, Malaybalay City, Bukidnon

Proponent Agency: DA-RFO X- Northern Mindanao Integrated Agricultural Research Center
Project Leader: Dr. Juanita Salvani
Contact Details: (0929) 505-5381 or (0920) 901-8521 or (0917) 726-2945
Date Started: July 18, 2014
Date of Completion: July 18, 2015

Objectives:

General
To establish an organic agriculture R&D center showcasing the different organic production and value-adding technologies and products in Region 10.

Specific
1) To construct a multi-purpose building for office, laboratory, research, and trainings with complete fixtures and equipment;
2) To showcase the crops, livestock, and fish integrated organic production system; and
3) To accelerate the commercialization of organic agriculture in the region thru the establishment of the OA R&D center.
Intended Beneficiaries:
- Farmers
- Researchers

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Generation of organic products and systems in crops, livestock, and fisheries
Establishment of an Organic Agriculture R&D Center in Region CAR
Baguio Stock Farm Compound, Sto. Tomas Road, Donongan, Baguio City, Benguet

Proponent Agency: DA-RFO CAR Cordillera Administrative Region Integrated Agricultural Research Center
Project Leader: Dr. Magdalena Wanawan
Contact Details: (0907) 612-0407 or (074) 444-8986
Date Started: September 12, 2014
Date of Completion: September 12, 2015

Objectives:
General
To improve the delivery and promotion of organic technologies to clients as well as to encourage farmers, senior citizens and other stakeholders to go organic farming.

Specific
1) To demonstrate integrated organic production systems for both crops and livestock;
2) To promote organic production technologies;
3) To showcase climate resilient multi-purpose facility with green building design; and
4) To provide a venue for facilitating technology promotion and strengthening linkage of organic stakeholder’s through meetings, consultations, seminars, and market encounters.

Intended Beneficiaries
- Farmers
- Researchers
- LGUs
- Students

Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
- Provision of facility and equipment to promote OA technologies
Establishment of R&D Center for Organic Agriculture in Bangsamoro
ROS-Maguindanao Complex, UAS-PTIA Campus, Upi, Maguindanao

Proponent Agency: Department of Agriculture and Fisheries - Autonomous Region in Muslim Mindanao
Integrated Agricultural Research Center
Project Leader: Mr. Esmael Satol
Contact Details: (0915) 304-2887 or (0929) 318-5479/abmsatol@yahoo.com
Date Started: October 9, 2014
Date of Completion: October 9, 2015

Objectives

General
To establish and operationalize an OA R&D center in Bangsamoro that will facilitate generation development, promotion, and commercialization of OA technologies, products, and services, which are demand-driven, location-specific and culturally acceptable

Specific
1) To construct a multi-purpose building with necessary equipment, facilities, and fixtures where personnel holds office, and conducts trainings and researches on OA;
2) To construct goat barn, poultry house, feed production and formulation house, composting, seed storage, and multi-purpose caretaker house;
3) To integrate, institutionalize, and demonstrate organic agriculture in Agri-Pinoy programs and projects in the site; and
4) To construct a concrete water reservoir.

Intended Beneficiaries
- Farmers
Contribution to one or all of the following:
1) R&D System, 2) AF Industry, and 3) AF Modernization
   ▶ Integration, institutionalization, and demonstration of organic agriculture in Agri-Pinoy programs and projects in the site
   ▶ Generation, development, promotion, and commercialization of OA technologies, products, and services
   ▶ Development of farmers' market linkages locally and abroad
   ▶ Sustainability of the fertility and productivity of farms
Establishment of Organic Agriculture R&D Center for Bicol Region
DA-BIARC, San Agustin, Pili, Camarines Sur

Objectives:

General
To establish facilities for OA R&D center in Bicol Region and demo farms at DA-BEST, San Agustin, Pili, Camarines Sur to serve as learning farm for interested stakeholders.

Specific
1) To construct OA R&D center building with office, conference/training room, organic display area, and canteen;
2) To construct organic fertilizer and feed production facility for vermiculture, vermicast, and feed production with shredding area, feed grinding and bagging area, and storage room;
3) To construct/establish swine house and a swine grazing area with perimeter fence; and
4) To designate techno-demo area for organic livestock, crops, and fisheries.

Intended Beneficiaries
- Farmers/cooperatives
- Extension workers
- Researchers
- Students

Contribution to one or all of the following:
1) R&D System 2) AF Industry and 3) AF Modernization
   - Increase in the number of RDE activities focusing on OA
   - Increase in the number of organic farming practitioners
   - Increased awareness of health conscious consumers on the importance of organic products
Establishment of R&D Facility in Support to Organic Agriculture
Sta. Maria, Ilocos Sur

Proponent Agency: Ilocos Sur Polytechnic State College
Project Leader: Dr. Gregorio Roa, Jr.
Contact Details: (0916) 444-6719 or (077) 732-5512
Date Started: June 17, 2015
Date of Completion: June 17, 2016

Objectives:
General
To establish and develop a model farm as a show window for the utilization and commercialization of matured OA technologies as well as to serve as a venue for relevant research and extension endeavors of the College

Specific
1) To enhance the operations and income-generating capacity of existing ISPSC projects such as vermicomposting, Bio-N, compost fungus activator (CFA), and Trichogramma and to ensure that these products are available to the farmers;
2) To produce organic pinakbet vegetables and exotic rice for the market;
3) To maintain a seed bank of organically produced seeds of pinakbet vegetables and traditional rice varieties as ready source for farmers;
4) To propagate green manure and botanical crops;
5) To disseminate matured organic farming technologies through school-on-air program, field days, S&T symposia, trainings, seminars, and other similar activities;
6) To train Home Economics and Livelihood Education (HELE) and Technology and Home Economics (THE) teachers of the Department of Education (DepED) in Ilocos Sur and provide technical assistance to elementary and high school heads on the integration of organic agriculture in the basic education curriculum;
7) To provide assistance to farmers;
8) To produce and publish IEC materials;
9) To conduct related R&D activities using the farming system research and/or on-farm research approach and methodology; and
10) To develop a package of technology on organic-based farming system appropriate for the province of Ilocos sur.

**Intended Beneficiaries:**
- Farmers
- Researchers
- Extension workers
- LGUs
- Students

**Contribution to one or all of the following:**
1) R&D System, 2) AF Industry, and 3) AF Modernization
   - Promotion of matured OA technologies
   - Facilities will serve as laboratory for students and as demo farm for farmers and other interested stakeholders to see and observe during field days
Department of Agriculture
Bureau of Agricultural Research
Organic Agriculture R&D Team

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