The Philippines' National Rice Development Strategy

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Presented by: Dr. Manuel Jose C. Regalado, Deputy Executive Director for Research, Department of Agriculture–Philippine Rice Research Institute (PhilRice)

Introduction: Current status of the rice sector

As the main staple food of Filipinos, rice is the most important agricultural crop in the Philippines. Rice farming is a way of life for most Filipinos in the countryside and 70% of the total population is greatly dependent on its production, processing, distribution and marketing. About 3 million farmers and farm workers spread across the many islands of the Philippine archipelago are actually involved in rice farming. Of the total value of PhP797.731B for agricultural crops produced in 2012, PhP292.125B or 36.6% is contributed by rice (BAS 2013). Moreover, of the gross value added (GVA) in agriculture and fishing which was PhP1.247 trillion in 2012, paddy or rough rice contributed 23% (Philippine Statistics Authority 2014).

Rice is grown in 2.2 million farms, which is about 45% of the total number of agricultural farms in the country, and covers a physical land area of 3.9 million hectares, about 40% of the total agricultural area (NSO 2005). In 2013, the area harvested to paddy expanded to 4.75 M ha, which is 9.2% higher than the4.35M ha in 2010.The average annual increase of area harvested to paddy from 2010–2013 was 3%. Of the 4.75 M ha harvested area in 2013, 3.24 M ha were irrigated, while 1.51 M ha wererainfed.

Total paddy production reached an all-time high in Philippine rice farming history of 18.44 million tonnes (Mt)in 2013(BAS 2014). This surpassed by 17%the total output at the beginning of the current Aquino administration in 2010 of 15.77 Mt. The average annual growth rate in total paddy production from 2010–2013 is 5.4%, and is more than twice the average annual growth of 2.5% in total paddy output from 2000–2010. The national average paddy yield for all ecosystems also rose from 3.6 t/ha in 2010 to 3.88 t/ha in 2013. On the one hand, average yield in the irrigated ecosystem was higher and increased from 4.0 t/ha in 2010 to 4.3 t/ha in 2013. On the other hand, average yield in rainfed environment was lower, although this also increased from 2.8 t/ha in 2010 to 3.0 t/ha in 2013.

The improved yields and yearly increases in total paddy output resulted in the increase in national rice self-sufficiency ratio, from a low 81% in 2010 to 92% in 2011 and 94% in 2012. In 2013, which was proclaimed as the National Year of Rice (NYR), the country was

able to attain 97% sufficiencylevel. Notwithstanding the increasing trend of annual national rice production volume and level of self-sufficiency, the Philippines remains a net importer of rice. In 2010, our country imported 2.38 Mt of this principal staple (BAS 2013). While, import volume substantially dropped to 0.71 Mt in 2011, it rose again to 1.0 Mt in 2012. One of the main reasons for the inadequacy of national rice production to meet the domestic demand is the ever-burgeoning population. In 2010, the Philippines had a total population of 92.34 M Filipinos, with an annual growth rate from 2000–2010 of 1.9% (NSO 2012). Corollary to this is the increase in annual per capita rice consumption (PCRC). In 1999–2000 the PCRC was 105.8 kg/year and this rose to 119 kg/yr in 2009 (Philippine Statistics Authority 2014). However, the PCRC slightly dipped to 114 kg/yr in 2012. Among the real factors identified as causing the increase of PCRC over time are the shift in consumers' preference from other food staples, such as corn, cassava and sweet potato, to rice, and the increasing number of poor families (PhilRice 2012).

Main challenges and opportunities

Whatever the odds might be, one of ournational goalsis still to attain and sustain self-sufficiency in our main staple food, rice. However, pursuing this elusive goal is fraught with challenges, foremost of which is the risk, even uncertainty, brought about by impacts of climate change. The Philippines has been listed as the third most vulnerable country to climate change in a report by the United Nations University's Institute for Environment and Human Security and the German Alliance Development Works, with a disaster risk rating of 24.3% (Alave 2011). The Department of Agriculture reported an increasing trend in the value of production losses attributed to climate change from a baseline of PhP13.8 billion in 2004–2010 to PhP25.1 B in 2011, PhP33.9 B in 2012, and PhP39.4 B in 2013. In particular, rice production in the Philippines has been projected to decline starting in 2020 by as much as 75% in 2100 from the current level unless the resilience and flexibility of rice-based farming communities in facing climate change is addressed through effective and efficient mitigation and adaptation measures (ADB 2009).

Another big challenge is high incidence of poverty, especially in the rural areas. The level of poverty in the country in 2009 was 26.3%. Despite spectacular economic growth as indicated by gross domestic product (GDP) growth rates of 6.8% and 7.2% in 2011–2012 and 2012–2013 (NSCB 2014), the poverty incidence in 2012 only slightly decreased to 25.2%. The productivity and income of many small rice farmers remain low because of the declining profitability of growing mono-crop rice. With rice yields reaching a plateau and cost of labor and other inputs steadily increasing, the income of farmers has decreased tremendously. Results of analysis of the household poverty and food security impact in relation to the income derived from rice-based farming vis-à-vis household basic needs and food expenditure show that rural incomes are indeed relatively low.

The annual net income derived from growing rice in irrigated areas was PhP 45,000.00 per hectare in 2012 (BAS 2013), which was less than half the annual poverty threshold income of PhP 94, 675.00 for a family of five in 2012 (NSCB 2014). The income in rainfed or non-irrigated areas could even be much lower. Indeed, this makes it difficult for the farm family to meet their food requirements. This implies the crucial importance of other farming components such as vegetables and other crops, fish, and livestock in augmenting farming income in order that necessary food and non-food requirements are met. Opportunities must therefore be explored in intensified, diversified and integrated rice-based farming systems to generate higher incomes above the poverty threshold.

Hence, it is also critical to identify and evaluate climate adaptation strategies and introduce innovative measures for enhancing resilience of food systems and natural systems including adaptation of agricultural-biological (agri-bio) production systems, building adaptive capacity and climate resilience of all stakeholders, and sustaining collaboration and partnership among stakeholders in the countryside.

Another major challenge is revitalizing the agricultural extension and technology promotion system. More than two decades ago,as a result of the enactment of the Philippine Local Government Code of 1991, these functions have been devolved to the local government units (LGUs). Before this happened there used to be a Bureau of Agricultural Extension, over which the Department of Agriculture had direct supervision and control. As a consequence, the country's agricultural extension system has become sort of dysfunctional. While all LGUs with agricultural programs try their best to discharge their extension and promotion functions through the provincial and municipal/city agriculture offices, their operations are hampered by such problems as inadequate fund allocation from the LGUs' own budget and as a result of this, insufficient number of capable extension workers. The LGUs' budget comes from their share in the national and local taxes collected in their locality, called the internal revenue allotment (IRA). For lower-class cities and municipalities with lesser tax revenues, the IRA is usually small and with so many development priorities, fund allocations are also small. As a consequence, local agriculture offices are usually undermanned andtechnicians, constrained by the tight budget, are able to do extension work in a limited area of farm coverage. In addition, most of the agricultural officers and staffers holding regular positions are already ageing. New staffers are hired on a job-contract basis, meaning there is less security of tenure, and they are not well-equipped or trained to do farm extension and technology promotion.

Not only is there a need to develop and train a new and critical mass of extension workers, even the next generation of "green and smart" rice-based farmers must also be prepared. Our farmers are not getting any younger, the average age of farmers being 57 years. What makes this more challenging is that young people, even those in the rural areas, would prefer working in other industries or in the service sector rather than engage in farming as a profession or a source of livelihood.

There are, however, opportunities that can be created or used to surmount these challenges. One important development is the increasing trend in the government's budget allocation for the Department of Agriculture. From a modest amount of PhP34.8 billion in 2011, the DA's budget in 2014 has almost doubled to PhP68.6 B. This meant more funds not only for irrigation infrastructure, climate change adaptation and farm-to-market roads, but also for technical and other support services, including R&D, training and extension.

Besides the increase in the DA's budget, the budgetary allocation for rice research and development has also increased, albeit modestly. The annual budget allocations for the Philippine Rice Research Institute (PhilRice) as well as those for the DA-Bureau of Agricultural Research (BAR) and the DA regional research centers and stations have been increasing since 2011. Moreover, the Department of Agriculture also forged an agreement in December 2012 with IRRI to implement beginning in 2013 a collaborative R&D program that will help to attain and sustain rice self-sufficiency in the country. This was provided funding through the DA-BAR of close to PhP1 B.

Another opportunity is the large and fairly young population(the Philippines' population will reach the 100 million mark in 2015 and its median age is 23 years). While this might mean more mouths to feed and more jobs needed, our country can take advantage of its growing working age proportion to pump up the economy. With fewer dependents to support by the working age, household income can be used for productive investments. The Philippines' growing labor force can be beneficial to the economy assuming that enough jobs will be available whether here or overseas. Gains in living standards can be made if the working age population will be equipped with sufficient education that will provide them opportunities for decent employment. Technology-driven agro-industrial and agri-business development in the countryside will surely contributein the generation of needed jobs or livelihood opportunities in the rural areas. It also helps that more and more young people are being exposed to and becoming more proficient in various forms of information and communication technologies. The use of ICT, modern machines, biotechnological advances and smart/precision farming techniques might help lure back some from the young generation to farming, agri-business or agricultural R&D.

Development plans and goals of rice sector

In addition to providing enough supply of rice on Filipinos' dining tables, the present government also envisions a modernized smallholder agriculture and fisheries, and diversified rural economy that is dynamic, technologically advanced and internationally competitive, with the transformation guided by sound practices of resource sustainability, principles of social justice and strong private sector participation.

To achieve the current government's goal of national rice self-sufficiency in 2015 and sustaining it onward, the DA will continue to implement the Food Staples Sufficiency Program (FSSP) 2011–2016. The FSSP envisions a food-secure society where farmers enjoy decent and rising standards of living, and aims to achieve self-sufficiency in food staples toward ensuring food security (DA 2012). Self-sufficiency means satisfying the national requirement for food, seeds, processing and feeds through domestic production. The key target in 2011 was to produce our national requirement by the end of 2013. However, owing to production setbacks caused by strong typhoons last year, the timeline has been reset until the end of 2015. Hence, the other aim of strengthening national resilience in food staples production to impacts of climate change has become more crucial.

To achieve this goal, this would require that our nation through the FSSP must produce 19.1 Mt of paddy from a total harvested area of 4.83 M ha in 2014, 20.1 Mt from 4.92 M ha in 2015, and 20.5 Mt from 4.95 M ha in 2016. National average yield across all ecosystems is projected to rise from 3.88 t/ha in 2013 to 3.95 t/ha in 2014, and 4.08 t/ha in 2015, and 4.14 t/ha in 2016.

To attain its goals, the FSSP has identified three sets of strategies and key interventions that are now being implemented, namely:

1. Raise farm productivity and competitiveness by:
    - 1.1 Accelerating the expansion of irrigation services and further investment in small-scale irrigation systems to increase the volume and percentage share of the first semester (dry season) production to the total production;
    - 1.2 Encouraging widespread use of high-quality seeds and integrated crop management practices;
    - 1.3 Sustaining R&D in new varieties and crop management, and intensifying conduct of mid-stream and downstream rice and rice-based research and development;
    - 1.4 Promoting mechanization of on-farm operations to bolster farm efficiency, ensure timeliness of operations and reduce unit costs;
    - 1.5 Enhancing the delivery and effectiveness of extension services through strengthening and greater involvement of the irrigators' associations (IAs) and other alternative and complementary local extension and service modalities, and mobilization of extension workers at all levels; and
    - 1.6 Boosting yield and overall productivity growth in the rainfed lowland areas through supplemental irrigation, use of high-quality seeds, proper nutrient management and training on the *Palayamanan* (integrated and diversified rice-based farming) system.
2. Enhance economic incentives and enabling mechanisms by:
    - 2.1 Strengthening price support, raising government procurement of domestic production to 9% by 2016, with focus on areas where trading is not competitive, and allowing market forces greater role in setting retail prices;

2.2 Facilitating credit provision to small farmers through credit sector reforms, multi-agency approach to credit provision, and innovations in credit delivery; and

2.3 Expanding crop insurance coverage by increasing the capitalization of the Philippine Crop Insurance Corporation, allocating more funds to provide coverage to rice farmers, and promoting new products, such as weather-based insurance.

3. Manage food staples consumption by:

3.1 Diversifying food staples consumption through intensifying production of other staples, such as white corn, cassava, sweet potato, and banana (plantain);

3.2 Encouraging the consumption of brown rice, which is more nutritious than white rice and has higher milling recovery rate; and

3.3 Reducing food left-overs and other forms of wastage.

The main executing agency of the FSSP is the Department of Agriculture. The Secretary of Agriculture provides overall leadership and policy directions in the FSSP implementation, ensures the availability of required budgets, approves the detailed implementation plans, and serves as the chair of the National Steering Committee for the Rice Program. The steering committee is composed of heads of DA bureaus and attached agencies working in the grains sector. It reviews and sets national targets and accomplishments, formulates guidelines for program implementation, deliberates on policy issues besetting the rice industry, and provides technical recommendations to the chairperson on policy directions.

The Agriculture Secretary is backstopped by the undersecretary for operations,who co-chairs the national steering committee, and the rice program national coordinator who serves as the chair of the national technical working group for rice and head of the national rice program secretariat. The national technical working group, which is composed of representatives from different DA bureaus and attached agencies, and other relevant government and private sector organizations, prepares and finalizes the rice program design, operational plans, strategies, interventions and budgets, and periodically evaluates the roles and contributions of different DA bureaus and attached agencies to program implementation.The national rice program secretariat prepares and consolidates the rice program's detailed work and financial plans, conducts field monitoring and assessment, and consolidates, analyzes, and prepares summary reports. At regional level, the DA regional offices led by regional executive directors are responsible for the overall planning, coordination and monitoring of program implementation in the regions, while at the provincial level, the local government unit led by governor, develops and implements the provincial FSSP, provides counterpart budget and resources, and mobilizes support from constituent municipalities.

Implications or strategies for national rice R&D

To pursue more focused, efficient, and appropriate R&D efforts, the Philippines through the Philippine Rice Research Institute (PhilRice) has developed its Strategic Rice R&D Plan for 2010–2020 with three main goals: (1) help in attaining and sustaining national rice self-sufficiency; (2) contribute in reducing the incidence of poverty and malnutrition; and (3) achieving competitiveness in rice science and technology. These goals are aligned with the Philippine Food Staples Sufficiency Program (FSSP, 2011-2016), the UN Millennium Development Goals, Philippine Development Plan (PDP), the Agriculture and Fishery Modernization Act (AFMA), and initiatives of civil society organizations (CSOs).

Rice R&D Programs for Technology/Product Development

PhilRice shall continue to develop technologies, and generate information and other products that can expand rice yield growth over the medium term, sustain activities that will help to narrow down the gap between actual farm yields and best practice yields, and create opportunities for poor farmers and enable them to improve their farming practices through appropriate diversified and integrated rice-based agri-biosystems, and participate in markets through high-value rice-based farm produce or processed products entrepreneurship.

Program 1: Coping with Climate Change

Higher risks and greater uncertainty owing to climate change in a highly vulnerable country like ours continue to daunt the Filipino rice farmer. Confronted with spiraling prices and dwindling supply of farm inputs, such as fossil fuel, fertilizers, irrigation water, and even human labor, the future of Philippine rice-based agriculture indeed looks grim. The incessantly rising population and continuing conversion of prime rice lands for other purposes further pose an enormous challenge of producing more food from smaller and less fertile, even marginal lands.

Changes in precipitation, increase in temperature, and sea level rise are among the projected impacts of climate change which will greatly affect agriculture, the prime source of food security in the country. Agriculture is very sensitive to climate change, which will exacerbate the annual damage in the sector. Rice production in the Philippines has been projected to decline starting in 2020 by as much as 75% from the current level unless the resiliency and flexibility of rice farming communities in facing climate change is addressed through effective and efficient mitigation and adaptation measures (ADB 2009).

To cope with climate change, there is a need to transform Philippine rice agriculture into a climate-resilient and energy-efficient system. The resilience and sustainability of our rice production system must be intensified, while making it more efficient in the use of energy, water and nutrients. This can be done by combining rapid advances in knowledge of plant genetics and the advanced approaches to agronomic management

to deliver the required sustainable intensification in productivity. The program shall consist of the following components:

1) Enhancement of the climate change adaptive capacity of rice-based farming systems.
2) Ensuring household food and income security in climate change vulnerable areas.
3) Generation and management of climate change-related knowledge and information

Program 2: Farming Without Fossil Energy

"Despite a near tripling of world oil prices, non-OPEC production, which accounts for 60% of world output, hasn't increased significantly since 2004. And many of those same experts, as well as some major oil companies, don't see it increasing again—ever," declared Richard Kerr in his article "Peak Oil Production May Already Be Here," published in Science, March 25,2011 issue.

In his essay published on Resilience (http://www.resilience.org) and titled "What will we eat as the oil runs out," Post Carbon Institute senior fellow Richard Heinberg laid out four dilemmas that comprise an unprecedentedly wide-scoped crisis that fossil fuel-dependent global agriculture and food system faces: 1) direct impacts on agriculture of higher oil prices are increased costs of tractor fuel, agricultural fertilizers and chemicals, and the transport of farm inputs and outputs; 2) an indirect consequence of high oil prices, the increased demand for biofuels, which is resulting in farmland being turned from food production to fuel production, making food more costly, 3) impacts of climate change and extreme weather events caused by fuel-based greenhouse gas emissions, and 4) degradation or loss of basic natural resources, principally topsoil and fresh water supplies, as a result of high rates and unsustainable methods of production stimulated by decades of cheap energy. Heinberg averred that we need a more fundamental reform of agriculture than anything we have had before to get to the heart of the crisis, and the solution is an agriculture and food system that does not require fossil fuels.

This program shall lay the foundation for and formulate science and technology-based solutions toward a fossil-fuel free rice-based agriculture in the Philippines. It shall be composed of the following projects:

1) Development of alternative, renewable, diversified and decentralized energy resource systems for and from rice-based agriculture.
2) Improving the energy resource use efficiency in rice-based farming.
3) Development of low external energy inputs in rice-based farming.

Program 3: High-Value Products from Rice and Its Environment

Poverty is a sad reality for the rice-based farming households in the country. It is also not uncommon that most of their income is devoted to food expenses. It is therefore important to empower farming communities not only to improve their practices, reduce farming cost, and increase the value of their produce, but also to explore additional sources of income from production of non-traditional raw materials, such as algae and single cell proteins, in order to improve their economic condition.

The program will generate high-value products from the rice environment to help increase the income of rice-based farming communities. Value-adding systems will be developed, evaluated and refined to increase the value and profitability of rice farming and processing of new products as an enterprise. The program consists of the following components:

1) High-value rice grain
2) High-value products from the rice grain and other parts of the rice plant
3) Beneficial organisms in the rice environment.

Program 4. Intensified Rice-Based Agri-Bio Systems

The productivity and income of many small rice farmers remain low because of the declining profitability of growing mono-crop rice. With rice yields reaching a plateau and the increasing cost of labor and other inputs, the income of farmers has decreased tremendously. Results of analysis of the household poverty and food security impact in relation to the income derived from rice-based farming vis-à-vis household basic needs and food expenditure show that rural incomes are relatively low.

The annual net income derived from growing rice in irrigated areas is Php 45,000.00 per hectare in 2012 (BAS 2013), which is less than half the annual poverty threshold income of Php 94, 675.00 in 2012 (NSCB 2014). Indeed, this makes it difficult for the farm family to meet their food requirements. This implies the crucial importance of other farming components such as vegetables and other crops, fish, and livestock in augmenting farming income in order that necessary food and non-food requirements are met. There is therefore a need to promote diversified and integrated farming systems to generate incomes above the poverty threshold. More importantly, there is a need to integrate diversification strategies in the national rice program to achieve a meaningful impact in terms of increasing household income and productivity of rice-based farmers.

Hence, it is critical to identify and evaluate climate adaptation strategies and introduce innovative measures for enhancing resilience of food systems and natural systems including adaptation of agricultural-biological (agri-bio) production systems, building adaptive capacity and climate resilience of all stakeholders, and sustaining collaboration and partnership among stakeholders in the countryside.

The intensified rice-based agri-bio systems model (Palayamanan Plus) is a community- or village-scale model aimed to increase income by purposive integration of certain farming components that will enhance rice and rice-based crops productivity, profitability and sustainability, cost reduction, value-adding through product processing and utilization rice-biomass and mechanization. An appropriate agri-bio systems model piloted at each PhilRice station is envisioned to spin-off into community agribusiness activities that can generate a calculated annual income of Php 1 million per hectare from all production and economic activities to generate the desired social and economic impact and progress. The program shall consist of the following projects:

1) Agri-biosystems mapping and scoping;
2) Assessment of agri-biosystems models; and
3) Pilot implementation of agri-biosystems models

Program 5. FutureRice

Rice farming in the Philippines will face several challenges in the future. With a very limited irrigated area of only 2 million hectares, it must produce 18 million metric tons of rice to feed an estimated 95 million Filipinos in 2012. The remaining 1.2 million hectares are without irrigation and depend on seasonal rains. The impact of climate change has also brought further destruction of remaining irrigation systems, and in some areas, much flooding and landslide due to shift in cyclone path. High population growth rate of 2.4% and rapid urbanization contribute to further reduction of prime agricultural land in the Philippines.

The challenge for R&D is to produce more food output from the same unit of land, and at the same time, protect the soil and the environment from further degradation due to intensive crop cultivation. This challenge is compounded the dwindling supply, and increasing costs of petroleum based products for farm fuel, pesticides, and fertilizers. The increasing production costs at the farm level are eroding potential income and profits of farmers.

Given this emerging environment, there is a need to develop and test new crop management innovations that will promote self-sufficiency, sustainability and competitiveness in the 21st century. We need to revolutionize and transform our food production and delivery system through the application of engineering, information technology, and biotechnology. This means that we have to upgrade the skills of extension agents and farmers on green, practical, and smart farming. Finally, these efforts must act as catalysts to transform farming communities into ecologically vibrant and competitive economies.

Key program components are as follows:

Rice Innovation Center. This component will inventory all local and global technology on clean, green and smart farming innovations, which can be modified or localized (adaptive and creative research) in order to reduce the time and cost of development. This will make it possible for innovations to become available in less than 3 years instead of 10 years. The center will develop a knowledge base of all relevant innovations developed locally and abroad, collecting relevant literature from journals, and establish linkages with concerned agencies, global networks, and agribusiness corporations. The center will develop a clearinghouse of appropriate technologies and help develop local prototypes of selected innovations for testing, application, and public dissemination.

Smart Rice Farms. This component will demonstrate the elements of green, practical and smart rice farming in small 5-hectare farms in several agro climatic locations of the country. This will demonstrate the 10-5 rice technology, where a high yield of 10tons/ha can be produced with a cost of P5/kg. This demonstration farm will become a test bed of local and global innovations that we identified at the Innovation Center for further testing and application in near-real farming conditions. The key features of the farm involve organic farming, low tillage, nutrient recycling, energy recycling, farm mechanization, and knowledge-based crop management. Alternative energy sources will be used to power farm implements. Information and communications technology will be used to provide timely and relevant information to guide on-farm crop management decisions. The performance of these innovations in real field conditions will be monitored and evaluated for their release to the farming community. The farms will also serve as practical training ground for participants of the Rice Academy

Rice Academy. This component will develop a new learning curriculum that will prepare a new generation of agricultural practitioners, extension agents and farmer leaders to meet the demands of rice farming in the future. This will include an understanding of the principles and concepts of green, practical and smart farming; climate change; renewable alternative energy and sources; nutrient cycling; and ecological biodiversity. This will require of the new generation of farmers a working knowledge of farm mechanization, information and technology tools and platforms, agro-ecology, and biotechnology. Digital content will be made accessible using new generations of ICTs such as tablets, smart phones, and SMS.

Farmer Cyber Community. This component will identify farming communities that are receptive to clean, green, and smart farming innovations. Innovations that were identified by the Rice Innovation Centre, and tested in the Smart Farms and Rice Academy, will be applied in real-world condition among members of the rice farming community. Members of the farming community may visit the Smart Farms and may attend the Rice Academy. Farmer-based ICT systems will be made available to the farming community to give them access to online content on green, practical and smart technologies. Technical and advisory services will be provided to the communities through various knowledge services such as mobile ICT facilities and farmers' text

advisories. Communities will be encouraged to develop clean and green products related to crops, alternative fuels, organic fertilizers, and feeds for livestock and fish.

Project Management and Support Communication. This component will provide the project management support in terms of seeking grants and funding for the project components; coordination with units of the Institute; collaboration with external partners and the farming community. This component will also provide logistical support for the efficient operation of the program; conduct public awareness on the future of rice farming and the impact of climate change, the potentials of alternative energy sources, and application of information and communications technology in agriculture. This unit shall establish and maintain a project website, document the project activities and processes in publications and video clips, and provide feedback through social media, such as Facebook, Twitter, Instagram, and SMS.

Department of Agriculture-PhilRice and IRRI Collaborative Program

To support, extend, and fast-track the delivery of the Philippines' Food Staples Sufficiency Program, the Department of Agriculture entered into a 5-year agreement with IRRI— "Sustaining rice self-sufficiency and food security in the Philippines" in December 2012. The agreement outlined areas of collaboration in research and development and extension (RDE) which will be principally carried out by the DA through the Philippine Rice Research Institute (PhilRice) and IRRI.The main goal of the collaborative program is to help the country to attain and more importantly to sustain rice self-sufficiency and ensure food security. The collaborative projects under this agreement are as follows:

1. PRISM: Philippine Rice Information System — An Operational System for Rice Monitoring to Support Decision-Making Toward Increased Rice production in the Philippines;
2. Accelerating the Development and adoption of Next-Generation (Next-Gen) Rice Varieties for the Major Ecosystems in the Philippines;
3. Improving Technology Promotion and Delivery through Capability Enhancement of the Next-Generation of Rice Extension professionals and Farmer Intermediaries (IPaD)
4. Raising Productivity and Enriching the Legacy of Heirloom/Traditional Rice through Empowering Communities in Unfavorable Rice-Based Ecosystem (Heirloom Rice Project);
5. *Rice Crop Manager*: A Comprehensive Decision Support Tool for Increasing Yields and Income for Farmers in the Philippines;
6. Accelerating the Development and Dissemination of Associated Rice Production Technologies that are Resource-Use Efficient (Associated Technologies); and
7. Benchmarking the Philippine Rice Economy Relative to Major Rice-Producing Countries (Benchmarking Rice Economy).

A four-year project, PRISM aims to develop a monitoring system which will provide accurate estimates of rice area, yield, crop damage based on a combined remote sensing and crop modelling approach. It will also assess pest injuries and characterize production situations of rice growing areas in the Philippines to provide information on pest risks and pest management strategies. Lead agencies for PRISM are PhilRice, IRRI and sarmap SA, while collaborating and advisory agencies include the DA regional field offices, Bureau of Agricultural Statistics (now under the Philippine Statistical Authority), DA-Information Technology Center for Agriculture and Fisheries, DA-Bureau of Soils and Water Management, DA-Bureau of Plant Industry and DA-Regional Crop Protection Centers.

Next-Gen is a three-year project led by IRRI andPhilRice and collaborated with UPLB, DA regional field offices, selected state universities and colleges, civil society organizations and farmer-partners. It attempts to accelerate the introduction and adoption of higher-yielding inbred rice varieties and hybrids with resistance to or tolerance of biotic and abiotic stresses. Among its expected outputs are new elite inbreds and hybrids with higher yield and tolerance of biotic and abiotic stresses for irrigated and rainfedecosystems, and high-quality seeds of inbreds and hybrid parents disseminated to farmers.

IPaD is also a three-year project with IRRI, PhilRice and DA-Agricultural Training Institute (ATI) as lead agencies and the Bureaus of Plant Industry, Soils and Water Management, and Animal Industry as collaborators. Its objectives are to: 1) develop a capability building framework for and a definition of the next-generation of rice extension professionals and farmer intermediaries; 2) provide or enhance enabling mechanisms for rice extension professionals and farmer intermediaries to perform their roles better; and 3) systematically document, monitor, and evaluate the effects of changes in roles, knowledge, and skills of the next-generation of rice extension professionals and farmer-intermediaries.

Heirloom Rice is being implemented starting this year until the end of 2016 by IRRI and PhilRice in collaboration with the DA-National Rice Program, ATI, University of Southern Mindanao, BPI, DA regional field offices, and local government units of the five project sites. Its main objective is to enhance the productivity and livelihood, and conserve *in situ* on-farm farmer-preferred heirloom/traditional, climate-resilient varieties and food crops by providing rice genetic resources and management options to smallholder groups and enterprises as models.

Rice Crop Manager is another three-year project that was implemented in mid-2013 by IRRI and PhilRice as lead agencies. It will be carried out until the mid-2016 in collaboration with DA regional field offices and regional integrated agricultural research centers, BSWM, NIA, and the provincial and municipal agriculture offices in the project sites. *Rice Crop Manager* replaces the Nutrient Manager and includes all the capabilities

of the previous Nutrient Manager plus customized guidelines on crop management practices best suited for the specific rice-growing conditions of a farmer. *Rice Crop Manager* aims to provide a recommendation that increases the net income of a farmer by PhP 4500 (USD 100) per hectare per crop. The project's target outputs are: 1) field-tested *Rice Crop Manager* v. 1 available for use by technicians and farmers through mobile phones and personal computers throughout the Philippines; 2) updated *Rice Crop Manager* v. 2 and an accompanying *Rice Doctor* available as mobile phone applications throughout the Philippines; and 3) national staff with capacity to develop, maintain, and enhance *Rice Crop Manager*.

Another three-year project Associated Technologies was implemented beginning in mid-2013 by PhilRice as lead agency in collaboration with IRRI, DA regional field offices, National Irrigation Administration regional offices and provincial/municipal LGUs. To be carried out until mid-2016, the project aims to increase production and reduce external inputs through the development, dissemination and adoption of appropriate crop management technologies, such as the alternate wetting and drying (AWD), minimum or reduced tillage and direct seeding.

The seventh three-year project Benchmarking Rice Economy is led by PhilRice in collaboration with IRRI and aims to assess the competitiveness of Philippine rice, and determine the comparative and competitive advantages of the Philippines in the production and marketing of commercial rice, and the production of hybrid seeds.

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