Corporation: Philippine Rice Research Institute

I. CORPORATE PROFILE

A. Corporate Objectives

PhilRice is a chartered government corporate entity created through Executive Order No. 1061 on Nov. 5, 1985 (amended by EO 60 on Nov. 7, 1986). According to Section 2 of its charter, the purpose of PhilRice is to develop a national rice research program so as to sustain and further improve the gains already made in rice production, improve the income and economic condition of small rice farmers, expand employment opportunities in the rural areas, and ultimately promote the general welfare of the people through self-sufficiency in rice production. Its functions as outlined in Section 3 of the charter include, among others, the following:

1. Serve as the coordinating center of a national network of rice research stations located in the different agro-ecological regions of the country;
2. Plan and carry out research and development activities, specifically in the areas of varietal improvement, planting and fertilizer management, integrated pest management, farm mechanization and post-harvest engineering, farming systems, training and technology transfer, and social science and policy research;
3. Verify, package and transfer economically viable technologies, giving emphasis on the social engineering aspects necessary for group endeavor;
4. Provide the data base or policy formulation that will stimulate and sustain rice production, marketing and consumption;
5. Organize and develop strong training programs for rice scientists, research managers and extension workers; and
6. Publish and disseminate research findings and recommendations

PhilRice shall continue to contribute in attaining and sustaining rice self-sufficiency by increasing productivity and profitability of rice-based farming, and building a competitive rice-based economy through intensive rice-based agricultural and biological systems research and development, technology promotion, and policy advocacy.

B. Corporate Priorities for Year 2015

In line with Agri-Pinoy, the national government's agricultural development framework toward food security and self-sufficiency, PhilRice shall anchor its R&D agenda on the foundation of rice science and technology for sustainable human development. Its R&D thrusts shall also be buttressed by the principles of the Department of Agriculture's Agri-Pinoy framework, namely: 1) sustainable agriculture, 2) natural resource-based management, 3) food security, and 4) participatory and local development.

PhilRice will continue its efforts in strengthening national rice R&D capabilities in generating, improving, and promoting appropriate and sustainable rice and rice-based technologies. Specifically, it will:

1) Develop location-specific and sustainable technologies and systems to increase farm productivity, such as high-yielding and export-quality rice varieties, cost-reducing and environment-friendly integrated crop management technologies and systems that will also adapt to the adverse effects of climate change, and address abiotic and biotic stresses (pest outbreaks, drought, flooding/submergence, soil salinity and toxicity, and higher ambient temperature);
2) Continue to apply biotechnology, information and communication technology, mechanization and precision farming technologies, and other advanced scientific techniques for faster and more efficient breeding of varieties and development of sustainable, fossil fuel-free and energy-efficient rice-based crop management technologies and systems;
3) Develop climate change-resilient, highly productive and profitable, intensified lowland and upland rice-based agricultural and biological systems;
4) Explore natural and high-value products from rice and its environment to create broad-based opportunities of providing livelihood in the countryside and raising farmers' income, and to help improve the nutrition and health status of rice-based farming communities and general consumers;
5) Secure and sustain the future of rice-based farming and farming communities by adapting local and global innovations and upgrading the skills of farmers and extension agents on clean, green, practical and smart technologies, thus catalyzing the transformation of rural communities into ecologically vibrant and competitive economies; and
6) Promote appropriate technology packages through the "nucleus estate" paradigm, wherein each PhilRice station will act as a nucleus to radiate location-specific technology packages through innovative approaches that consider farmers' resource capacity, integrate farmers' best practices, utilize advances in information and communication technology and tri-media, and partner with local organizations from government, the academe, private sector, and farming communities.

C. Major Programs and Projects (2014–2018)

To pursue more focused, efficient, and appropriate R&D efforts, PhilRice has developed its Strategic 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).

To achieve these goals, major programs and projects for 2011–2016 were conceptualized and developed in 2010, and implemented in 2011. After an R&D review in December 2012, the programs were recast into relevant and responsive themes, which have undergone review, consultation and critiquing during the PhilRice Board of Trustees meeting on March 4, 2013 and the quarterly meeting of the NAFC Sub-Committee on Cereals (composed of various private, government and non-government organizations in the rice and corn sub-sector) on March 15. The new programs were implemented beginning the second half of 2013.

C.1. 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, Manila Times 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.

C.2. Basic and Applied Rice R&D Projects

C.2.1. Division-based Basic and Upstream Rice Research

In support of the implementation of the Rice R&D programs, PhilRice is implementing basic and upstream research activities through its R&D divisions:

Plant Breeding and Biotechnology focuses on enhancing genetic variability of potential rice varieties/elite lines; developing breeding materials with yield-enhancing, stabilizing and value-adding traits for use as parents in hybridization programs and/or direct utilization as varieties; characterizing important germplasm and making available nucleus seeds for commercial cultivation. It seeks to ensure stable and sustainable rice production through the development of high-yielding, pest and abiotic stress-resistant and good grain quality rice varieties suitable to major rice growing ecosystems.

Agronomy, Soils, and Plant Physiology leads research efforts to evaluate, refine, and facilitate the delivery of improved soil, nutrient, and water management practices to enhance soil quality and profitability and plant resource use efficiency.

Crop Protection seeks to help attain rice self-sufficiency and build a competitive rice economy through the generation, development, and promotion of pest management strategies, which are environment-friendly, economical, sustainable, and compatible with each other to address farmers' needs. It also assists breeders in screening potential varieties for insect and disease resistance.

Genetic Resources carries out germplasm collection, conservation, management, dissemination and utilization. It ensures availability of fully characterized germplasm to rice plant breeders and researchers. It also conducts research on genetic diversity.

Rice Engineering and Mechanization develops machines and tools to increase the national level of farm mechanization and modernize rice production and postharvest operations to increase farm efficiency and productivity.

Rice Chemistry and Food Science focuses on increasing the productivity and profitability of rice farming systems by determining grain quality characteristics of rice; developing technologies on other uses of rice and its by-products; and promoting these high-quality and value-added products to benefit consumers/farmers and food manufacturers.

Seed Technology performs basic studies on seed biology and physiology, health and pathology, purity and quality control, production, preservation and storage, coating/treatment and mechanical seeding. It also ensures that high-quality seeds are available to farmers/stakeholders, and helps make rice farming a profitable business by developing cost-effective and environment-friendly rice seed technologies. In addition, it runs and maintains a lab and facility for seed health and quality testing as prescribed in the international seed testing rules by ISTA.

Socioeconomics conducts research and policy studies to help develop an efficient, competitive; and sustainable rice industry, nurtured by sound policy environments. It supports PhilRice's function of providing timely information to the industry.

Technology Management and Services promotes/disseminates high-impact rice technologies through area-based technology promotion, and training and education to help increase the productivity and income of rice farmers'. Likewise, it enhances capacities of extension workers and other change agents through retooling or rice science and technology updates.

Development Communication promotes rice science for sustainable development through strategic use of communication media. It plays a major and significant part in communicating the results/products of rice science effectively, particularly to the intended users.

Information Systems and Data Management will interactively and collaboratively cater to the data information needs of rice stakeholders. The integration of information systems with the rice R&D will help to systematically plan, schedule, share, and document key activities that support the development of rice production technologies, farm equipment, technology transfer, and the production of high-quality rice varieties.

C.2.2. Area-Based Rice R&D Projects

Cutting across R&D programs are station-based projects that address location-specific problems in areas of operations of PhilRice Batac, Isabela, Los Baños, Bicol, Negros, Midsayap, and Agusan branch stations.

PhilRice Batac serves as the nucleus or core for development and improvement of intensified rice-based agri-bio systems (IRBAS) technologies and enterprises in semi-arid areas and other environments in Northwestern Luzon. It shall also develop technologies and management options for rice and rice-based crops in the rainfed and drought-prone environments, such as water harvesting, conservation and management, and mechanized rice-based farm production and postproduction operations.

PhilRice Isabela focuses on development of IRBAS technology packages and enterprises for Northeastern Luzon that also features the high-yielding yet low-cost

10-5 (10 tons per hectare at Php 5.00 per kg palay unit production cost) technology system anchored on hybrid rice.

PhilRice Los Baños, in addition to being the Institute's principal office, serves as nucleus for developing and radiating IRBAS technology and enterprise systems in the Calabarzon region (Region IV-A). Its partnership with IRRI and host, UPLB will also focus on basic research studies in plant breeding, crop protection, agronomy and soils, rice chemistry and food science for the generation of new products out of invention, innovation or discovery. The station also shall oversee the development of ***PhilRice Mindoro*** satellite station as the IRBAS nucleus estate model for the entire Mindoro Island.

PhilRice Bicol develops and promotes IRBAS technology packages and enterprise systems for the Bicol Region with special focus on climate change adaptation and resilience. It will also shepherd the ***PhilRice Samar*** satellite station which will be developed as the IRBAS-focused nucleus to spur rural transformation and development and attain inclusive growth in the entire Samar Island.

PhilRice Negros pilot-tests, fine-tunes and radiates fossil fuel-free IRBAS technology packages and enterprises for Western Visayas, even as it is being transformed into an organic rice-based integrated and diversified product development center.

PhilRice Agusan is the Institute's IRBAS nucleus estate for Northern Mindanao. Similar to PhilRice Bicol, it will also refine and promote IRBAS technologies and enterprises to CARAGA communities vulnerable to adverse effects of climate change. Moreover, it will also address challenges, such as nutrient-deficient and problem soils and low solar radiation in the area because of frequent rainfall. It also oversees the ***PhilRice CMU*** field station and office located inside the Central Mindano University campus in Maramag, Bukidnon, where 100 hectares have been made available by CMU to PhilRice for rice seed production and IRBAS technology and enterprise development and promotion in Central Mindanao. In addition, PhilRice Agusan also initially supervises the development of the ***PhilRice Zamboanga*** satellite station into the IRBAS nucleus estate model for the Zamboanga Peninsula.

PhilRice Midsayap is being transformed to be the IRBAS nucleus estate model for Southern Mindanao, with focus on ecological engineering and integrated pest management practices because of the prevalence of pests of rice and other crops within the region

C.2.3. Specialized Rice R&D Projects

The PhilRice-based Crop Biotechnology Center implements a rationalized, effective, and efficient agricultural biotechnology R&D program for the Department of Agriculture with the end view of generating improved agricultural technologies, productivity, profitability and enhanced commercial potential, value, and activities for agricultural crops.

C.3. New Initiatives

C.3.1. Rural Transformation and Inclusive Growth Through PhilRice Stations as Nucleus Estates.

This program seeks to catalyze rural transformation and achieve inclusive growth in rice-based farming communities by empowering PhilRice Stations as Nucleus Estates. Specifically it will sustainably increase productivity and income at the stations and adjoining communities; strengthen resilience to climate change and variability; and reduce agriculture's contribution to climate change.

The program expects to develop viable IRBAS enterprise models at PhilRice CES and branch stations with an annual gross income from operations of up to Php1M/ha/yr by the third year of operation. It also expects to develop spin-off agri-bio techno enterprise & business opportunities for surrounding communities with at least 1 similar viable nucleus estate; multi-sector partnerships for rural transformation and development; and information campaigns & policy advocacies for replication of nucleus estates in the country.

C.3.2. PhilRice Research Fellowship/Competitive Grant Scheme.

The PhilRice Research Fellowship Program aims to establish and develop research partnerships and collaboration with promising researchers from academic and other research institutions. In turn, PhilRice supports these endeavors with research funding and provides other forms of assistance to these talented individuals. The provision of research fellowships, grants or assistantships is based on merit and is subject to competition among qualified professors, researchers or PhD/MS/BS students from SUCs and other research institutions. Invitation to submit quality research proposals is posted at the PhilRice website and communicated to potential candidates through email.

This program seeks to (1) support outstanding and promising R&D practitioners in various fields of rice R&D; (2) provide opportunities to talented researchers while developing and fostering mentoring and collaboration; and (3) carry out research that is of major importance and with potential high impact to Filipinos.

This program also serves as an opportunity for young researchers and students to gain vital career or relevant research experience while contributing to PhilRice's mission of helping the country attain rice self-sufficiency by increasing the productivity and profitability of rice farmers through rice science. The program will also facilitate the access and exposure of these young talents to modern research facilities and equipment at research institutions, such as IRRI, PhilRice, UPLB, and other institutions.

C.3.3. Establishment of the Applied Biology Center for the Rice Environment (ABCRE).

The ABCRE is anchored on the strong and urgent need for radical innovations in the rice-based farming environment that will increase output and reduce external inputs in rice-based farming and require integration of disciplinary perspectives for the effective and systematic utilization of existing knowledge in applied biology. PhilRice recognizes the limitations of the traditional discipline-based divisions in terms of physical and technical manpower resources for planning and implementing needed research and development activities in Applied Biology. As such, establishment of ABCRE is expected to enhance interdisciplinary research capability in applied biology, initially by drawing needed expertise available from the traditional disciplinary divisions available at PhilRice (soil science, agronomy, plant physiology, plant pathology, entomology, chemistry, agricultural engineering, agricultural economics, etc.) and from collaborating DA agencies, SCUs, and private sector.

ABCRE aims to explore, advance, and utilize existing knowledge in applied biology in rice environment and develop innovations that will increase output and reduce external inputs in rice farming and non-rice enterprises. It will draw expertise from various fields of applied biology and agriculture particularly plant nutrition, plant physiology, crop protection, plant physiology, and soil science, among others. It will also harness skills and modern facilities available in DA-PhilRice and will also work closely with other scientists across the R&D network.

C.3.4. Further Development of Satellite Stations/Field Offices

PhilRice strengthens its capability to accomplish its mandate by continuously developing and promoting location-specific rice and rice-based technologies through the PhilRice Branch Stations. Located strategically in key rice-producing provinces in the country, each branch station focuses on a specific area of R&D work based on regional characteristics and needs. It develops or modifies technologies addressing location-specific concerns. The branch stations also serve as satellite centers in promoting technologies and getting feedbacks from the stakeholders of the rice industry, particularly the farmers and LGU extension workers. These stations are a mirror image of the Central Experiment Station (CES) serving as hubs of information, training, and technologies that cater to provincial and regional needs. Currently, Catarman, Northern Samar; San Jose, Occidental Mindoro; and Ipil, Zamboanga Sibugay are served by PhilRice Negros, Los Baños, and Midsayap, respectively. It is now felt that having satellite stations/field offices in these areas would be more practical and effective in generating location-specific technologies, and in partnering with LGUs in promoting these to farmers. Accessibility of the rice scientists to the LGUs and farmers will further enhance interactions which are inspirations to PhilRice to do more and better.

With the establishments of satellite stations/field offices in these provinces, the 2011 average yields of 2.67 mt/ha in Northern Samar; 3.92mt/ha in Occidental Mindoro; and 3.58 mt/ha in Zamboanga Sibugay can increase. This increase will subsequently help secure deficit areas in their regions. With the further development

of the stations in terms of physical infrastructures, such as buildings and road system, and other facilities/equipment, these satellite stations will be primed for their establishment as IRBAS-focused nucleus estates in their respective areas of operation that will catalyze rural transformation and help attain inclusive growth in these regions, which are among those which have the highest rates of unemployment and incidence of poverty in the country.

D. Linkages of Corporate Priorities/Programs/Projects with the Five Key Result Areas (KRAs), Philippine Development Plan, President's Social Contract with the Filipino People, and National Pronouncements

PhilRice shall anchor its research, development and extension (R,D&E) agenda on the foundation of rice science and technology that must be clean, green, practical and smart (Clean GPS) for competitive, sustainable and resilient (CSR) human development. With its R&D thrusts buttressed by and adhering to the principles of the Agri-Pinoy framework, namely: 1) sustainable agriculture, 2) natural resource-based management, 3) food security, and 4) participatory and local development, PhilRice therefore focuses on helping to transform the agriculture sector into one that is not only highly productive but also climate-resilient, environment-friendly, and sustainable, as envisioned in the ***Philippine Development Plan 2011-2016, Chapter 4 – Competitive and Sustainable Agriculture and Fisheries Sector***. PhilRice's priorities, programs and projects are also geared toward helping to attain the five Key Result Areas (KRAs) contained in the President's Social Contract with the Filipino People.

Through its renewed emphasis on (1) science, an honest-to-goodness pursuit and acquisition of knowledge, (2) application of rigorous scientific methods in studies and experiments to instill exactness and discipline and eliminate guesswork, and (3) requirement of publication of R&D results in reputable and refereed journals, registration of generated intellectual properties, such as varieties, machines, and processes, and their presentation in various fora and conferences to subject these to peer critique and review prior to technology promotion and dissemination, PhilRice fosters ***KRA no. 1 – Transparent, accountable and participatory governance***.

Peer-reviewed and reliable technologies and other products of rice R&D shall be generated by PhilRice to improve farm productivity and efficiency, reduce costs and losses, enhance climate change-resiliency, and open up agribusiness or additional income opportunities. This will contribute to ***KRA no. 2 – Poverty reduction and empowerment of the poor and vulnerable***.

To contribute in the attainment of ***KRA no. 3 – Rapid, inclusive and sustained economic growth***, PhilRice shall implement programs that will explore the development of high-value products from the rice environment, as well as the develop integrated rice-based agri-biosystems (IRBAS) technology-based enterprise models to help create livelihood and business opportunities and 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-based farming and processing of new

products as an enterprise. The IRBAS program will also help to sustain rice self-sufficiency and food security and improve the competitiveness of Philippine rice-based agriculture by developing and promoting technologies that will intensify production, improve efficiency, and reduce costs in rice-based agricultural systems.

The Institute is also proposing to implement the rice-based techno-business incubation under the program of strengthening the PhilRice stations into Nucleus Estates to develop the capacity of PhilRice and adjoining rural communities to commercialize and market its technologies and other R&D products and services. The program shall also study and initiate the formation and operation of spinoff companies that will fully commercialize the "incubated" rice-based technology business in accordance with the Technology Transfer Act. It will also develop facilities, such as fabrication workshop, laboratories, pilot assembly plants, and training center for agribusiness incubation and technology entrepreneurship. PhilRice also hopes to establish rice-based farm machinery pools for mechanization services provision in compliance with the Section 9 IRR of RA 10601 or the Agricultural and Fishery Mechanization Law that will help in improving not only the country's rice mechanization level but also farm labor productivity, and provide employment opportunities for graduates of technical-vocational schools.

Through area-based IRBAS projects and externally supported development projects, such as the JICA-assisted technical cooperation project on improving farm productivity and income through Palayamanan (diversified and integrated rice-based farming system) in the Autonomous Region of Muslim Mindanao (ARMM) and other similar projects carried out by PhilRice in various regions of the country through its branch stations, the Institute does its share in the attainment of ***KRA 4 – Just and lasting peace and the rule of law*****.** PhilRice also proposes the establishmentfurther development of the three new satellite stations in Northern Samar, Zamboanga Sibugay and Occidental Mindoro to help address rural underdevelopment and poverty, and substantially contribute to foster *KRA no. 4* in these areas.

PhilRice shall implement two major programs, namely: (1) "Coping with Climate Change" and (2) "Farming Without Fossil Energy" to help the government in achieving ***KRA no. 5 – Integrity of the environment and climate change adaptation and mitigation***. The first program aims to transform Philippine rice agriculture into a climate-resilient and energy-efficient system. The resilience and sustainability of our rice production system will be intensified, while it is made 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 second program shall lay the foundation for, and formulate science and technology-based solutions toward, a fossil-fuel free rice-based agriculture in the Philippines. This will provide the fundamental, holistic, long-lasting and sustainable solution to the 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.