

## **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). PhilRice is mandated to:

- (1) Serve as a vital force in attaining and sustaining the country's goal of sufficiency in rice and in promoting greater access of farmers to agricultural technologies, and
- (2) Lead, unify, and strengthen the manpower capabilities and improve the facilities of agencies involved in national rice research and development.

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

### **B. Corporate Priorities for the Budget Year**

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 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 rices, cost-reducing and environment-friendly integrated crop management technologies and systems that will also adapt/mitigate effects of climate change, and address abiotic/biotic stresses (pest outbreaks, water stresses, and others);
- (2) Continue to apply biotechnology and other advanced rice science techniques for faster and more efficient breeding of varieties and development of appropriate crop management options and systems;
- (3) Assess impacts, vulnerability, adaptability of rice farming to climate change develop framework, and evaluate existing developmental adaptation to and mitigation of climate change in rice and rice-based watershed systems;

- (4) Promote technologies through location-specific approaches considering farmers' resource capacity, integrating farmers' best practices, utilizing advances in information technology and tri-media, and partnering with local organizations from government, non-government, private sector, and farming communities; and
- (5) Explore natural products not only as source of income but also to help improve the nutrition and health status of rice-based farming communities and the general consumers; develop value-adding systems for rice and rice-based crops to enhance their physicochemical, nutritional, and eating quality as well as shelf-life and market value.

## **C. Major Programs and Projects (2011–2016)**

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 national rice self-sufficiency by 2013 and in sustaining it thereafter; (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 Self Sufficiency Plan (FSSP, 2011-2016), the UN Millennium Development Goals, Medium-Term Philippine Development Plan (MTPDP), the Agriculture and Fishery Modernization Act (AFMA), and initiatives of research groups. To achieve these goals, the following programs and projects, which have undergone review and critiquing during rice industry stakeholders consultation meetings held in Luzon, Visayas, and Mindanao in August 2010, are being implemented starting 2011:

### **C.1. Rice R&D Programs for Technology/Product Development**

The AFMA envisions a technology-driven attainment of food self-sufficiency and security. PhilRice will help to ensure the availability of enough affordable rice for all Filipinos. It will do this through more strategic R&D interventions. PhilRice shall develop technologies and other products that can expand rice yield growth over the medium term, sustain activities that narrow down the gap between actual farm yields and best practice yields, and create opportunities for the poor farmers and enable them to improve their farming practices or participate in markets through rice-based products entrepreneurship.

#### **Program 1: Developing Technologies to Break the Low Rice Yield Barriers in Rainfed, Upland, and Other Adverse Environments**

Cultivation and development of the upland rice ecosystem and other marginal rice areas in the country is one of the major strategies of DA to achieve its key goal to increase rice supply. These other marginal rice areas are classified as adverse environments that include flood, submergence, saline, drought and temperate prone areas. There is a need to increase production in the marginal rice areas usually planted during the wet season, where majority of the subsisting farmers are resource-poor.

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 address this, the program targets to increase production and profitability of rice farming in the rainfed, upland, and abiotic stress-prone environments. The program comprises the following components:

1. Variety development for rainfed, upland, and abiotic stress-prone rice environments.
2. Development of integrated crop management options for rainfed, upland, and other abiotic stress-prone rice environments.
3. Water harvesting, conservation and management.
4. Development of systems/technologies for crop intensification and diversification.
5. Development of PalayCheck® system for rainfed, upland and abiotic stress-prone environments.

## **Program 2: Developing Technologies to Surpass the Dry Season Irrigated Lowland Rice Yield Plateau**

Rice is the major and staple food of Filipinos. Most of the palay (rough rice) harvested comes from the irrigated ecosystem that comprises 3.1M ha of the total 4.5M ha planted to rice in the Philippines (BAS, 2009). Irrigated rice is defined as a crop that requires standing water for its normal growth, not confined to lowland but also to high places where paddies are built for planting rice. It requires irrigation water made available through artificial means such as gravity, force, power pumps, etc. In 2009, rice production in irrigated areas was 12.1M mt of the total 16.3M mt produced with an average yield of 4.14 mt ha<sup>-1</sup> (BAS).

Irrigated areas for rice production are critically important to the country as its population continues to increase. Rice consumption is projected to increase at a rate corresponding to the population growth. The continuous development of high-yielding inbred and hybrid varieties resistant to pests and diseases with excellent grain qualities is essential to keep up with the increasing demand for rice. Raising rice yield to its maximum potential under irrigated conditions particularly during the dry season is the main goal of the program through the following projects:

1. Breeding of new and superior inbred rice for transplanted irrigated lowland areas.
2. Development of inbred varieties for direct wet-seeding.
3. Development of hybrid rice varieties.
4. Development of seed and seed production, and crop management technologies.

### **Program 3: Natural Products & Value-Adding Systems Development**

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. Aside from low levels of productivity, cheap prices of produce, and weak marketing support, poverty also manifests high cost of inputs and hired wages in farming. It is therefore important to empower farming communities to improve their practices, reduce farming cost, increase the value of their produce, and explore additional sources of income in order to improve their economic condition. Another significant problem caused directly or indirectly by poverty is malnutrition. This affects not only the rice-based farming households but also the consumers in general.

The program will explore rice and other commodities to help increase income and improve the nutritional status of rice-based farming communities. Value-adding systems will be developed and evaluated to enhance quality, nutrition, shelf-life, market value, profitability, and availability. The different activities will increase the value and profitability of rice farming. Therefore, this program aims to contribute to the reduction of poverty and malnutrition in the rice-based farming households. The program comprises the following components:

1. Development of rice varieties with value-added traits (special purpose, micro-nutrient-dense rices)
2. Assessment and improvement of quality and utilization of rice variants
3. Utilization of rice and other agricultural commodities for food applications
4. Maximizing the potential of rice by-products, farm biomass, and biotics
5. Development of systems and modalities to improve the nutritional and economic conditions of rice-based farming communities.

### **Program 4. Impact Evaluation, Policy Research, and Advocacy**

To create bigger impact, rice R&D products must be adopted first by the target clientele. Though rice R&D products are designed to improve the productivity of rice farming, these products may have unforeseen negative interaction with their intended users that could hinder widespread use. R&D managers, scientists, and researchers need to understand the dynamics of technology adoption. Through the IEpra program, the NRRDP can get a better hold of the patterns and constraints to adoption, and social acceptability of rice R&D products. By having a good feedback mechanism about the acceptability of rice R&D products to target users, R&D managers, scientists and researchers can improve their technology development processes and thereby become proactive in increasing the adoption level of rice R&D products.

There is also a need to conduct socioeconomic and policy researches to gain a better understanding of how issues in the rice industry affect the national economy and, in turn, how policies at the macroeconomic level affect the development of the rice industry. The NRRDP can contribute better to the rice development objective of the government if it has a clear grasp of the policy environment that surrounds the rice industry. With a program on IEpra that directly analyzes the key issues

surrounding the rice industry, the NRRDP can be in the best position to recommend appropriate actions to policymakers so that they can make informed decisions and better policies toward the achievement of rice self-sufficiency, poverty alleviation, and improvement of nutrition status of the population. The program is composed of four research projects namely:

1. Social dimensions of rice-based farming systems
2. Impact evaluation of rice R&D and related production services
3. Understanding markets and prices of rice, value-added rice products, and farm inputs
4. Policy research and advocacy

### **Program 5. Developing and Packaging of Location-Specific Rice Technologies for Irrigated, Rainfed and Upland Areas**

Location-specific technology development (LSTD) is a process of modifying or fine-tuning a package of technologies generated through scientific research to make these suitable to the prevailing biophysical, socio-economic, cultural, and environmental conditions in a certain locality. LSTD in rice production generates science-based, precise, socially accepted, environment-friendly, high-yielding, and cost-reducing technologies suited to particular rice ecosystems, and seasonal, soil and climatic conditions. This on-farm research approach to developing site-specific technologies has been adopted by countries like Thailand, Taiwan, India and other countries for the past years and has been proven to be highly effective in getting rapid response from farming communities to adopt more productive and sustainable crop production practices.

PhilRice is scaling-up the PalayCheck® and Palayamanan® technology platforms by making more location-specific or customized to the farmers' needs through the LSTD program. It aims to further strengthen its support to the national rice self-sufficiency program of the government. Started in 2009 wet season cropping, PhilRice has mobilized all its seven branch stations to plan and implement, with partner institutions, LSTD thrust in particular areas; and training and information support services in irrigated farms where rice yields are below 4 t/ha, rainfed areas where rice yield is below 2.9 t/ha, and upland areas where rice yield is below 1.5 t/ha.

This program will bring back the rice scientists and specialist of PhilRice and other research institutions to work closely with local extension workers, farmers and local leaders in developing location-specific technologies especially in areas where recommended rice technologies have not worked well in increasing rice yields and profits.

Thus, this program aims to contribute to the achievement of national rice self-sufficiency by: (1) increasing the productivity and income of farmers in irrigated areas producing less than 4 t/ha through the promotion of a customized PalayCheck® system, and (2) improving the productivity of farmers in rainfed areas

producing less than 2.9 t/ha, and increasing and diversifying the sources of their income through the promotion of a customized Palayamanan® system.

1. Development and packaging of location-specific technologies for irrigated, rainfed, and upland areas
2. Capacity building of rice specialists and extension workers
3. Enhancement of knowledge-sharing, learning & decision-making on LSTD

## **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.

***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.

***Germplasm and Seed Health*** manages and ensures availability of fully characterized germplasm to rice plant breeders and researchers. 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.

***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. The division also aims to help increase the Institute's profitability by rendering quality analytical services in support of the development of appropriate and best technologies for Filipino farmers.

***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. Branch Station-Based Rice R&D**

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 center for dryland agriculture R&D focusing on the improvement of rice-based cropping systems in semi-arid areas and development of technologies and management options for rice in the rainfed and other stress-prone environments such as water harvesting conservation and management.

***PhilRice Isabela*** is the institute's hybrid rice center to develop, package, and promote hybrid rice-related technologies. The station also pursues activities on nutrient, water, and pest management, and socio-

economics and policy. Through the station's support, Region 2 has become the country's main producer of hybrid rice seeds.

***PhilRice Los Baños***, in partnership with the research institutions and local government units (LGUs), has been conducting major activities in plant breeding, crop protection, agronomy and soils, rice chemistry and food science, and technology promotion and development. Its strong collaboration with IRRI, UPLB, and members of the rice R&D network has led to the development of location-specific rice varieties and technologies.

***PhilRice Bicol*** is being developed as the future center of rice R &D for climate change adaptation and disaster risk reduction and mitigation within the five-year period (2011-2016). The evolving station's initial R&D activities focus on screening and adaptability trials of promising lines and varieties in irrigated, rainfed, and upland areas. It will also help in promoting high-yielding rice varieties by producing high-quality seeds of adaptive varieties in the locality.

***PhilRice Negros*** develops specialty and premium rices (organic rice). It also serves as the distribution center for quality seeds of high yielding and disease-resistant modern varieties suited for the varying conditions of the islands in the Visayas.

***PhilRice Agusan*** is the institute's nutrient management center. Zinc deficiency is among the prevalent problems of rice farmers in the area because of frequent rainfall. The station participates in the yield trials for the national cooperative testing project and seed production. It also conducts technology promotion activities in partnership with the local government units.

***PhilRice Midsayap*** focuses on rice pest problems in Mindanao. The station is also active in seed production and in the development of integrated pest management practices because of the prevalence of rice pests within the locality.

The Midsayap and Agusan stations conduct rice R&D for Mindanao to propel the growth of Mindanao as the other Philippine Rice Bowl. Mindanao has 1.063 M hectares harvested rice areas or 23% of the total harvested rice areas of the country. There is still a great opportunity to further increase the yield level from 3.61 t/ha to 5 t/ha, which is the yield level at 100% rice self-sufficiency national level.

### **C.2.3. Specialized Rice R&D**

***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.

**PhilRice Climate Change Center** will help bring about clear and judicious understanding of the current and future impacts (i.e. biophysical, socioeconomic, etc.) of climate change, including variability and extremes on Philippine rice farming systems. It will also provide direction, leadership, and coordination of Rice and Climate Change-related R&D activities to ensure optimum utilization of research outputs related to climate change mitigation and adaptation. The center's outputs will be useful to policy-makers, stakeholders and decision-makers in the rice sector as well as funding donors in better allocating their support toward climate change mitigation and adaptation.