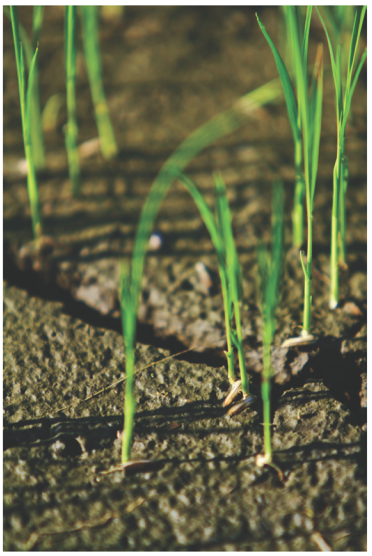

Toward a More Resilient and Competitive Philippine Rice Industry: Lessons from the Past Three Decades

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Toward a More Resilient and Competitive Philippine Rice Industry: Lessons from the Past Three Decades[1]

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Executive Summary

This paper explores the potential for a sustained and mutually beneficial partnership between the Philippine government through the Department of Agriculture (DA) and the International Rice Research Institute (IRRI) in the light of the national and global challenges faced by the Philippine rice sector. In this context, the paper examines the National Rice Program and sector performance over time, and analyzes government spending in connection with the program.

Rice has been the focus of Philippine agricultural development since the 1950s. This rice bias of the government agricultural program is reflected in the disproportionate amount of resources poured into the sector. Rice self-sufficiency has been a recurring goal as a short-term response to both local and international economic crises and the aftermaths of natural calamities. With the increasingly felt effects of climate change events on the rice sector, there is pressure to veer away from business as usual and move toward increasing the resilience of the sector. In addition, with the lifting of quantitative restrictions, there is a strong reason for the sector to shape up and be competitive.

The paper has six sections. **Section 1** shows that rice remains an important component of the Filipino diet, and it comprises a significant share of household food expenditures. Relative to other Asian countries, per capita rice consumption continues to increase. However, the rice protection policy of the government has penalized the poor, who spend more on rice. Compared to other ASEAN countries, the paddy farm price in the country had been high—an indication of inefficiencies in the production system—which may have been perpetuated by the protectionist policy. In fact, the cost to the country of the gap between world and domestic rice prices has been substantial and, at some point, it was larger than the budget allocation for the entire DA system.

Section 2 reviews the National Rice Program (NRP) from 1986 to 2016 and the rice sector performance from 1970 to 2014. It shows the NRP targets and accomplishments in terms of rice production and yield to achieve self-sufficiency across the past five administrations. Even with new acronyms for the key programs introduced, the components have not been too different although the allocations varied. The results indicate that the NRP targets have been generally not achieved. The targets in the earlier administrations were way off compared with the last two. Also, targets for rainfed rice appeared to be conservative enough for them to be met while those for irrigated rice were not reached. How production and yield targets are set is not apparent (and not done transparently) although this appears to be getting better or becoming more conservative as the gaps between targets and accomplishments decrease. Trends in production and yield performance show consistent improvement over time, especially for irrigated rice, with yield increasing an average of 0.05 t/ha and production an average of close to 300,000 tons per year. These favorable trends in production and yield, especially in the past five years, are confirmed by the decline in the self-sufficiency gap in the same period. Yet, the global food security standing of the country is relatively poor compared with that of Thailand, Vietnam, and Malaysia. In addition to this concern, comparison of performance in terms of growth in total factor productivity (TFP) indicates that the country did better than the four other Asian countries in the early 1980s according to a study of Sawaneh et al (2013). However, this productivity growth was not sustained until the recovery in 2001 to 2010, with growth solely accounted for by technical progress. Also, although rice productivity improved, growth has been lowest among the five Asian countries. Meanwhile, production efficiency improvement, after its key role in the 1980-85 TFP growth, has not been contributing to productivity growth since then.

Section 3 examines production costs and returns of rice farmers and implications for rural poverty. Rice farms are becoming more fragmented and the average size is becoming smaller, with more

than 50% having an area of less than 1 hectare. The greatest cost in rice farming is labor; thus, farm mechanization has the greatest potential for increasing profit. However, the fragmentation of small rice farms poses a serious challenge to farm mechanization. For the majority of rice farmers, income from rice farming has become a smaller part of the household income.

The poverty situation in rural areas has not changed much during the past 15 years. The reduction was very modest in comparison with that of other ASEAN countries. Thus, the strategic goal of the rice sector development program should be to increase total farm productivity and income rather than rice production alone in order to optimize total farm income.

Section 4 discusses government allocation and spending on the rice sector, especially the National Rice Program. The rice bias in the past two decades is more apparent in the allocation for rice relative to the agricultural sector budget through the DA and its attached corporations. The ratio of the rice sector budget to that of the DA system ranged from 60% to 73% from 1995 to 2015 and it dropped to about 50% in the past three years. In terms of palay GVA growth, the data indicate that the government has been allocating substantially more resources to prod the growth of rice sector output.

Regional Field Office (RFO) allocations by major final outputs (MFOs) show that production support accounts for about a third of the total, followed by infrastructure and postharvest, and irrigation. The Office of the Secretary (OSEC) continues to hold a substantial amount of the budget, and it gives priority to extension support, education, and training services (ESETS), and production support services. It also allocates a quarter of the resources for plans, policy, program coordination, and monitoring and evaluation (M&E), which are the core functions of the Office. For the NRP for the 2011-16 budget, the priority was infrastructure and irrigation, followed by production support. Although ESETS had been allocated 15%, R&D had only about 9%. Thus, the National Rice Program of the last administration was mostly about infrastructure and production support, which consists mainly of subsidy for seeds. Regional allocation in 2012 to 2015 had been biased toward poorly performing regions, which were obtaining more related to their palay GVA contributions or area harvested. The government appears to be investing more in the less performing regions in terms of palay value added.

Section 5 deals with the IRRI-DA partnerships during the post-Marcos years (1987-2016). The analysis covers the years from 1987 to 2009 under the administrations of four presidents. This part is followed by an assessment of the current partnership of IRRI with the DA (2010-16) through the seven projects under the Food Staples Sufficiency Program (FSSP). This section highlights IRRI's comparative advantage as an international research partner of the Philippine national agricultural research and extension system (NARES) toward addressing the strategic issues that continue to hobble the rice sector.

Section 6 presents a framework for partnership between IRRI and the Philippine government through the Department of Agriculture. This section recommends reforms for the rice sector to make it more resilient and competitive. It also explores the various forms and nature of partnerships that support the goals and objectives of the Philippine National Rice Program.

Contents

Introduction 1

Why This Study?

This study is sponsored by the International Rice Research Institute (IRRI) and funded by the Food Self-Sufficiency Program (FSSP) of the Department of Agriculture (DA). The objective is to determine short-term and long-term areas of partnership between the Philippine government, particularly the DA, and IRRI that could effectively help the Philippines attain a more resilient and competitive rice sector.

Five key issues drive this study. First, rice has always taken the center stage of Philippine agricultural development since the 1950s, and the Philippine government has consistently pursued a policy of rice self-sufficiency (**Habito 2016a**). In pursuit of this policy, the government has spared no effort to pour a disproportionate amount of government attention and resources into the rice sector of the country to the point that the growth of other sectors has suffered (Dy 2016, Habito 2016c). Second, despite a rice bias, Philippine agricultural development, the goal of rice self-sufficiency, affordable rice, and prosperous rice farmers have remained largely elusive. From the 1950s to the present, the Philippines has attained self-sufficiency in only four years, a 7% success rate, which has befuddled the public, and has been the subject of severe public criticisms (Gamboa 2016). The domestic price of rice in the Philippines is one of the most expensive in the ASEAN region, and a large segment of rice farmers and Filipino farmers suffers from continuing poverty; Philippine rural poverty is the highest among the five original ASEAN countries (Leoncio 2015). Third, ASEAN economic integration is due by June of 2017, which will result in the removal of quantitative restrictions on rice imports. Fourth, the effects of climate change on the agricultural industry, particularly rice, have become more serious, which threatens further the rice industry and the nation's food security. Therefore, there is an urgent need to focus on making the rice industry competitive if it is to survive and develop (PhilRice DA News, 2016). Fifth, IRRI, the world's leading rice research institute, is located in the Philippines. For the general public in the Philippines, it is difficult to understand the Philippines' continued failure to achieve rice self-sufficiency despite IRRI's presence (Wailes and Chavez 2012).

- **Section 1: How Much Do Filipinos Pay for Rice?** This section looks at Filipino household expenditures using the latest Family Income & Expenditure Survey (FIES) 2012. The section

examines the food composition of a typical Filipino diet from the Food & Nutrition Research Institute's (FNRI) study. Then, the section proceeds to examine food expenditures as a composition of the total household expenditure by income classes, and also rice and products expenditure in the total food expenditures among different income classes. Then, the section looks at the domestic price of rice in relation to other ASEAN countries and the world domestic price. Given the relatively high domestic price of rice compared with the world price, the section compares price differentials across various Philippine administrations, starting with Marcos and ending with B. Aquino. Finally, computation was made on the total annual additional cost that Filipino consumers pay for rice as a consequence of the domestic rice protection policy.

- **Section 2: The National Rice Program and Performance: 1986-2016.** This section examines the government National Rice Program (NRP) during the past three decades, covering five administrations, starting with President C. Aquino and ending with B. Aquino. The analysis focuses on the targets set by the NRP on rice yields as a measure of rice productivity and total harvest to achieve self-sufficiency. Then, the section examines the goals, objectives, and strategies employed in each administration and its actual performance, that is, actual yields and total production against the targets set. Comparisons are made across administrations on the various facets of the program to see how the NRP is evolving as a result of its learning experiences, particularly in its strategies, investment in key policy instruments, and the corresponding results in terms of yield and total production. This is quite critical given the continuing challenge of the country to achieve its elusive goal of rice self-sufficiency for more than half a century.

- **Section 3: Rice Production Costs and Returns and Rural Poverty.** This section proceeds to analyze the costs and returns of rice production to determine the factors that contribute to the cost of domestic rice, and to determine possible areas of research and innovations to bring down the cost of production. Finally, the chapter looks at landholding and rural poverty in rice as a takeoff point in the search for innovations to help address the problem of poverty alleviation among rice producers, especially among smallholders.

- **Section 4: Financing the Rice Sector and the National Rice Program.** This section discusses the budget of the national government for the National Rice Sector Program and the NRP. The key critical questions here are: How much does the national government budget annually for the rice sector program under different administrations? How do these budgets compare with the rice GVA and the total budget of the Department of Agriculture? Given the importance of rice research, development, and extension in the pursuit of growth in productivity, the study examines the RDE budget in relation to the GVA for rice to assess whether it has met the minimum rule of thumb of 1% of the commodity GVA to sustain productivity growth. Then, the section proceeds to examine the various components of the budget for the NRP in terms of the major final outputs (MFOs) mandated by EO 116 under the Freedom Constitution. Since the budget items in the NRP do not exactly follow the investment categories under EO 116, the section proceeds to deconstruct the budget in terms of the MFOs of EO 116 (**Table 4.9**). The aim is to quantify investment by key policy instruments. The objective is to determine whether balanced investment exists among various policy instruments. Equally important is to determine whether the DA rice budget coheres to a key principle of New Public Management (NPM), that is, government investment shall focus on the provision of public goods to help create a policy environment that makes agriculture efficient and, thus, encourages farmers and the private sector to take greater risks (Habito and Briones 2005).

- **Section 5: IRRI-Philippine Partnerships in the Past 30 Years.** The next section deals with the IRRI-DA partnerships during the post-Marcos years (1987-2016). The analysis covers the years from 1987 to 2009 under the administrations of four presidents. This part is followed by an assessment of the current partnership between IRRI and the DA (2010-16) through the seven projects under the Food Staples Sufficiency Program (FSSP). This section highlights IRRI's comparative advantage as an international research partner of the Philippine national agricultural research and extension system (NARES) toward addressing the strategic concerns that continue to hobble the rice sector.

- **Section 6: Toward a More Resilient and Competitive Rice Sector: Areas of Reform and Partnerships.** The sixth section presents a framework for partnership between IRRI and the Philippine government through the DA. This section details the recommended reforms of the Philippine NRP to better meet the objectives of resilience and competitiveness of the sector.

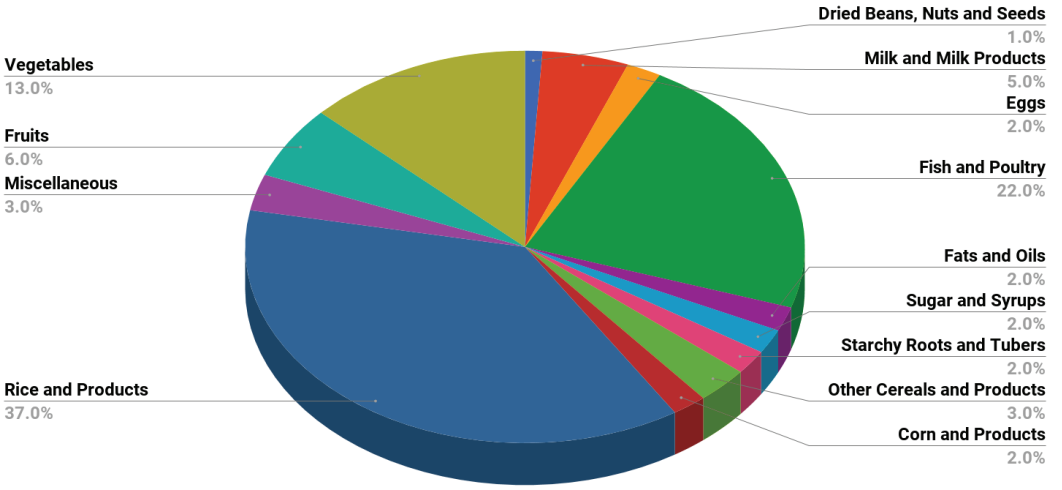
Methodology

To accomplish the objectives of this study, a combination of desk review, key informant and expert interviews, and secondary data analysis was carried out. Specifically, in reestablishing the importance of rice in Filipino diets and budgets, data from the Food Nutrition Research Institute (FNRI) and the Philippine Statistics Authority (PSA) were analyzed. The review of the NRP required looking at documents from various offices of the DA such as the NRP, Financial Management Service, Planning and Monitoring Service, Philippine Rice Research Institute (PhilRice), Bureau of Agricultural Research, Philippine Crop Insurance Corporation, Agricultural Training Institute (ATI), Field Operation Service, and Administrative Service. The secondary data collected from various agencies included the DA, National Irrigation Administration (NIA), PSA, Food and Agriculture Organization (FAO) for FAOSTAT, World Bank (WB) for World Development Indicators (WDI), and United States Department of Agriculture (USDA) for world prices of rice. On the other hand, the review of IRRI partnerships with the Philippines involved examining relevant documents and project reports of IRRI. Specifically, in analyzing the partnership projects during the post-Marcos years (1987-2016), the study examined pertinent project documents such as agreements, interim and progress reports, and preliminary assessments. The review focused on characterizing the partnerships in every administration in terms of the following areas: (a) objectives of the partnerships, (b) scope of the partnerships in terms of institutions involved and resources invested by both parties, and (c) outputs and impact, if available. This discussion on partnerships ends with the review of the projects under the FSSP from 2010 to 2016. For this part, the study carried out a peer review and expert judgment to obtain perspectives on the various projects and interviewed key government partners: PhilRice, ATI, and the DA regional field units (RFUs) for Regions 2, 8, and 11. The last section on framework for partnership between IRRI and the Philippine government draws from the findings and integrated lessons from all the earlier sections.

Rice in the Filipino Diet and Expenditure

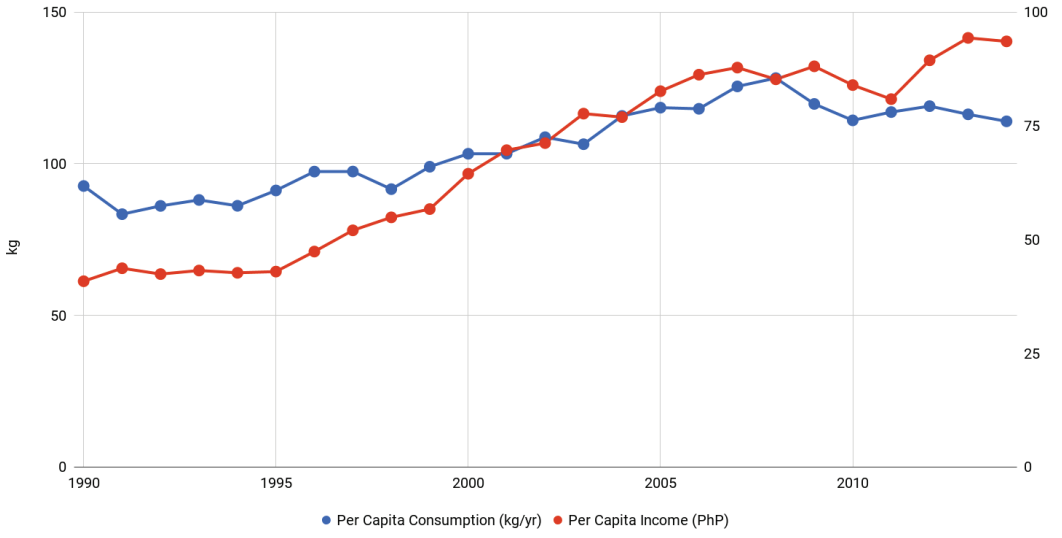
Rice is the most important staple and constitutes a big part of the family budget. Rice and its products constitute the most important source of carbohydrates among Filipinos (**Fig. 1.1**), and per capita consumption has been increasing as per capita incomes increase (**Fig. 1.2**). Rice and its products comprise 37% of the average daily diet of a Filipino family. Far second to rice are fish, meat, and poultry products, followed by vegetables.

Fig. 1.1. Average daily per capita food intake by food groups, Philippines, 2008.



Data source: FNRI-DOST (2008)

Fig. 1.2. Per capita rice consumption and per capita income, 1990-2014.



Data sources: PSA & WDI World Bank

For 80% of Filipino families, food accounts for more than 50% of the household's total expenditure. The lower income groups spend more than 60% on food. Rice expenditure accounts for roughly one-fifth of the total family food expenditure. Across income classes, rice expenditure ranges from 22% to 31% for the bottom four quintiles of households as shown in **Table 1.1**.

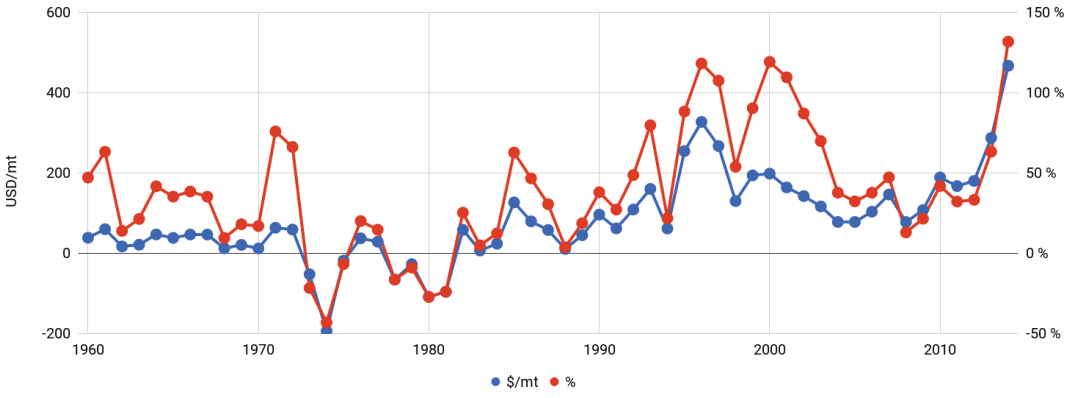
Table 1.1 Bread and cereals in family food expenditures by income class, 2012.

Item	All income classes	Income Classes				
		Under 40,000	40,000 –59,999	60,000 –99,999	100,000 –249,999	250,000 and over
Food Expenditure (PhP M)	1,765,634	14,042	46,767	192,833	677,073	837,475
% of Total Family Expenditure	42.8	62.3	62.2	60.1	51.8	34.9
% Distribution of Food Expend.						
Total Bread and Cereals (%)	28.0	42.2	43.7	41.1	31.3	20.9
Rice Expenditure (%)	19.9	30.0	31.1	29.3	22.3	14.9
Corn Ependiture (%)	1.2	1.8	1.8	1.7	1.3	0.9
Flour Expenditure (%)	0.1	0.1	0.2	0.1	0.1	0.1
Other Cereal Preparation (%)	1.5	2.2	2.3	2.2	1.7	1.1
Bread Expenditure (%)	4.3	6.4	6.6	6.2	4.8	3.2
Pasta Expenditure (%)	1.0	1.6	1.6	1.5	1.2	0.8
Other Bread Expenditure (%)	0	0	0	0	0	0
Other Food (%)	54.5	47.4	50.1	51.2	54.2	56.0
Food Regularly Consumed outside the home (%)	17.5	10.4	6.2	7.7	14.5	23.1
Total Food Expenditure (%)	100	100	100	100	100	100

Data source: 2012 Family Income and Expenditure Survey (FIES), NSO.

Wedge between world and domestic prices penalizes the poor. The difference between domestic and world prices of rice for more than five decades is shown in **Figure 1.3**. Except for a few years, domestic prices have been higher than world prices. With rice comprising a big part of household budgets, consumers bear the cost of the government's rice policy, which results in higher domestic prices. Given that the poor spend more on rice, the government price policy, unfortunately, has the unintended effect of penalizing the poor.

Fig. 1.3. Difference between Philippine domestic rice prices and world prices, 1960-2014.



Items	Pre-Marcos		Marcos		C. Aquino		Ramos		Estrada		Arroyo		B. Aquino	
	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest
USD/MT	15	59	-188	127	16	97	80	329	136	200	78	164	172	471
%	16	64	-42	64	6	39	23	119	55	120	15	110	34	132

Data sources: World Bank, UDSA-ERS, PSA CountryStat.

Estimates of the burden on Filipino consumers due to the higher cost of domestic rice indicate that this is very substantial, ranging from PhP 65 billion to PhP 127 billion per annum (**Table 1.2**). The differential cost between the world price and domestic price was highest in 2003, reaching 42%. It should be noted that the 2012 cost at PhP 91 billion is 1.5 times the PhP 61 billion budget of the DA and its attached agencies for that year.

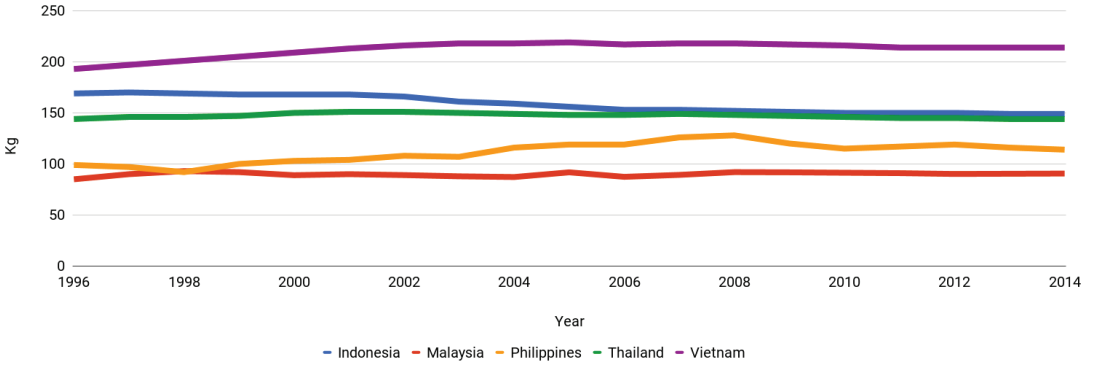
Table 1.2. Estimated costs to households of the price wedge, 2003-12.

Items	All income classes			
	2003	2006	2009	2012
1. Domestic Price (PhP/MT)	16,510	19,490	28,250	30,040
2. World Price (PhP/MT)	9,654	13,956	22,950	22,266
3. Annual Consumption* (MMT)	9.49	22.90	21.53	11.70
4. Family Total Annual Rice Expenditure at Domestic Price (PhP M)	156,717	446,240	608,331	351,511
5. Family Total Rice Expenditure at World Price (PhP M)	91,634	319,542	494,197	260,546
6. Difference (PhP M): (4) – (5)	65,083	126,698	114,135	90,965
7. % Difference	42	28	19	26
8. Total DA budget (GAA at current prices)	16,824	15,383	46,862	60,871

Data sources: Basic data are from PSA CountryStat and FIES 2003, 2006, 2009, and 2012, World Bank, USDA ERS.

Increasing rice consumption. Figure 1.4 shows that, despite the seemingly flat trend, compared to Vietnam, Indonesia, and Thailand, Philippine rice consumption is growing fastest. From 2000 to 2014, the per capita consumption of the Philippines grew at 0.53%, which is more than three times that of Vietnam.

Fig. 1.4. Trends in per capita rice consumption, selected ASEAN countries.

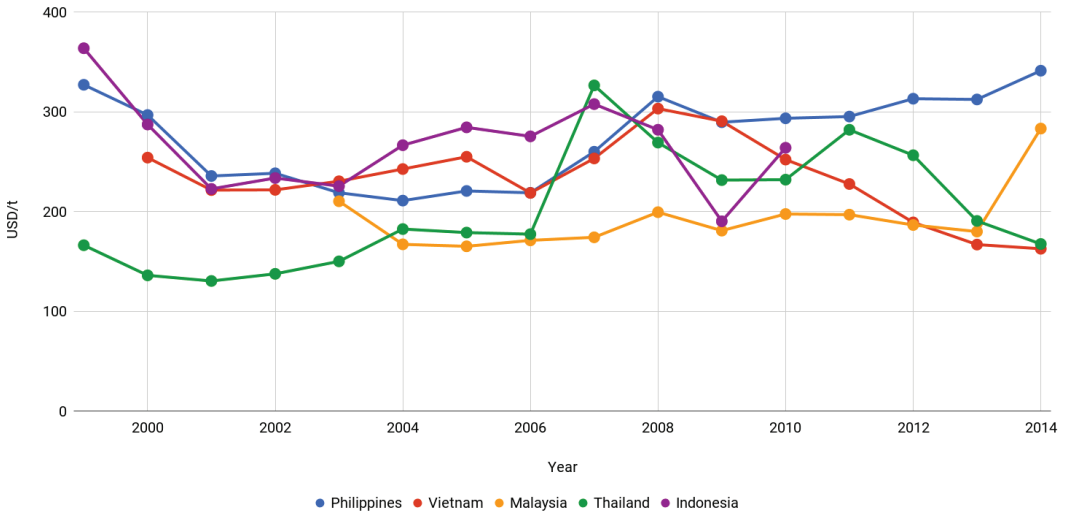


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Growth Rate(%) 2000-2014
Indonesia	169	170	169	168	168	168	166	161	159	156	153	153	152	151	150	150	150	149	149	-0.806
Malaysia	85	90	93	92	89	90	89.1	87.9	87.2	91.8	87.4	89.3	92	91.8	91.4	91	90.2	90.4	90.6	0.119
Philippines	99	97	92	100	103	104	108	107	116	119	119	126	128	120	115	117	119	116	114	0.531
Thailand	144	146	146	147	150	151	151	150	149	148	148	149	148	147	146	145	145	144	144	-0.286
Vietnam	193	197	201	205	209	213	216	218	218	219	217	218	218	217	216	214	214	214	214	0.161

Data source: University of Arkansas Rice Research (2015).

Worth noting is that paddy prices have been the highest since late 2000 (**Fig. 1.5**).

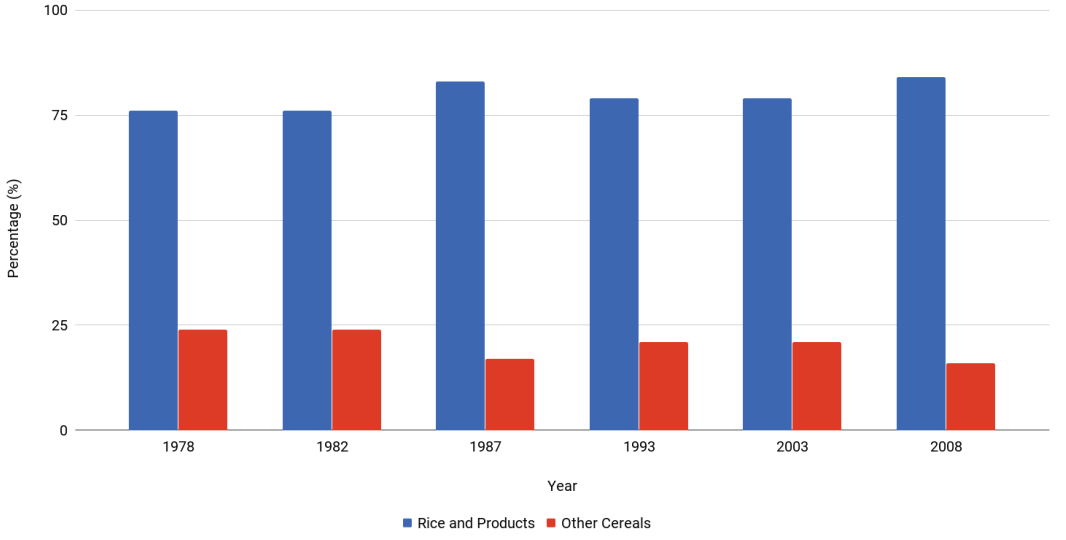
Fig. 1.5. Paddy price trends of selected ASEAN countries, 1991-2014.



Data source: FAOSTAT
Note: deflated by CPI 2010 = 100.

Relative to other cereals, however, Philippine rice per capita consumption has been increasing as shown in **Figure 1.6**. This pattern remains despite the DA promotion of other staples. With the increasing population, it is expected that demand and consumption of rice will continue to rise in the coming years.

Fig. 1.6. Distribution of food staples, Philippines, 1978-2008.



Data source: FNRI-DOST (2008).

Summary

Rice continues to be the most important source of carbohydrates in the Filipino diet. It is eaten three times a day besides being served as snacks in between meals. Per capita rice consumption is increasing with increasing incomes. It is perhaps for these reasons plus the threat of climate change that the Philippine government has adopted a policy of rice self-sufficiency since its independence.

The Philippines has the highest domestic price compared with that of other rice-producing ASEAN countries, and the difference between the domestic price and world price is large and increasing in the past 30 years.

The price for rice exacts an undue burden on three-fourths of the Filipino households whose food expenditure constitutes more than 60% of total household expenses among households in the lower 60% income group. The annual cost differential (what consumers additionally pay) between the world price and domestic price is greater than the annual budget of the DA family of agencies in the years studied.

The poor bear the greatest burden of the high domestic price for rice; therefore, the government rice protection policy has the effect of penalizing the poor. Thus, if the government is able to bring down the cost of domestic rice equal to that of the world price, it will likely have a strong positive impact on reducing poverty in the country (Habito 2016b, Cororaton and Yu 2017). Family savings from rice will likely stimulate economic growth. Therefore, the national challenge is affordable and available rice for Filipinos.

The National Rice Program and Rice Sector Performance: 1986-2016

2

The government's vision for the agricultural and fisheries sector is a "competitive, sustainable, and technology-based" sector, "driven by productive and progressive farmers and fishers, supported by efficient value chains, and well-integrated in the domestic and international markets, contributing to inclusive growth and poverty reduction" (AFMP, 2011-17). This vision is translated into three specific sector goals: (a) assure food security and increased income; (b) reduce risks inherent in the sector, including climate change impacts; and (c) enhance policy environment and governance. Compared to past plans, this vision and the sector goals are not too different from those of past administrations. To translate the goals of the Agricultural and Fisheries Modernization Plan (AFMP), the DA formulates national commodity banner programs on rice and corn, high-valued crops, fisheries, and livestock. Since President Marcos, rice has always been the central focus of the Philippine agricultural development program (Philippine LaRouche Society 1985).

Rice Sector Performance under Various Administrations, 1986-2016

From President Cory Aquino to President B. Aquino for a period of 30 years, the government achieved self-sufficiency in only three years: 1991, 1992, and 1994, which translates to a success rate of 10%. From 1994 to 2015, the self-sufficiency ratio ranged from 72.05% in 1998 due to El Niño to 96.81% in 2013, the year the DA targeted 100% self-sufficiency. Excluding the effects of El Niño in 1998 from the computation, the self-sufficiency ratio of the country stands at an average of 91.59% from 1988 to 2014 (**Table 2.1**).

In pursuit of the goal of rice self-sufficiency, administrations since President Cory Aquino have established yield targets for irrigated and rainfed rice. Unfortunately, the *success rates for these targets are very low: zero for irrigated rice and 27% for rainfed rice* (**Table 2.1**). The very low success rate raises two critical issues: first, the methodology for computing yield and production targets by the NRP. Unfortunately, this is not clearly articulated in the program documents. Second is the ability of the rice research and extension system of the country to bring about the required improvements to meet the NRP targets.

Table 2.1a. Targets and accomplishments of the national rice programs from C. Aquino to Estrada administrations (1986-2001).

Administration	DA secretary	Programs & budget	Accomplishment				
			Year	Yield (t/ha)		Self-sufficiency ratio (%)	
				Target	Actual*	Actual	Deficit
			1987	I: 4.25	I: 3.14		
				R: 3.5	R: 1.94		
	C. Dominguez 1987-89	Rice Productivity Enhancement Program (RPEP), 1987-89	1988	I: 4.25	I: 3.12	97.10	2.90
				R: 3.5	R: 1.99		
			1989	I: 4.25	I: 3.19	96.93	3.07
				R: 3.5	R: 2.00		
	S. Bacani (1990-92)	Rice Action Program (RAP) 1990-92	1990	I: 4.25	I: 3.29	90.96	9.04
				R: 3.5	R: 2.07		
		Budget: PhP 10,995 M (1989-90)	1991	I: 4.25	I: 3.32	100.16	-0.16
				R: 3.5	R: 2.08		
			1992	I: 4.25	I: 3.34	100.57	-0.57
				R: 3.5	R: 2.07		
Fidel V. Ramos, President (June 30, 1992-June 30, 1998)	R. Sebastian (1992-96)	Key Production Areas, 1992-96	1993	I: 3.5	I: 3.34	96.83	3.17
				R: 2.0	R: 2.14		
			1994	I: 3.5	I: 3.38	100.00	0.00
				R: 2.0	R: 2.11		
			1995	I: 3.5	I: 3.26	96.31	3.69
				R: 2.0	R: 2.07		
			1996	I: 3.5	I: 3.31	89.49	10.51
				R: 2.0	R: 2.08		
	S. Escudero (1996-98)	Gintong Ani-Program, 1996-98	1997	I: 5.0	I: 3.39	91.07	8.93
				R: 3.0	R: 2.08		
			1998	I: 5.0	I: 3.06	72.05	27.95
		Budget: PhP 9,887 M (1995-98)		R: 3.0	R: 1.90		
Joseph E. Estrada, President (June 30, 1998-January 20, 2001)	W. Dar (1998-99)	Agriculturang Makamasa Program, 1998-2000	1999	W: 5-7	W: 2.89	90.23	9.77
				D: 7-10	D: 3.02		
				A: 5-6	A: 2.95		
	E. Angara (1999-2001)	Budget: PhP 6,259 M (1999-2001)	2000	W: 5-7	W: 3.02	92.69	7.31
				D: 7-10	D: 3.13		
	D. Panganiban (2001– 1 mo.)			A: 5-6	A: 3.07		

Data source: Department of Agriculture.
Notes: I = irrigated, R = rainfed.

Table 2.1b. Targets and accomplishments of the national rice programs from C. Aquino to Estrada administrations (1986-2001).

Administration	DA secretary	Programs & budget	Accomplishment				
			Year	Yield (t/ha)		Self-sufficiency ratio (%)	
				Target	Actual*	Actual	Deficit
Gloria M. Arroyo, President (January 20, 2001-June 30, 2010)	L. Montemayor (2001-02)	Ginintuang Masaganang Ani-Countrywide for Rural Employment and Services (GMA-CARES), 2001-10	2001	3.35	3.19	91.29	8.71
			2002	3.48	3.28	87.89	12.11
			2003	3.56	3.37	90.88	9.12
	L. Lorenzo Jr. (2002-04)		2004	3.67	3.51	90.45	9.55
			2005	3.83	3.59	83.98	16.02
	D. Panganiban (2005-06)		2006	3.91	3.68	85.38	14.62
			2007	4.21	3.80	85.47	14.53
	A. Yap (2004-05, 2006-10)	Budget: PhP 29,557 M (2002-10)	2008	4.14	3.77	81.90	18.10
			2009	4.11	3.59	85.83	14.17
	B. Fondevilla (2010–3 mos.)		2010	3.91	3.62	81.27	18.73
Benigno C. Aquino III, (June 30, 2010-June 30, 2016)	P. Alcala	Agri-Pinoy Program, 2010-16	2011	I: 4.16	I: 4.0	93.91	6.09
				R: 2.88	R: 3.0		
		Food Staples Sufficiency Program, (2011-16)	2012	I: 4.46	I: 4.2	92.13	7.87
				R:2.95	R: 3.1		
			2013	I: 4.66	I: 4.3	96.81	3.19
		Budget: PhP 38,868 M (2011-16)		R: 3.02	R: 3.1		
			2014	I:4.87	I: 4.4	92.04	7.96
				R: 3.09	R:3.1		
			2015	I: 4.9	I: 4.3	89**	11
				R: 3.16	R: 3.0		
			2016	I: 4.93			
				R: 3.23			

Data source: Department of Agriculture.
Notes: I = irrigated, R = rainfed.

Figures 2.1a to **2.1b** show the size of the gaps between the targets of the NRP and the actual palay yields over time and by production environment across different administrations. Notable are the very high targets from the C. Aquino up to Estrada administrations, leading to the bigger gaps for 1986 to 2000, except in 1993-94. The targets for the succeeding administrations have been more modest but performance continues to fall below the targets.

Fig. 2.1a. Trends in target vs. actual irrigated palay yields, 1986-2015.

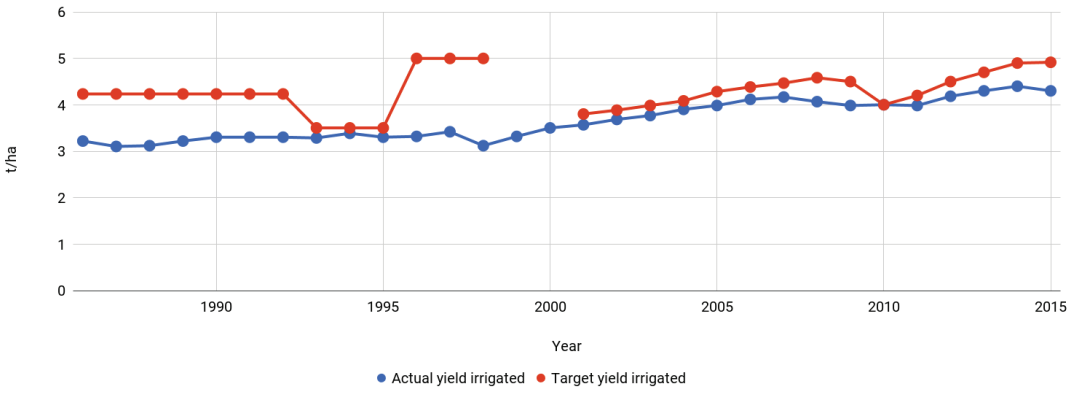


Fig. 2.1b. Trends in target vs. actual rainfed palay yields, 1986-2015.

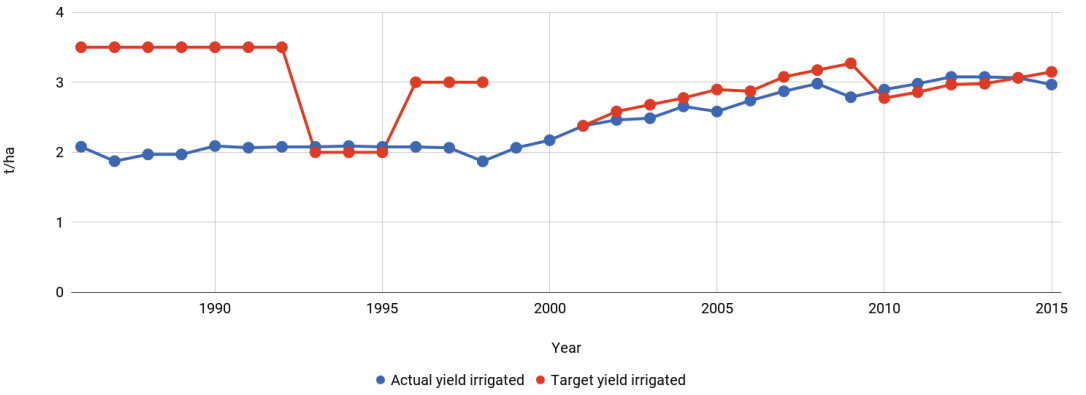
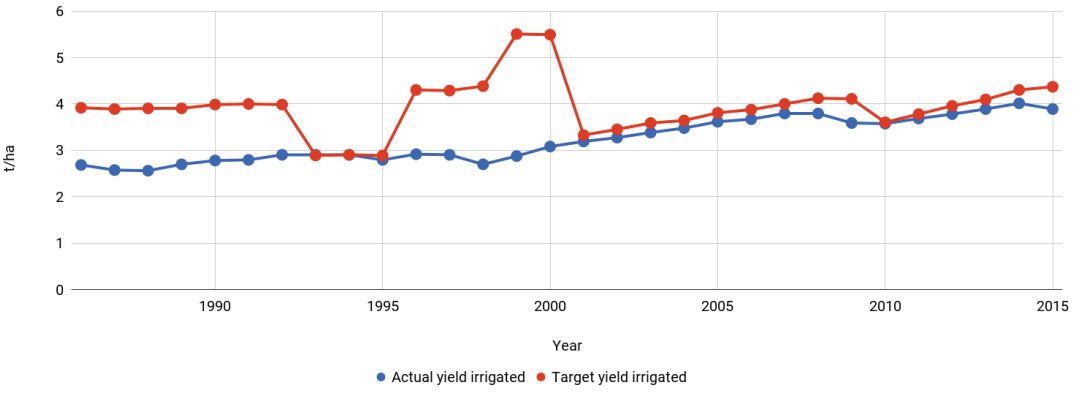


Fig. 2.1c. Trends in target vs. actual total palay yields, 1986-2015.



Data sources of basic data: PSA, DA.
Note: No data for targets by production environment for the Estrada administration.

The gap between targets and performance in the past two administrations has been more modest than in previous administrations, perhaps indicating improvement in the target-setting methodology, which, unfortunately, has not been articulated in the NRP plans, accomplishment reports, or its monitoring and evaluation reports.

The continued focus by the NRP on rice self-sufficiency raises an important issue in the planning and development of the rice sector. The performance outcomes or targets of the rice sector, like those of other sectors of agriculture, were defined by EO 116 in the creation of the DA. Section 4 is quite clear that farmers' income and job generation are the primary agricultural development goals. In the pursuit of these goals, the DA shall focus its intervention on "providing the policy framework, public investments, and support services needed for domestic and export-oriented business enterprises (Tables 4.7 and 4.8). In principle, the NRP should cohere to these important provisions of EO 116. Unfortunately, the NRP has failed to structure NRP plans and programs to the provisions of EO 116 from President Cory Aquino to the Duterte administration as of December 2016.

Making yield and production targets the key outcomes of the NRP is misleading besides being noncompliant with EO 116. Yield and production targets are not the direct outputs or outcomes of the DA's rice program. Natural resource factors such as the weather or climate, which are outside of the control of the government, play an important role in rice performance. Besides, by focusing on rice self-sufficiency, the NRP veers away from what is truly important in terms of the mandates of EO 116: income and job generation. It also veers away from the goals of agricultural development of RA 8435, that is, food security, poverty alleviation, global competitiveness, and sustainable development. Examining the NRP plans of various administrations shows that the outputs and outcomes of EO 116 and RA 8435 have not been given the right emphasis; the NRP plans have always focused on rice self-sufficiency and the corresponding yield and production targets.

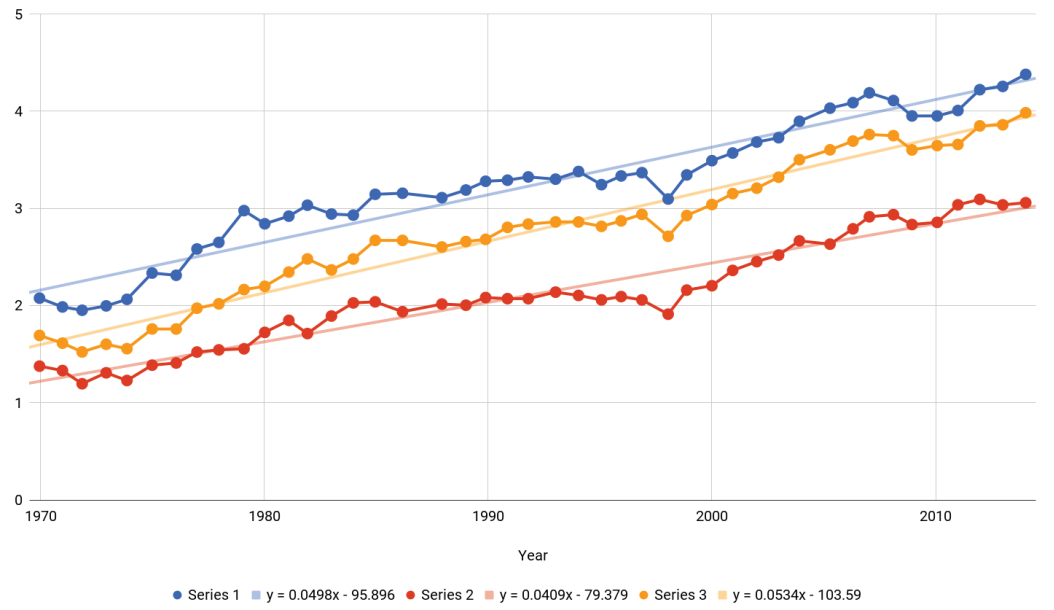
Trends in Palay Yield, Area, and Production

Figures 2.2a to 2.2c show the trends in palay yield, area, and production. Total area harvested increased at an average of 30,250 hectares annually from 1970 to 2014. This growth was largely contributed by the expansion in irrigated rice, which is increasing at the rate of 45,600 ha per year. This increase is partly offset by the decrease in rainfed areas. Comparing all administrations, growth in area harvested was highest during the Ramos administration at 3.98%, followed by B. Aquino at 2.16%.

Yields of irrigated area, as expected, are at least 1 to 2 tons higher than for rainfed areas. After the Marcos years, yield growth has been highest in the last five years, at an average of 2.5%, counting out the Estrada administration because of the effect of El Niño in 1998 (**Fig. 2.2a**).

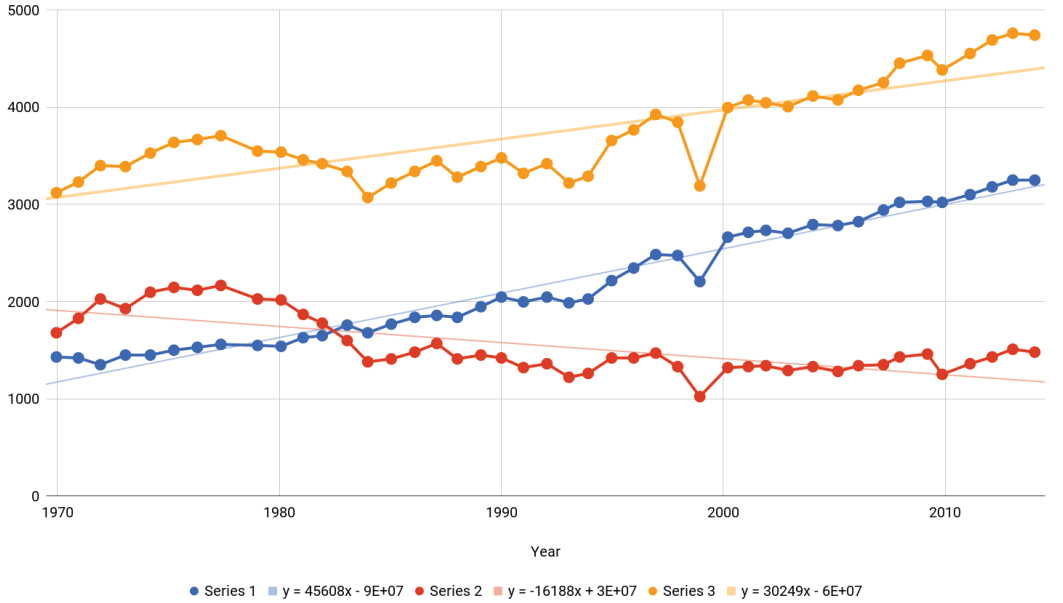
In production, the total increased at an average of 294,000 tons per year from 1970 to 2014. Nonetheless, the total is still lower than the FSSP target of 22.71 million tons by 2016. The growth can be largely attributed to the expansion and increasing productivity of irrigated areas. It is notable that production growth in the B. Aquino administration was almost double that of the Arroyo administration.

Fig. 2.2a. Trends in palay yield by production environment, 1970-2014.



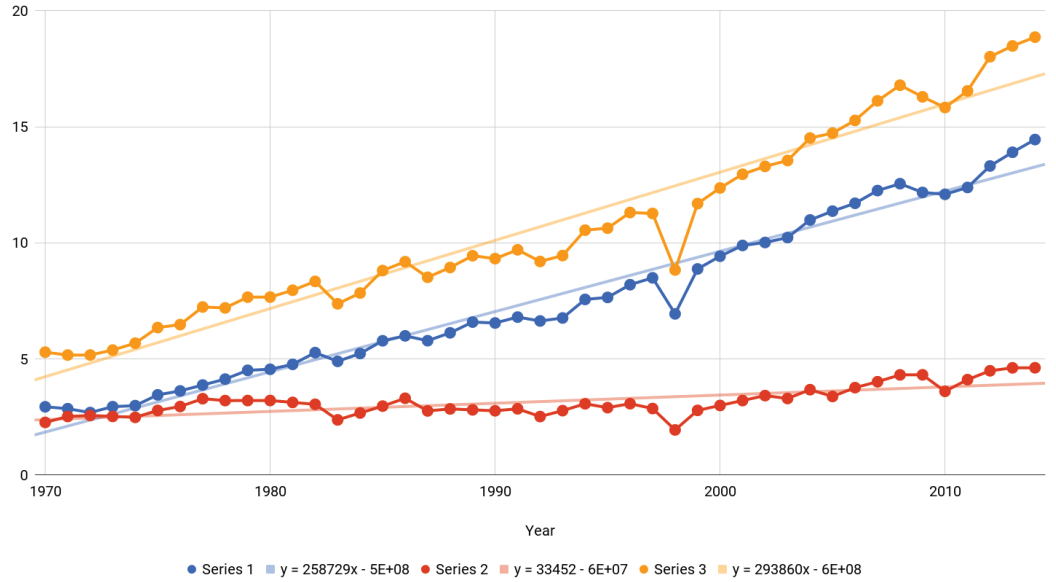
	Marcos	C. Aquino	Ramos	Estrada	Arroyo	B. Aquino
Yield growth	2.80%	1.07%	0.57%	5.02%	1.47%	2.53%

Fig.2.2b.Trends in palay area harvested by production environment, 1970-2014.



	Marcos	C. Aquino	Ramos	Estrada	Arroyo	B. Aquino
Ave. area growth	0.76%	-0.66%	3.98%	6.83%	1.14%	2.16%

Fig. 2.2c. Trends in palay production by production environment, 1970-2014.



	Marcos	C. Aquino	Ramos	Estrada	Arroyo	B. Aquino
Ave. production growth	3.71%	0.41%	5.10%	12.47%	2.62%	4.75%

Data source: PSA.

High self-sufficiency ratios. The respective self-sufficiency ratios for each rice program are shown in **Table 2.1**.[2] The ratios had been quite high in the late 1980s to mid-1990s at over 90% and even reached 100% in 1991 and 1992. The ratio was lowest in 1998 as a result of the worst El Niño episode the country experienced in 1997. The years spanning the Arroyo administration had the lowest self-sufficiency ratios. In fact, starting in 2002, rice imports had already reached 1 million tons. From 2005 to 2010, average annual rice imports were close to 2 million tons (Virola 2011). During the global food crisis in 2008, the country imported a record 2.34 million tons of rice, deemed the largest for any country.

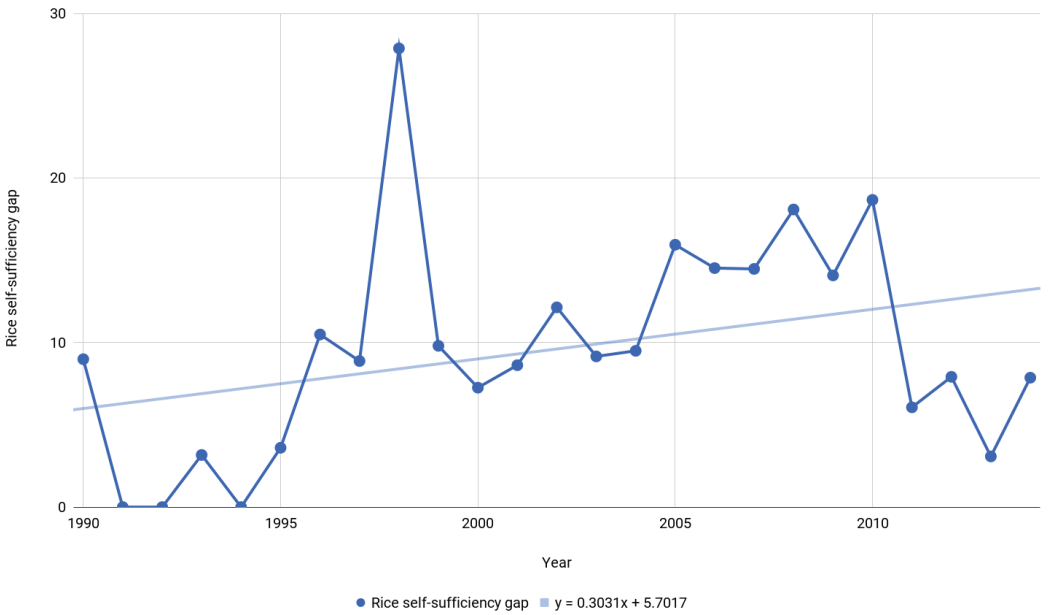
Figure 2.3 gives the rice self-sufficiency gap (defined as the deficit or shortfall in self-sufficiency or 100% less the self-sufficiency ratio) from 1990 to 2014. A trend analysis shows an increasing pattern, with an annual increase of 0.3%. However, in the last four years, a decline in the self-sufficiency gap is apparent. This decreasing pattern is perhaps a function of the government's massive funding support to attain rice self-sufficiency, as shown in **Table 2.1**.

In 2013, the country's self-sufficiency level stood at 96.8%. In the Food Staples Sufficiency Program, the initial target was for the country to be self-sufficient in rice by 2013. Achievement of the target was later extended to 2016 due to the effects of bad weather, particularly frequent typhoons and floods. This target is 25% higher than the lowest self-sufficiency level in 1997, when the country suffered its worst rice harvest.

Among the ASEAN countries in **Table 2.2**, Malaysia, Singapore, and the Philippines are not rice self-sufficient. Yet, Singapore, with no production agriculture, is rated as the second most food secure

[2] Self-sufficiency ratio is defined as production divided by production plus net imports.

Fig. 2.3. Rice self-sufficiency gap, 1990-2014.



Data source: PSA CountryStat.

country in the world (AFSIS 2016), and Malaysia, with a much lower rice self-sufficiency ratio than the Philippines, has a higher ranking in the Global Security Index than the rice-surplus countries of Thailand, Vietnam, and Cambodia.

The continuing pursuit of rice self-sufficiency by the Philippines is perhaps a function of its politics rather than an economic issue. There is a certain degree of political uneasiness among the politicians on the Philippines' inability to attain rice self-sufficiency (Intal and Garcia 2005).

The data show that the Philippines is doing relatively well in terms of rice availability in the domestic market (**Table 2.2**). Given the Philippines' high birth rate and large population of more than 100 million and the limited area for rice production, the Philippines' rice performance at an average 91.59% self-sufficiency ratio during the past three decades can be considered satisfactory. But, the high cost of domestic rice has negative effects on the country's high poverty, especially in rural areas. Therefore, there is much merit to the policy pronouncement of the new secretary of the National Economic Development Authority (NEDA) to refocus the DA's goal from rice self-sufficiency to food security (Ordinario 2016) to bring down the cost of rice. Further, this is the appropriate response to the forthcoming ASEAN economic integration, which will result in the removal of all quantitative restrictions, including those for rice. This policy will make rice cheaper for Filipino consumers and its impact on food expenditures, especially among the poor, is going to be highly significant.

The Philippines has one of the most expensive rice prices in the ASEAN (**Fig. 1.5**) and Filipinos' rice food expenditures are a large percentage of total household expenditures (**Table 1.1**). The NEDA's policy pronouncement therefore necessitates a refocusing of the NRP from self-sufficiency to competitiveness, income, and resilience, which is also in keeping with the provisions of EO 116 and RA 8435. Considering a history and organizational culture of almost half a century of rice self-sufficiency orientation, the shift will require program transformation, including the reorientation of DA employees involved in the program.

Table 2.2. Rice self-sufficiency ratios of selected ASEAN countries, 2009.

Country	Area harvested	2009			Global Food Security Index 2015 (rank)
		Production (MMT)	Domestic Use (MMT)	Rice self-sufficiency ratio (%)	
Singapore	None	None	0.18	None	2.00
Malaysia	0.67	1.59	2.53	63.00	34.00
Thailand	11.14	20.89	11.27	185.00	52.00
Vietnam	7.44	25.28	18.33	138.00	65.00
Philippines	4.53	10.74	13.16	82.00	72.00
Indonesia	12.90	40.35	38.43	105.00	74.00
Cambodia	2.60	4.59	2.93	157.00	96.00
Lao PDR	0.78	1.82	1.76	103.00	-

Data source: ASEAN Food Security Information System.

The National Rice Program Key Strategies under Various Administrations

To put the performance review into context, the program components and strategies of the various rice programs under different administrations were examined and compared. **Tables 2.3a to 2.3c** present the key goals and strategies of various administrations. In all of these administrations, the rice programs have similar goals and components but differ to a certain degree in strategies and emphasis.

The entry of the Aquino administration in 1986 makes policy and institutional reforms intended to free agricultural markets and enable farmers to enjoy higher farm-gate prices a core agenda in agriculture. Executive Order 116 was issued in January 1987. It converted the Ministry of Agriculture and Food into the Department of Agriculture. The DA introduced reforms in the rural credit system and established the Comprehensive Agricultural Loan Fund (CALF). In 1988, the Livelihood Enhancement for Agricultural Development (LEAD) program was launched to speed up farmers' organizations' access to financing, management expertise, and marketing. Agriculture and fishery councils (AFCs) were set up at the sectoral, regional, provincial, and municipal levels to provide inputs on major programs and policy decisions and help plan and monitor DA projects. The Rice Action Program (RAP) introduced in January 1990 enabled the country to export rice in 1992. RAP was heavy on irrigation, whereas its predecessor, RPEP, focused on the distribution of fertilizer and seeds, irrigation, credit, and price stabilization.

Under President Fidel Ramos, the DA instituted the Key Production Area (KPA) approach in 1992; it became the basis in the formulation of the Medium-Term Agricultural Development Plan (MTADP). Mid-way in the Ramos term and upon passage of the GATT by the Philippine Congress, the DA launched *GintongAni* (*Golden Harvest*) in 1996, as a GATT safety net. In support of the *GintongAni* program, Congress approved a lump-sum appropriation, which was placed directly under the Office of the Secretary (OSEC) to finance the various programs under it, including the NRP, called *GintongAni* Rice.

By putting the *GintongAni* programs directly under the OSEC instead of mainstreaming them in the organic agencies or offices of the DA, the secretary was in effect directly involved in operations. Heads of *GintongAni* programs reported directly to the secretary. The big-ticket items such as rice, the livestock dispersal program, and high-valued crops organized their own operational staff, albeit ad hoc, whose heads reported directly to the secretary. With the banner programs getting the attention of the secretary as well as the public, this distracted the secretary's attention from policy making as well as overseeing the DA's organizational effectiveness. It is worthwhile to mention that during this time the DA was the subject of severe public criticisms because of poor agricultural performance and graft and corruption, which was highlighted by the fertilizer scam that was the subject of a Senate Blue Ribbon Committee investigation.

In December 1997, Congress passed the Agriculture and Fisheries Modernization Act (AFMA) of 1998 or Republic Act (RA) No. 8435. It put into action the visions of transforming and modernizing the country's agriculture and fisheries sector. But, even with the passage of AFMA, the funding and organizational arrangements on the NRP and selected National Commodity Banner Programs were retained and continued until 2010. Lump-sum funding under the OSEC was discontinued only by the Department of Budget and Management in 2011 as a consequence of the Supreme Court's ruling declaring the Priority Development Assistance Fund (PDAF) unconstitutional. The NRP has been a recipient of PDAF funding for a number of years, which in theory augments the NRP budget in the General Appropriations Act (GAA).

The short-lived Estrada administration had the opportunity of starting the implementation of AFMA. *Agrikulturang Makamasa* was its banner program to accelerate agricultural development, a 10-point agenda laid out in July 1998. Essentially, *Makamasa* was *GintongAni* in another name; the program goals, structure, program strategies, and implementation schemes were essentially the same.

Upon the assumption of President Gloria Arroyo to finish the uncompleted term of Estrada, the *Makamasa* program was relabeled as *Ginintuang Masaganang Ani*—Countrywide Assistance for Rural Employment and Services (GMA-CARES) in 2001, with special emphasis on social equity. Essentially, the overall program structure and strategies were similar to those of the *Makamasa* program under the Estrada administration. It was during this time that the NRP provided greater focus and support to the adoption of hybrid rice by providing incentives in the form of free hybrid seeds, pesticides, and fertilizers to encourage irrigated rice farmers to shift from inbreds to hybrids.

In 2004, the "vision of a modernized smallholder agriculture and fisheries, a diversified rural economy that is dynamic, technologically advanced, and internationally competitive" was upheld under the elected term of Arroyo. Two goals were set: (1) "develop two million hectares of new lands for agribusiness to contribute two million to the 10 million jobs targeted by 2010" and (2) "make food plentiful while keeping the price low."

In 2006, "food security and self-sufficiency" became the focus of the NRP. The FIELDS (fertilizer, irrigation, extension, loans for inputs including shallow tube-wells and surface-water pumps, dryers and other postharvest facilities, seed subsidy) program was launched at the 2008 Food Summit.

The rice banner program in 2010 was structured after the *Agri-Pinoy* framework of development at the start of the B. Aquino administration. The program was intended to optimize the development of the country's natural and human resources to achieve the goals in agriculture and fisheries and contribute to national development. *Agri-Pinoy* broadened the focus of the rice self-sufficiency program to include other staples, thus the Food Staples Sufficiency Program. It targets rice sufficiency by 2016 by expanding area planted to rice to include uplands, marshlands, and idle farmlands.

Overall, the strategies of the various rice programs under different administrations have been biased in their resource allocation toward the provision of government support services and subsidies to accelerate the spread of new knowledge and technologies. Subsidies focused on the distribution of material technologies such as fertilizers, pesticides, and certified seeds of high-yielding varieties, farm machinery, and equipment. Subsidies also included agricultural structures and multi-purpose postharvest facilities. Support services included credit, research and extension, information and communication, and price stabilization.

Proponents of agricultural subsidies have argued that such programs "stabilize commodity markets, aid low-income farmers, raise unduly low returns to farm investments, aid rural development, compensate for monopoly in farm input supply and farm marketing industries, help ensure national food security, offset farm subsidies provided by other countries, and provide various other services." However, these arguments have not been substantiated (Sumner 2016).

Among the common concerns on farm subsidies are that (Sumner 2016) (a) they are income transfers from consumers and taxpayers to all farm owners and operators, who are not necessarily poor; (b) they impose net losses on society (or deadweight losses) and have no clear broad social benefit; and (c) they impede movement toward more open international trade and impose net costs on the global economy.

However, abstracting from the above, meeting production and yield targets is not just a function of government interventions but of other factors as well. For instance, decisions by farmers, their farm endowments, and nature also play significant roles. This complexity is reflected in the relatively low annual rates of growth in yield of just 1.4% for irrigated rice and 1.2% for rainfed rice despite the seemingly comprehensive and high cost of government interventions.

Table 2.3a. Rice programs, key objectives, and major strategies, 1986-92.

Programs	Key objectives/goals	Major strategies
Masagana 99 (M99), 1986-87	To plant 691,529 hectares of irrigated area and 71,278 hectares of rainfed area in 58 priority and 10 associate provinces. Target: 64.2 million cavs. of 50 kg (3.2 MMT); projected average yield per ha of 85 cavs. (4.25 t/ha for irrigated) and 70 cavs. (3.5 t/ha for rainfed)	• Use technology package, IR40 and IR42 • Noncollateral production loans • Improve seed production and distribution • Improve distribution of fertilizer • Training for extension workers and farmers • Intensified pest and disease control campaign • National artificial rain stimulation • Formulation and implementation of policies on price support, procurement, and storage • Improve the management information system • Set up Rice Management Task Force
Rice Productivity Enhancement Program (RPEP), 1987-89	To increase palay production in 1990 to 9.7 MMT from the projected 9.3 MMT in 1989 and provide contingencies to cover probable losses due to inclement weather and allow a sufficient buildup of NFA stock carried into the 1990 lean season	• Fertilizer and seed palay exchange, 3 bags palay for 4 bags fertilizer and 1 bag certified seeds • NFA to lease all its underused facilities • DA to accelerate construction of SWIPs and rehabilitation of large systems • Credit: enhance farmers' access to production credit • Price stabilization • Rice information dissemination

Source: Department of Agriculture.

Table 2.3b. Rice programs, key objectives, and major strategies, 1986-92.

Programs	Key objectives/goals	Major strategies
Rice Action Program (RAP), 1990-92	Increase 1990 production of rice by 3% to 3.5% over the 1989 harvest, stabilize 1990 prices of rice at levels for both consumers and producers, initiate continuing actions to promote rice productivity and increase rice yields through better availability and more efficient use of water, fertilizer, and quality seed; reduce postharvest losses	• Strengthen capability for rainmaking • Ensure supply of stock seed • Lower irrigation cost • Establish farm-level rice centrals • Repair communal and national irrigation systems • Provide transportation-handling facilities in trading routes • Construct SWIP • Expand and strengthen credit support • Intensify NFA procurement to absorb 5% of expected production in 1990 • Expand fertilizer assistance to farmers • NFA to focus on grains stabilization • Improve irrigation management system • Intensify varietal and production and postharvest technology improvement activities • Increase use of organic fertilizer • Monitor the fertilizer market • Review and reform seed policies and programs • Establish seed certification laboratories in each • province
Key Production Areas, 1992-96	Improving farm productivity by addressing the low use of certified seeds, and inadequate irrigation systems and postharvest equipment and facilities	• Subsidized certified seeds and organic fertilizers • Shallow tube well (STW) development
Gintong Ani-Program, 1996-98	To attain palay production of 10.5 MMT in 1996, improve rice productivity from 3.5 to 5.0 t/ha in irrigated areas and from 2.0 to 3.0 t/ha in nonirrigated areas, enhance farm income and stabilize prices of palay and rice at levels equitable to both producers and consumers	• Soft loans for farm inputs • Remove subsidies on output and input prices • Remove nontariff barriers • Provide efficient support services, growth in productivity, and increased expenditure on R&D
Agriculturang Makamasa Program, 1998–2000	Cover 300,000 to 500,000 ha of rice production area in all provinces with irrigation facilities; in wet season 1999-2001 (4 seasons), yields will be analyzed; in dry season 2001 to 2004 (6 seasons), production technologies will be widely implemented to achieve high yields of 5-7 t/ha during the wet season and 7-10 t/ha during the dry season. Average yield will be 5-6 t/ha.	• Provide support to LGUs to attain target yield increase • Avail of trade and fiscal incentives • Promote production-intensifying cost-reducing technologies • Tap expertise of state universities and colleges (SUCs) • Increase public investment in irrigation, postharvest facilities, FMRs, and farm mechanization • Improve production marketing systems • Improve quality of seeds • Monitor rice supply situation in deficit areas

Source: Department of Agriculture.

Table 2.3c. Rice programs, key objectives, and major strategies, 1986-92.

Programs	Key objectives/goals	Major strategies
Ginintuang Masaganang Ani-Countrywide for Rural Employment and Services (GMA-CARES), 2001-10	To increase rice yield by 9% and farm income by at least 10% per year, reduce postharvest losses by at least 1% per year, generate additional jobs in hybrid and inbred rice seed production and cultivation, increase palay production from 14.49 MMT in 2004 to 15.12 MMT in 2005, 15.88 MMT in 2006, and 16.67 MMT in 2007, and increase yield by 20% from 2004 to 2007	• Fertilizer subsidy of PhP 500 per farmer and subsidy of certified and hybrid seeds • Location-specific and LGU-centered program planning and implementation • Adoption of precision rice farming with latest technologies • Strengthen commercialization technologies • Focus on state-of-the-art postproduction technologies • Improve irrigation services and systems • ESETS Innovation: Palay Check • Make credit facilities accessible • Develop marketing system
Agri-Pinoy Program, 2010-16	To produce our domestic rice/palay requirement by 2013; beyond this year, the aim is to strengthen national resilience in staple/rice production to impacts of climate change, from 15.77 MMT of palay in 2010, it aims to increase production to 22.73 MMT by 2016 at an average growth of 6% per year.	• Promote widespread use of yield-enhancing technologies and appropriate farm machinery and postharvest facilities • Bolster public investment in key public goods, including irrigation, research and development, and extension services • Reform the domestic staples market and policy

Source: Department of Agriculture.

Less Efficient Rice Production and Low Technical Progress

To gauge the performance of the rice sector relative to other Asian countries, we look at estimates of total factor productivity (TFP) growth of rice farming from Sawaneh et al (2013). The Malmquist productivity index is used to measure total factor productivity. It is defined as the "maximum level of outputs that can be produced using a given set of inputs and a production technology relative to the observed level of outputs" (Coelli et al 2005). Productivity growth can be decomposed into technological advance or technical change and efficiency change. Technical change measures innovation while efficiency change captures the effects of institutional factors and domestic and trade policies (Belloumi and Matoussi 2009).

The study used panel data to measure rice productivity growth from 1980 to 2010. The estimates show that all countries exhibit positive growth in rice productivity over the entire period. The Philippines has 1.1% TFP growth, which is just at the same level as Thailand and lower than the average for the five countries of 1.4% (Sawaneh et al 2013). In terms of sources, the structures of TFP growth between the Philippines and Thailand differ because most of the growth for the latter largely comes from efficiency change. For the Philippines, it is almost the same contribution from the two sources. Vietnam and Myanmar, on the other hand, have more than double TFP growth at 2.5%. The growth for Myanmar is solely contributed by technical change while that for Vietnam, 68%, is accounted for by technical change.

The TFP in different periods shows changing sources of growth in terms of production efficiency and technological improvement (**Table 2.4**). The breakdown shows that productivity growth in all periods has been sustained by technological improvement. The period between 1980 and 1985 was the best for the Philippines relative to latter periods, with a TFP growth of 4.2%, which was even higher than that of Vietnam. This growth was brought about by efficiency gains of 3.2%. Succeeding periods,

Table 2.4. Efficiency change, technical progress, and Malmquist total factor productivity indices in paddy production, 1980-2010.

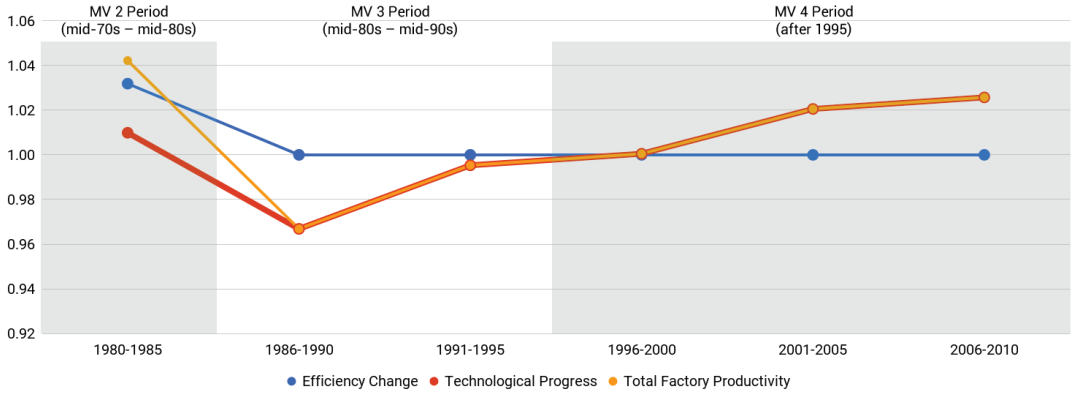
		Malaysia	Myanmar	Philippines	Thailand	Vietnam	*Mean*
1980-85	EC	1.000	1.000	1.032	1.011	1.025	*1.014*
	TP	0.976	0.968	1.010	0.995	1.003	*0.990*
	TFP	0.976	0.968	1.042	1.005	1.029	*1.004*
1986-90	EC	1.000	1.000	1.000	1.004	1.019	*1.005*
	TP	0.998	1.049	0.967	0.954	1.003	*0.994*
	TFP	0.998	1.049	0.967	0.957	1.023	*0.998*
1991-95	EC	1.000	1.000	1.000	1.000	1.000	*1.000*
	TP	1.018	0.960	0.996	1.000	1.029	*1.000*
	TFP	1.018	0.960	0.996	1.000	1.029	*1.000*
1996-2000	EC	1.000	1.000	1.000	1.000	1.000	*1.000*
	TP	0.976	1.065	1.001	1.023	1.026	*1.018*
	TFP	0.976	1.065	1.001	1.023	1.026	*1.018*
2001-05	EC	1.000	1.000	1.000	0.990	1.000	*0.998*
	TP	1.007	1.618	1.021	1.024	1.036	*1.120*
	TFP	1.007	1.618	1.021	1.014	1.036	*1.118*
2006-10	EC	1.000	1.000	1.000	1.010	1.000	*1.002*
	TP	1.045	1.048	1.026	1.032	1.033	*1.037*
	TFP	1.045	1.048	1.026	1.042	1.033	*1.039*

Data source: Sawaneh et al (2013).
Note: EC = efficiency change, TP = technical progress, TFP = total factor productivity.

however, showed no change in efficiency and hardly any technical change. The country's rice sector recovered only in 2001-05 and 2006-10, with TFP growth higher than that of Malaysia and Thailand but lower than that of Myanmar and Vietnam.

Figure 2.4 plots the average TFP growth per period against the trend or predominance of certain modern varieties (MVs) in those periods. In the early 1980s, the higher efficiency gains coincided with MV2 varieties, which were resistant to major pests and diseases. From 2000 onward, technical progress coincided with MV4 varieties, which were meant to address difficult production environments. However, the late 2000s were also the period when government investment in hybrid rice was significant. It appears that MV2 and MV3 were unable to contribute much to TFP growth. The technical gains in the latter years cannot be fully attributed to MV4.

Fig. 2.4. Efficiency change, technological progress, and total factor productivity in paddy production, Philippines, 1980-2010.



Data source: Sawaneh et al (2013).
Notes: MV1 = mid-1960s to mid-1970s (required high inputs).
MV2 = mid-1970s to mid-1980s (resistances to major pests and diseases).
MV3 = mid-1980s to mid-1990s (improved resistances and higher grain quality).
MV4 = after 1995 (target more difficult production environments).

Summary

The quest for rice self-sufficiency has been an elusive goal of the Philippine government. During the past 30 years, the Philippines has achieved self-sufficiency in only three years. Overall, however, rice self-sufficiency continues to increase despite the country's relatively high population growth and increasing per capita consumption of rice and its products. The targets in the earlier administrations were way off compared with the last two. Also, targets for rainfed rice appeared to be conservative enough for them to be met while those for irrigated rice had not been reached. How production and yield targets are set is not apparent (and is not done transparently) although it appears to be getting better or becoming more conservative as the gaps between targets and accomplishments decrease.

The rice self-sufficiency program strategies to achieve yield and production targets have basically remained the same despite changes in labels and budgets in various administrations. This revolves around the following mechanisms: provision of improved support services such as ESETS; research and development; regulatory services; policy development; the provision of subsidized certified seeds, organic fertilizers, and pesticides; market development services; irrigation development services; other infrastructure and postharvest development services; and innovative partnerships with local government units (LGUs).

Trends in production and yield performance show consistent improvement over time, especially for irrigated rice, with yield increasing an average of 0.05 t/ha and production an average of close to 300,000 tons per year. These favorable trends in production and yield, especially in the past five years, are confirmed by the decline in the self-sufficiency gap in the same period. Yet, the global food security standing of the country is relatively poor compared with that of Thailand, Vietnam, and Malaysia. In addition to this concern, comparison of performance in terms of growth in TFP indicates that the country did better than the four other Asian countries in the study by Sawaneh et al (2013) in the early 1980s. However, this productivity growth was not sustained until the recovery in 2001 to 2010, with growth solely accounted for by technical progress. Also, although rice productivity improved, growth has been lowest among the five Asian countries. In terms of production efficiency improvement, after its key role in the 1980-85 TFP growth, it has not been contributing to productivity growth since then.

Rice Production Costs and Returns and Rural Poverty

3

Rice Farming and Rural Poverty

The negative impacts of climate change and natural calamities on rice area and farmers' income translate into higher levels of poverty. With decreasing sizes of farm holdings, rice farmers have fewer resources for coping and recovering once hit by natural calamities. Compared to bigger farms, small farm households often bear the brunt of the damages because often they do not have the means and capacity to invest in protecting their sources of income.

In just a decade, the total area for agriculture decreased by more than 2 million hectares (**Table 3.1**). Yet, the number of farm holdings increased by half a million. Thus, the average farm holding fell from 1.85 ha to 1.29 ha, a decrease of 30%. In terms of the percentage of rice in agricultural area, there was a decrease of 5% or 1.27 million ha in the span of 10 years. At the same time, the number of farm holdings increased by 100,000, resulting in a smaller area per farm holding of 1.18 ha.

Table 3.1 Agriculture and rice areas, and number of farms/holdings.

Farm area & no. of farms/ holdings	CAF 2002			CAF 2012		
	Area (M ha)	No. of farms/ holdings (M)	Ave. area (ha) per farm/ holding	Area (M ha)	No. of farms/ holdings (M)	Ave. area (ha) per farm/ holding
Total Agriculture	9.29	5.01	1.85	7.19	5.56	1.29
Rice/Palay	3.92	2.15	1.82	2.65	2.25*	1.18*
% of Rice/Palay in Agriculture	42	43		37	41	

Note: * Calculated range, assuming an average of 38% and 43% increase of palay farm holders from 2002 to 2012.
Data sources: PSA, CAF (2002 and 2012).

Table 3.2 shows the distribution of farm holdings according to size. A total of 39% of the farms have sizes below half a hectare, and they account for 4% of total agricultural area. More than one-half of the farms hold less than 1 hectare. They comprise a total of 887,000 ha or 12% of the total agricultural area.

Farms with sizes between 1 and 3 hectares comprise 32% of total holdings and 36% of total agricultural area. These farm holdings average 1.5 ha. The bottom three size ranges account for 89% of farm holders but only 48% of total agricultural area. Given the structure of landholdings in the country, it is estimated that close to three-fifths of the rice farmers earned, on average, below PhP 23,471 per season in 2012 (PSA-BAS estimated net income for a hectare of rice).

Table 3.2. Size of farm, number of farms/holdings, and average area per farm/holding, 2012.

Size of farm	Number ('000)	%	Area ('000 ha)	Average area (ha)
Total	5,562,577	100.00	7,190,087.11	1.29
Under 0.5 ha	2,159,963	38.83	277,780.82	0.13
0.5 ha to 0.999 ha	1,004,633	18.06	609,084.07	0.61
1 ha to 2.999 ha	1,780,702	32.01	2,594,814.77	1.46
3 ha to 7.000 ha	518,046	9.31	2,112,231.94	4.08
7.001 ha to 9.999 ha	44,102	0.79	363,201.96	8.24
10 ha to 24.999 ha	49,657	0.89	655,133.75	13.19
25 ha to 49.999 ha	3,877	0.07	125,214.21	32.30
50 ha and over	1,597	0.03	452,625.59	283.42

Data sources: PSA, CAF (2012), and CountryStat.

Rice Production Net Returns

The 2002 average net returns for rice production per season in both irrigated and rainfed areas are compared with those of 2014 in **Table 3.3**. In all production environments, net returns have increased, albeit modestly. Net returns per hectare in irrigated rice for both the wet and dry seasons were higher than for rainfed rice. Comparing 2014 and 2002 figures, the net returns in irrigated areas are one and a half times those of rainfed areas. In rainfed areas, the net returns in 2014 are a little over two times the 2002 values.

Table 3.3 Rice production costs and returns per hectare per season, Philippines, 2002-14 (constant 2005 prices).

Irrigated average (2002-14)									
Season	2002			2014			% Difference 2002 vs. 2014		
	Total cost	Gross returns	Net returns	Total cost	Gross returns	Net returns	Total cost	Gross returns	Net returns
Dry	27,849	36,268	8,419	32,269	54,510	22,241	16	50	164
Wet	27,146	35,848	8,702	32,307	53,274	20,967	19	49	141
Average	27,502	36,059	8,557	32,291	53,854	21,563	17	49	152
Rainfed average (2002-14)									
Season	2002			2014			% Difference 2002 vs. 2014		
	Total cost	Gross returns	Net returns	Total cost	Gross returns	Net returns	Total cost	Gross returns	Net returns
Dry	18,831	21,874	3,044	22,511	32,794	10,283	20	50	238
Wet	18,996	23,642	4,646	25,999	40,043	14,045	37	69	202
Average	18,916	22,757	3,841	24,638	37,326	12,688	30	64	230

Data source: PSA CountryStat.

Using the figures in **Table 3.1** and **Table 3.4**, in 2014, farms under 0.5 ha would on average have net returns per season of PhP 9,502.

Table 3.4. Comparative net returns per hectare per landholding, 2002 vs 2014 (constant 2005 prices).

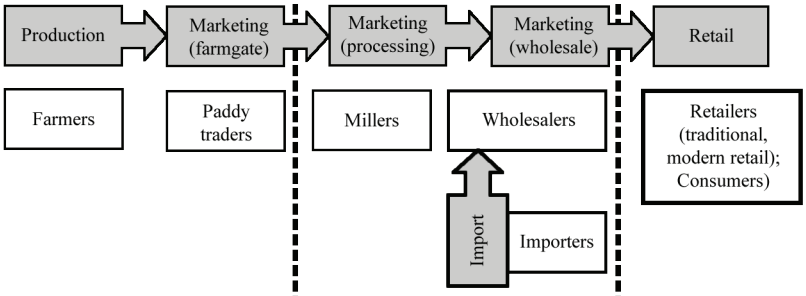
Ave. net returns per season	2002	2014	% Increase
Irrigated Rice Production (PhP/ha)	8,557	21,541	152
Rainfed Rice Production (PhP/ha)	3,841	12,674	230
All Rice Production (PhP/ha)	7,149	18,750	166
Per Rice Farm/Holding (PhP/holding)*	13,012	22,215	70

Note: *Per rice farm/holding: average net returns of all rice production multiplied by average area per farm (1.82 for 2002 and 1.18 for 2012).
Data sources: PSA CountryStat, CAF (2002 and 2012).

On a per farm holding basis, the increase in net returns was 72%. Part of the reason for a relatively smaller increase compared with either irrigated or rainfed rice is the decrease in average farm size from 1.82 ha in 2002 to 1.18 ha in 2012 (see **Table 3.1**). The dramatic increase in net returns can be attributed to the increases in yield or production per hectare in both environments. These yield increases in turn must be due to new technologies and better farm management given the higher improvement in rainfed vs. irrigated rice.

The rice value chain is shown in **Figure 3.1**. From 1990 to 2014, there has been a wide gap between farm paddy and wholesale prices, and a relatively small difference between wholesale and retail prices over the past 24 years. Figure 3.1 shows that the difference between farm-gate and retail prices ranged from a low of 77% during the C. Aquino administration (1986-92) to a high of 100% during the Estrada administration (1998-2001).

Fig. 3.1. Farm paddy, wholesale, and retail prices, 1990-2014.



Administration	Farm Paddy				Wholesale				Retail			
	Amount (P/mt)		% Difference (Farm Paddy vs. Wholesale)		Amount (P/mt)		% Difference (Wholesae vs. Retail)		Amount (P/mt)		% Difference (Farm Paddy vs. Retail)	
	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest
C. Aquino	4,740	4,770	77	79	8,380	8,521	6	8	8,920	9,340	88	94
Ramos	4,820	8,130	85	95	8,910	15,860	8	9	9,650	17,130	100	111
Estrada	7,870	8,420	89	100	15,766	15,910	8	11	17,100	17,590	106	119
Arroyo	8,170	11,220	83	96	15,990	20,660	8	10	17,540	22,390	98	115
Aquino	14,870	2,070	83	92	28,450	36,780	6	8	30,840	38,930	94	107

Data sources: PSA CountryStat; figure adapted from Briones and dela Pena Discussion Paper Series No. 20015-04 (2015).

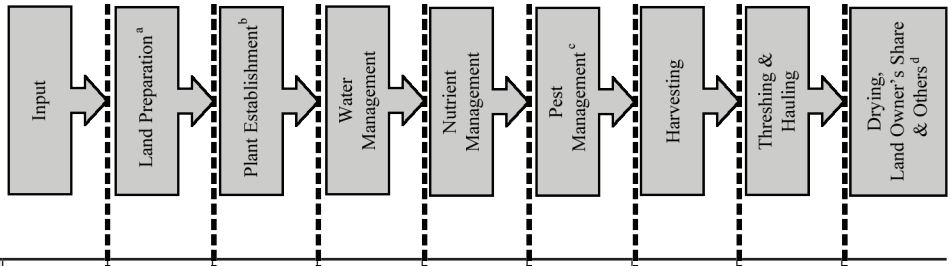
The average production cost per hectare from 2009 to 2012 is shown in **Figure 3.2**, which shows the sequential steps in rice production and the corresponding accumulated cost, total per item/process, and percentage of labor distribution. The four tasks with the highest cost are, in order, (1) drying, landowner's share, and others; (2) harvesting; (3) nutrient management; and (4) threshing and hauling. These expenditures make up 70% of the total cost per ha.

In terms of labor distribution, the top five tasks in person-days are as follows, in decreasing order: plant establishment, harvesting, pest management, land preparation, and threshing and hauling. These key activities account for 88.6% of the total.

The distribution of average production costs by environment from 2009 to 2012 is shown in **Table 3.4**. Labor for either irrigated or rainfed rice accounts for the greatest expense in rice production. It ranges from 24% to 25% for irrigated rice and from 31% to 34% for rainfed rice. In areas where harvesting is done manually, the cost of labor can rise to as high as 35% for irrigated rice and 44% for rainfed rice, tasks that would have a strong impact from farm mechanization in terms of reducing the cost of production.

Inputs in the forms of seeds, fertilizers, and pesticides represent the second biggest expense, ranging from 20% to 22% in irrigated rice and from 19% to 21% in rainfed rice. The price differentials in

Fig. 3.2. Average production cost per ha, 2009-12.



Accumulated Cost	1,977	3,651	6,620	8,008	12,905	16,688	23,031	27,664	39,337
Total per Item/Process	1,977	1,674	2,969	1,389	4,896	3,784	6,343	4,633	11,673
% of Labor Distribution*		11.7	24.1	3	2.4	21.2	22.1	9.5	6.1

Data sources: PSA CountryStat, *SED PhilRice (2013) – labor distribution.

Note: a. Land prep includes plowing, harrowing, and leveling.
b. Plant establishment includes care of seedlings, pulling and bundling of seedlings, and planting/transplanting.
c. Pest management includes care of crops, mechanical weeding, manual weeding, chemical application, and picking of snails.
d. Others consists of land tax, rental value of owned land, interest payment on crop loan and operating capital, repairs, depreciation, and all other cost items not elsewhere classified.

inputs between the two production environments could be a function of the cost of seeds; hybrid seeds that are grown in irrigated areas are more expensive than inbred seeds that are grown in rainfed areas.

Irrigation fee is a small percentage of the total cost of production for irrigated rice. It is a mere 2% of the total cost. As expected, this is a missing cost in rainfed rice. The proposed policy of providing free irrigation services is discriminatory in the sense that it will not benefit rainfed farmers.

The data of PhilRice (2010) in **Figure 3.3** appear consistent but the increase in real rice income is not as substantial as in **Table 3.3**. One possible explanation is that the PhilRice data are seven years older, which implies that much of the growth seen in PSA data must have happened after 2006-07. Notable is the 25% drop between 1996-97 and 2001-02. This decrease could be the effect of the 1997 El Niño, which drastically reduced rice production and the corresponding income.

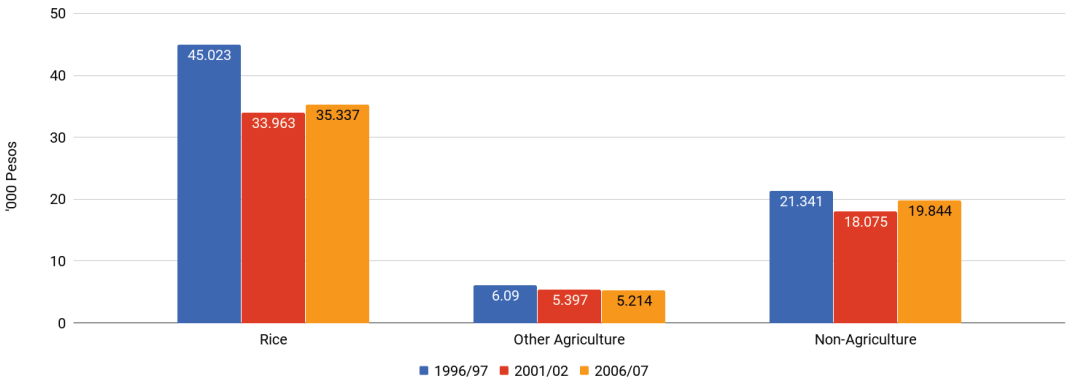
Table 3.5. Distribution (%) of average production costs by environments, 2009-12.

Items	2009		2010		2011		2012	
	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Inputs	22	21	20	19	22	20	21	20
Seeds	5	6	5	6	5	6	5	6
Fertilizer	13	11	11	9	13	10	13	10
Pesticides	4	4	4	4	4	4	3	4
Labor*	24	31	25	34	25	34	25	34
Harvester's share	9	9	9	10	9	10	10	10
Thresher's share	8	7	9	7	8	7	9	8
Landowner's share	8	9	8	9	8	8	8	9
Land tax	0	1	0	1	0	1	0	1
Rentals**	7	7	7	6	6	6	6	6
Fuel and oil	2	1	3	1	3	1	3	1
Interest payment on crop loan and operating capital	4	3	4	3	4	2	3	2
Irrigation fee	2	0	2	0	2	0	2	0
Food expense	2	2	2	2	2	2	2	2
Repairs	3	4	3	3	3	3	3	3
Depreciation	2	2	2	2	2	2	2	2
Others***	6	3	6	3	6	3	6	3
Total	100	100	100	100	100	100	100	100

Note: * Consists of hired, operator, family, and exchange labor.
** Includes rental value of owned land.
*** All other cost items not elsewhere classified.
Data source: PSA CountryStat.

As shown in **Figure 3.3** and more clearly in **Figure 3.4**, the relative importance of rice as a source of income has decreased by 4%. Correspondingly, nonagriculture's contribution has increased by 3%. The slightly increased diversity in income source can be taken as a good sign if taken to mean greater resilience of farming households in times of climate events that largely affect rice. Nonetheless, the absolute decline in rice income per hectare is a reason for concern.

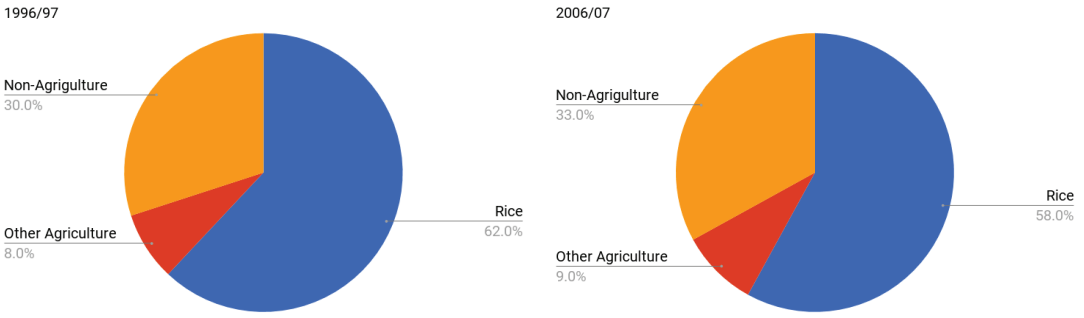
Fig. 3.3. Real income of rice-based farm households, 1996-97 to 2006-07.



Data source: PhilRice (2010).

As earlier shown in **Table 3.2**, rice farms are becoming smaller, and rice farmers with less than 0.5 ha constitute 38.83%. The total percentage of rice farmers owning less than 1 ha is 57%. Perhaps this explains why rice farm income's contribution to household income has become less important (**Fig. 3.5**). In the 1960s, it was close to 70%, but went down to less than 20% in the 2000s.

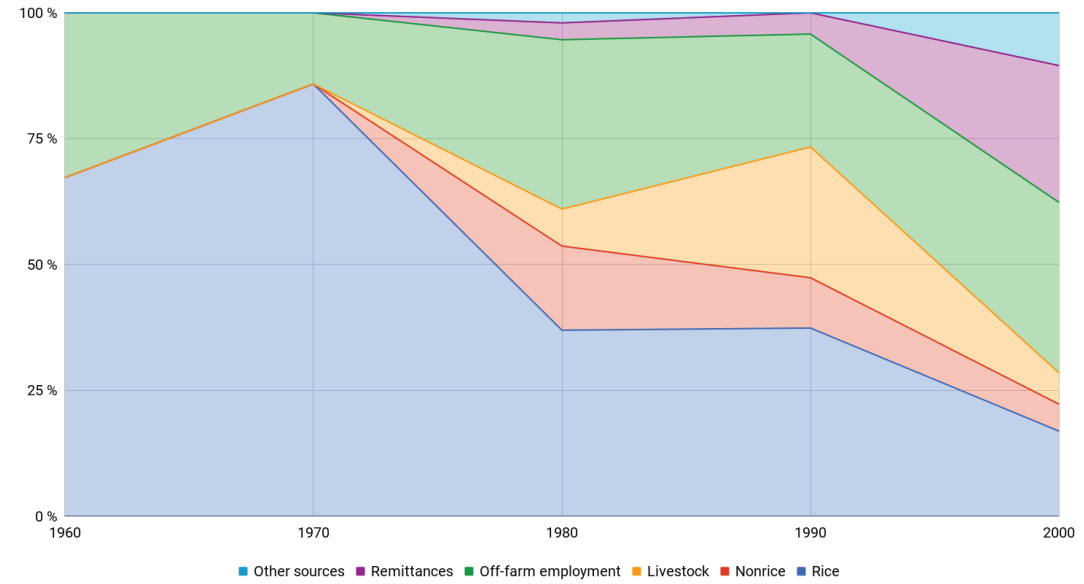
Fig. 3.4. Distribution of real income of rice-based farm households by source, 1996-97 to 2006-07.



Data source: PhilRice (2010).

Rural poverty. The Philippine population poverty incidence in **Figure 3.6** shows that poverty went down from a high of 49.2% in 1985 to 25.2% in 2012. Although the reduction during the past 27 years is very significant, it's still relatively high in comparison with that of other countries (**Table 3.6**). And, given the low returns to rice production (**Tables 3.3 and 3.4**), especially among rice farmers with

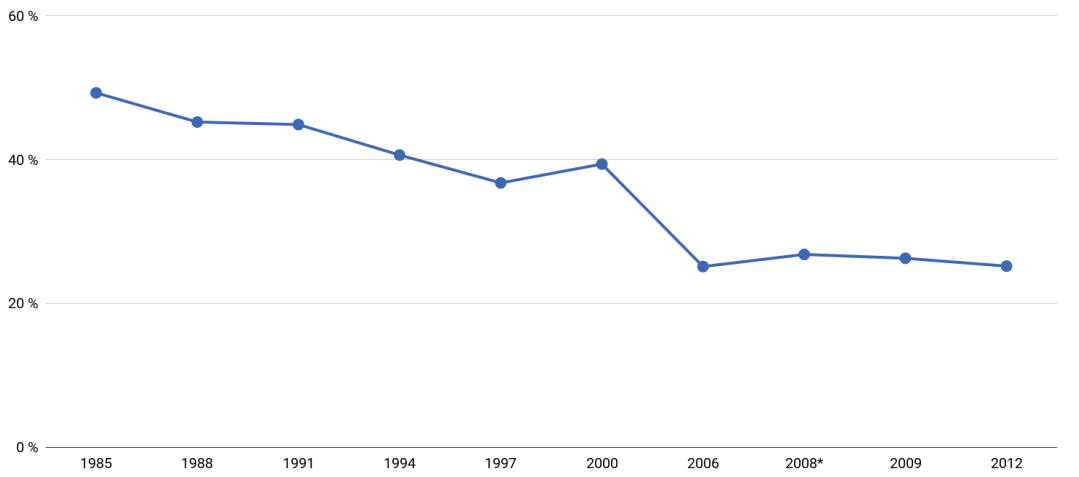
Fig. 3.5. Sources of rice farming household income, 1960-2000.



Source: Tolentino (2015).

small landholdings, there is serious concern whether the goal of rice self-sufficiency is in fact helping rice farmers move out of poverty.

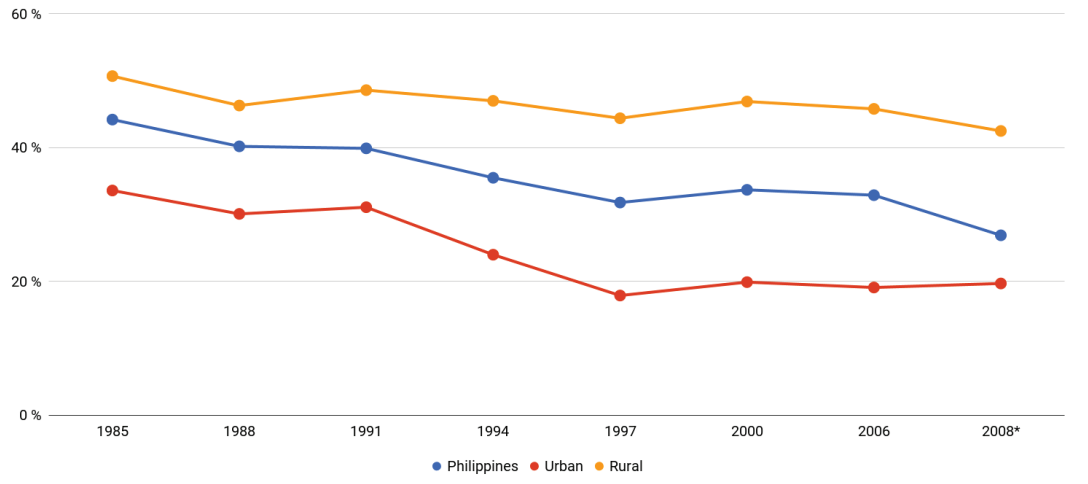
Fig. 3.6. Philippine population poverty incidence, 1985-2012.



Data sources: PSA, FIES various years.

The FIES study on poverty incidence of families from 1985 to 2008 shows that Philippine poverty is essentially a rural phenomenon. The gap in the magnitude between rural and urban poverty is large. In 1985, the gap was 17.1% while in 2008 the gap increased to 22.8% (**Fig. 3.7**).

Fig. 3.7. Poverty incidence of families, 1985-2008.



Data sources: National Statistics Office—FIES (2006), An Assessment of the Poverty Situation in the Philippines—Reyes (2010), The Poverty Fight: Has It Made a Difference?—Reyes (2003).

*From the Annual Poverty Indicators Survey (2008), not the FIES (2006).

Rural poverty remains high as the country's gain in poverty reduction is modest compared with that of other ASEAN countries (see **Table 3.6**).

Table 3.6. Comparative poverty gap* of selected ASEAN countries, 1997-2012.

Year	Philippines	Vietnam	Indonesia	Thailand	Malaysia
1997	14.23				1.23
1998		26.38		2.52	
1999			29.69	3.70	
2000	14.93			3.68	
2001					
2002		28.18	20.09	2.10	
2003	13.71				
2004		21.43		1.46	4.38
2005			18.78		
2006	13.5	17.77		1.04	
2007				0.64	0.19
2008		14.68	17.62	0.46	
2009	11.0			0.40	0.49
2010		4.91	14.19	0.33	
2011				0.16	
2012	11.68	3.47	11.80	0.19	
% Reduction	17.90	86.80	60.30	92.50	60.50
Years	15	14	13	14	12

Note: * Poverty gap at USD 3.10 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line of USD 3.10 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.
Data source: World Bank WDI.

Summary

Rice farms are becoming more fragmented and the average size is becoming smaller, with more than 50% having an area of less than 1 hectare. The greatest cost in rice farming is labor; thus, farm mechanization has the greatest potential in increasing profit. However, the fragmentation of small rice farms poses a serious challenge to farm mechanization. For the majority of rice farmers, income from rice farming has become a smaller part of household income.

The poverty situation in rural areas has not changed much during the past 15 years. The reduction was quite modest in comparison with that of other ASEAN countries. Thus, the strategic goal of the rice sector development program should be to increase total farm productivity and income rather than rice production alone in order to optimize total farm income.

Financing the Rice Sector and the National Rice Program

4

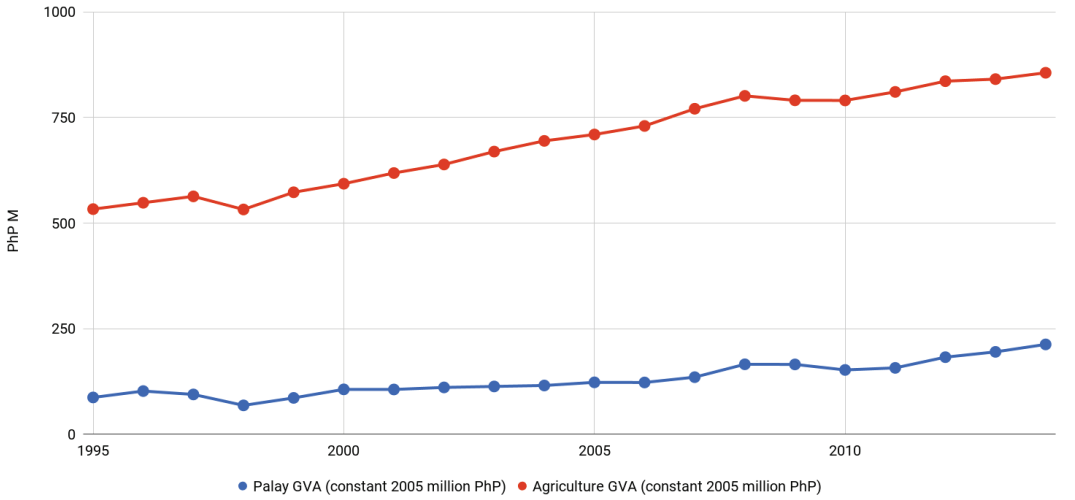
There is growing evidence that public expenditure can affect development at both the macro and micro levels (Armas et al 2012). Public investments in areas where the market fails and public-good externalities exist can have high positive rates of return and benefits that exceed costs. Specifically, public spending that increases the economy's physical and human capital stock and marginal productivity of both publicly and privately supplied production factors contributes to growth. Examples of the latter are government expenditure on public agricultural research and development (R&D), extension services and agricultural marketing, and public infrastructure such as rural roads and irrigation systems.

In theory, public goods will always be under-provided by the market because of their nature of being nonrival and nonexcludable. In these cases, the public sector can improve the outcomes by providing these goods more efficiently and adequately than the market. Subsidizing private inputs, on the other hand, at the expense of providing more public goods often has negative impacts on productivity (Bordey 2010). Examples of private goods are seeds, fertilizer, and farm machinery (seed dryers, tractors, harvesters, pumps).
The government's role in agricultural development is to set the enabling environment where the private sector can flourish, correct for market failure in allocating resources efficiently, and minimize price distortions (Rosellon and Yap 2010). This role also includes correcting for externalities, addressing information asymmetries, and eliminating information gaps to help farmers make informed decisions.

Increasing the Contribution of Palay to Total Agricultural GVA

The trends in agriculture and palay gross value added (GVA) are shown in **Figure 4.1**. Although both items show an increasing pattern, the rates of growth are relatively low given the flatter lines. Across various administrations, the share of palay in total agriculture has been rising from 15% during the Estrada administration to 22% in nominal terms.

Fig. 4.1. Trends in real agriculture and palay GVA (2005 prices), 1995-2014.



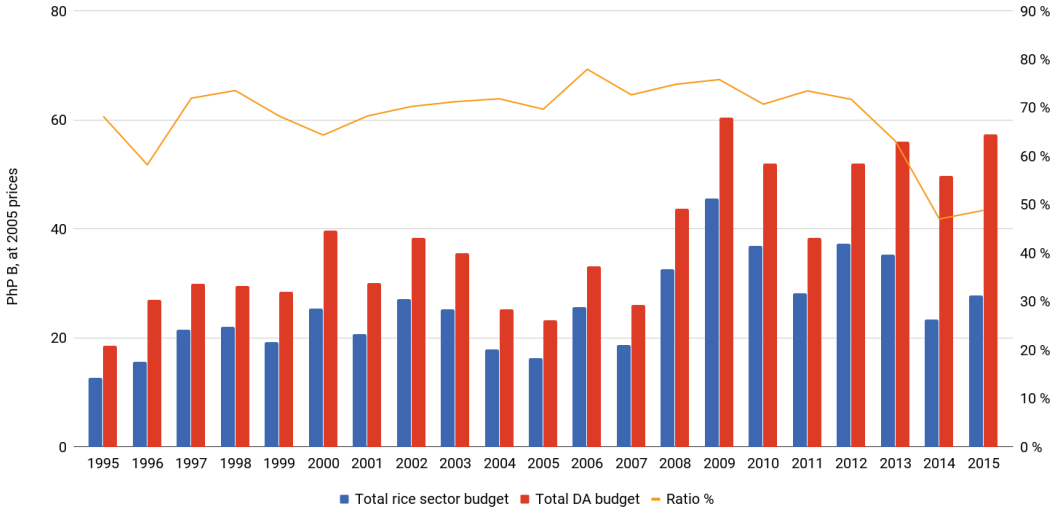
Items	Ramos (1995-97)			Estrada (1998-2000)			Arroyo (2001-09)			B. Aquino (2010-14)		
	Amount	%	GR*	Amount	%	GR*	Amount	%	GR*	Amount	%	GR*
Palay GVA	216,470	17	-5.09%	218,541	15	2.53%	1,236,529	18	3.06%	1,408,121	22	1.68%
Agric. less palay GVA	1,059,410	83		1,210,871	85		5,516,397	82		4,910,659	78	
Agric. GVA	1,275,880	100	-0.19%	1,429,412	100	1.68%	6,752,926	100	2.51%	6,318,780	100	1.14%

Data source: PSA.

The allocation for the agricultural sector through the Department of Agriculture and the attached agencies has been generally rising and increased dramatically starting in the last two years of the Arroyo administration as a reaction to the rice crisis (**Fig. 4.2**). In the succeeding administration, the allocation increased even further apparently as a response to the calamities battering the agricultural sector and the stronger resolve to attain rice self-sufficiency.

To get a sense of the importance given to rice, the total resources allocated to this commodity have been estimated using the budgets allocated to the DA and the group of agencies and corporations under it. This allocation includes the budgets for the rice commodity programs over time, irrigation through the NIA and the BSWM, and to research through PhilRice. It also includes the budget allocated to the NFA. These figures may grossly underestimate the total resources that go to rice because they do not include budgets on rice programs by the DOST, the state colleges and universities (SCUs) of agriculture, the augmentation made by congressmen through the outlawed PDAF, and perhaps most importantly the LGUs. Earlier estimates of Dy (2004) and David and Inocencio (2000) show that rice accounted for between 75% and 80% of total agricultural allocation. Nonetheless, in these estimates, the allocations exceeded 60% of the total allocations for the Department, including the attached agencies and corporations for almost all years. In the latter part of the Ramos administration and the middle part of the B. Aquino administration, sharp increases were observed, followed by sharp declines. In the Ramos time, the sharp increase in the relative allocation for rice was likely a response to El Niño. In succeeding administrations, the rise in allocations must have been a response to the rice crisis in 2008 and the deluge of major calamities that largely affected agricultural outputs.

Fig. 4.2. Budgetary allocation for the DA and rice commodity and ratio of palay to DA budget, 1995-2015.



Data sources: GAA for DA allocation and Department of Agriculture for paddy (2016).
Note: Palay commodity allocation is composed of the budgets for the national rice programs, NIA, PhilRice, NFA.

Table 4.1 gives the annual average budgets by administration. All four administrations had 60–73% allocated to the rice commodity. Although in relative terms the importance of rice in the budget has not changed much, the magnitude has been increasing drastically.

Table 4.1.Total rice sector budget (PhP M) vs. total DA budget and budgets compared to palay GVA growth rates by administration, 1995-2015.

Items	Ramos (1995-98)		Estrada (1999-2000)		Arroyo (2001-10)		B. Aquino (2011-15)	
	Amount	%	Amount	%	Amount	%	Amount	%
Total Rice Sector Budget	56,568	68	37,773	67	296,586	73	234,410	60
(Annual Ave.)	(14,142)		(18,886)		(29,659)		(46,882)	
Total Agriculture Budget	82,810	100	56,736	100	406,380	100	392,069	100
(Annual Ave.)	(20,703)		(28,368)		(40,638)		(78,414)	
Annual Average Palay GVA Growth Rate (%)	-5.09		2.53		3.06		1.68	
Annual Ave. Rice Budget per 1% Growth in Palay GVA (PhP M)	-2,778		7,465		9,692		27,906	

Data sources: GAA various years; Department of Agriculture (2016), PSA CountryStat.
Note: Rice sector budget includes National Rice Program, NIA Capital Outlay, NIA Support, PhilRice, and NFA Budgetary Support plus Obligation.

As shown in **Table 4.1**, the total budgets per administration have ballooned over time from just PhP 14.1 billion from the time of Ramos to more than three times that by the time of the B. Aquino administration. In fact, with 1% growth in palay GVA, the B. Aquino administration had to spend three times that of the Arroyo administration. Likewise, the last administration had to spend PhP 27 billion or three times the spending of the Arroyo administration. These patterns indicate that it has become more expensive for the government to attain growth in rice.

To help analyze the public spending patterns, **Table 4.2** shows rice commodity spending by key policy instruments across the five administrations. The policy instruments include R&D; information, communication, and education (ICE); price stabilization by the NFA; and irrigation by the NIA.

Table 4.2. Annual rice sector budget (PhP M) by key policy instruments vs. percent of palay GVA by administration, 1995-2015.

Items	Ramos (1995-98)	Estrada (1999-2000)	Arroyo (2001-10)	B. Aquino (2011-15)	All periods (1995-2015)
Annual Average Palay GVA (PhP M)	67,923	81,659	145,777	297,182	160,890
Annual Average Rice Sector Budget (PhP M)	14,142	18,886	29,659	46,882	31,267
Rice Sector Budget as Percent of Palay GVA (%)	21	23	20	16	19
Annual Ave. R&D Budget (PhP M)*			543	1,057	800
Rice R&D Budget as Percent of Palay GVA (%)			0.37	0.36	0.36
Annual Ave. ICE Budget (PhP M)*			546	938	742
Rice ICE Budget as Percent of Palay GVA (%)			0.37	0.32	0.35
Annual Average NFA Budget (PhP M)*	6,794	11,209	17,932	12,891	14,669
NFA Budget as Percent of Palay GVA (%)	10	14	12	4	9
Annual Average NIA Budget (PhP M)	4,725	5,505	8,100	26,458	12,160
NIA Budget as Percent of Palay GVA (%)	7	7	6	9	8

Notes: Rice sector budget includes National Rice Program, NIA capital outlay and budgetary support to operation, and PhilRice; data on PhilRice are only for 2008 to 2014; R&D budget data are from 2009 to 2015 only; ICE budget data are from 2005 to 2015; NFA data consist of Budgetary Support plus Obligation.

Data sources: GAA various years; PSA CountryStat.

Using the Ramos administration's spending pattern as the baseline to compare the spending of succeeding administrations, the priorities in each period are revealed through the ratios of public spending to palay GVA. The total rice allocations relative to palay GVA vary from 16% to 23% across the last four administrations. In terms of key policy interventions, only the last two administrations have figures for R&D and ICE. Relative to palay GVA, they are both way below 1% for the two administrations. Price stabilization, on the other hand, received more during the Ramos administration although, if the corporate budget were included, the Arroyo and Aquino administrations would likely show more. Of all the policy instruments, irrigation received the bulk across all the administrations, obtaining the most during the last administration at about 9%.

Table 4.3 shows the relative importance of the instruments for each administration. The NRP budget was highest in the Ramos administration and lowest in both Estrada's and Arroyo's time at 11% of total spending for the rice sector. Price stabilization has been receiving the largest share of public funds. Irrigation has the second-largest budget at an average of 39% for all periods.

Table 4.3. Rice sector budget distribution, 1995-2015.

Distribution	Ramos		Estrada		Arroyo		B. Aquino		1995-2015		
	1995-98		1999-2000		2001-10		2011-15				
	Budget (PhP B)	%	Budget (PhP B)	%	Budget (PhP B)	%	Budget (PhP B)	%	Total	Ave.	%
National Rice Program +	**10**	**17**	**4**	**11**	**33**	**11**	**35**	**15**	**82**	**4**	**13**
PhilRice	**1**	**1**	**0**	**1**	**3**	**1**	**3**	**1**	**6**	**0.3**	**1**
NFA*	**27**	**48**	**22**	**59**	**179**	**60**	**64**	**27**	**293**	**15**	**47**
NIA	**19**	**33**	**11**	**29**	**81**	**27**	**132**	**56**	**243**	**12**	**39**
Total	**57**	**100**	**38**	**100**	**297**	**100**	**234**	**100**	**625**	**31**	**100**

Data source: GAA.
Note: *NFA consists of Budgetary Support plus Obligation.

Table 4.4 shows the NRP budget by operating units from 2011 to 2016. In terms of operating units, the RFOs account for more than three-fourths of the total budget while the OSEC gets 9%. This distribution indicates that the RFOs are directly responsible for the bulk of the budget of the Department, which reflects a decentralized system. If the allocation for RFOs is divided among the 17 regions, the regional average allocation would be just 4.6%. Among the bureaus, the combined budget for research and extension is indicative of an increasing importance given to these functions, although investment for each function is still below 1% minimum of the palay GVA.

Table 4.4. National Rice Program (NRP) budget by operating units, 2011-16 (in PhP M).

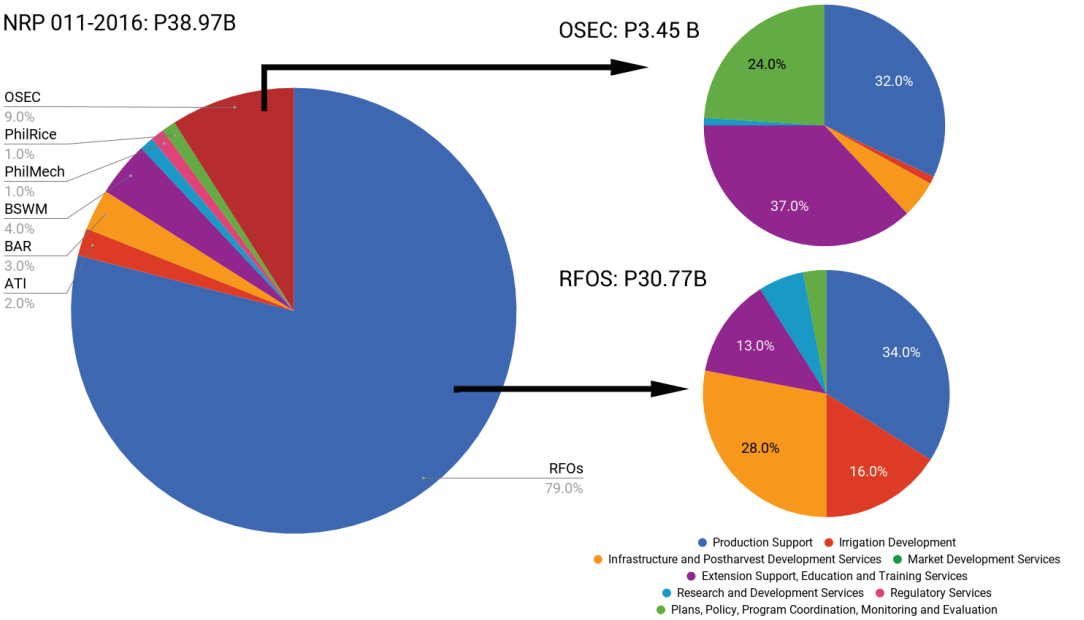
Components	Prod. Support	Irrigation Dev't. Services	Infra. & Postharvest Dev't. Services	Market Dev't. Services	ESETS	R&D Services	Reg. Services	Plans, Policy, Prog. Coord., M&E	TOTAL	%
RFOs	10,396	4,839	8,556	84	3,921	2,043	70	864	30,772	79
ATI	27				467	10		79	583	1
BAR					24	1,141		20	1,185	3
BAS						10		143	153	>1
BSWM	196	1,217			28	23		72	1,536	4
BPI	122				31	31	182	41	407	1
PhilMech			535		15			15	565	1
PhilRice						322			322	1
OSEC	1,098	32	162	20	1,271	20		848	3,451	9
TOTAL	11,838	6,088	9,253	104	5,757	3,600	252	2,082	38,974	100
%	30	16	24	>1	15	9	1	5	100	

Data source: DA National Rice Program.

Before the PDAF scandal, the NRP was a lump-sum budget under the OSEC, which is then sub-allocated to various operating units based on their approved proposals. This practice has been criticized by the COA as prone to leakages and political interference (COA Special Audits Office Report No. 2012-03). Since 2014, as a result of public outcry on the PDAF, the NRP in the General Appropriations Act (GAA) reflects its allocation to the various operating units. The Bureau of

Agricultural Research manages the R&D budget while the ATI manages the extension budget. These lead agencies sub-allocate their respective budgets for R&D or extension to partner institutions within or outside the DA based on approved proposals.

Fig. 4.3. Distribution of National Rice Program (NRP) budget by agency and budget distribution for RFOs and OSEC, 2011-16.



Data source: DA National Rice Program.

Figure 4.3 gives the NRP budget by agency and major final output (MFO) for the RFOs and OSEC from 2011 to 2016. The distribution of budget by the RFOs differs from that of the OSEC. The RFO allocation by MFOs shows that production support accounts for about a third of the total. This item is followed by infrastructure and postharvest, and irrigation, which comprise close to half of the total budget.

The OSEC, on the other hand, despite the DBM ruling of allocating the budgets to the operating units, continues to have a substantial allocation of PhP 3.45 billion over a period of six years or an average of PhP 0.58 billion annually. The distribution of the OSEC budget indicates that extension support, education and training services, and production support are priorities. One good feature of the OSEC budget distribution is the substantial share for plans, policy, program coordination, and monitoring and evaluation, which are the core functions of the OSEC.

For the entire NRP for 2011-16, the infrastructure and irrigation MFOs received 44% of the total while production support received about 30%. ESETS were allocated about 15% while R&D had close to 9%. Thus, the NRP of the last administration was mostly about infrastructure and production support.

Regional Allocation Biased Toward Poorly Performing Regions

Table 4.5 shows the regional allocation of the NRP. Of the 15 regions, six were allocated more than PhP 2 billion for 2012 to 2015 or an annual allocation of more than half a billion. Of the six regions, five are in Luzon. Six regions had below PhP 1 billion for the same period or an annual average of less than a quarter of a billion. Four of the six regions are in Mindanao. Comparing allocations to the palay GVA of each region shows that the regions with the smallest allocations had the highest ratios. This result shows that, in relative terms, these regions are in fact allocated more than the regions with the higher nominal budget allocations. One interpretation of this observation is that the government appears to be investing more in the less performing regions in terms of palay value added. The budget allocation per palay area harvested by region shows the same bias. In relative terms, lower allocations are given to the regions with most of the palay harvested area at about PhP 1,300 per ha compared with PhP 1,600–2,100 per ha for the other regions.

Table 4.5. The NRP regional budget allocation by RFO vs. regional palay GVA and total area harvested, 2012-15.

DA Unit	Total budget 2012-15 (PhP B)	Annual ave. budget 2012-15 (PhP B)	Budget as % of palay GVA	Ranking	Ratio of budget to palay area harvested (PhP/ha)	Ranking
Reg. 3	2.89	0.72	1.09	14	1,030	13
Region 2	2.57	0.64	1.47	13	1,095	12
Reg. 6	2.38	0.60	1.71	11	943	14
Region 1	2.10	0.52	1.58	12	1,284	10
Reg. 4A & 4B	2.05	0.51	2.10	7	1,294	9
Reg. 12	1.89	0.47	1.98	8	1,364	5
Reg. 5	1.82	0.45	2.38	5	1,347	7
Reg. 8	1.43	0.36	2.30	6	1,277	11
Reg. 10	0.96	0.24	1.91	9	1,506	4
Reg. 9	0.88	0.22	1.88	10	1,361	6
Reg. 13	0.86	0.21	2.41	4	1,298	8
Reg. 11	0.86	0.21	2.72	1	2,085	1
CAR	0.85	0.21	2.64	3	1,809	2
Reg. 7	0.66	0.17	2.72	2	1,587	3

Data sources: GAA and PSA.

Annual Allocation of the NRP Budget in the Past Two Administrations

The annual distributions of the NRP budget according to the AFMA component or major final output spanning two administrations are reported in **Tables 4.6** and **4.7**. Although the two rice programs have the same components, the priorities are significantly different. The Arroyo administration has a clear bias for production support, which received half of the budget for the period. Distant second and third priorities were ESETS and agricultural equipment. The last administration gave significant attention to agricultural equipment and facilities after production support. A significant difference is the R&D share, which was more than double in the last administration compared with that of Arroyo. Also, R&D allocation in the Aquino administration was generally higher than the budget for ESETS compared with the prior administration, which had it the other way around. Also notable was the 6% budget for policy and planning in the Aquino administration versus 3% in the Arroyo administration.

Table 4.6. Annual distribution of National Rice Program budget by AFMA major final output, 2005-10 (PhP M).

Component	2005	2006	2007	2008	2009	2010	Total	Annual average	%
Prod. Support Services	777	950	1,057	1,730	5,317	1,418	11,249	1,875	50
Market Dev't. Services	3	7	7	6	8	10	42	7	>1
ESETS	53	162	248	311	1,733	770	3,277	546	15
R&D Services					419	1,270	1,688	281	7
Irrig. Network Services	131	135	137	107	624	120	1,254	209	6
Agric. Eqpt. and Facilities Support Services	441	212	9	307	1,809	442	3,220	537	14
Regulatory Services	117	404	330	172	77	26	1,126	188	5
Policy and Planning				423	244	667	111	3	
Total	1,522	1,871	1,788	2,632	10,411	4,300	22,524	3,754	100

Note: Information Services Budget in 2009 was not included due to absence of data.
Data source: DA Budget Division (2016).

The budget in the last administration appears to be more spread across the key intervention areas compared with the relatively skewed distribution of the Arroyo budget. The big increase in the irrigation services allocation in the Aquino administration is notable. Although the transfer of NIA to the Office of the President may have some influence, it looks like the government's Food Staples Sufficiency Program must have prompted the DA to take matters into its own hands and do more irrigation projects outside NIA. This argument is supported by the doubling of the allocation in 2013, and this level was maintained in the succeeding years.

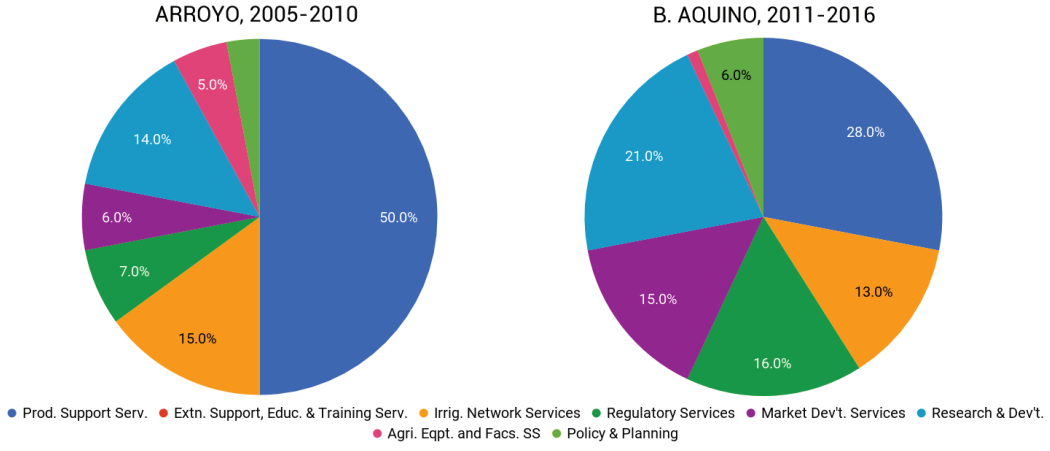
Table 4.7. Annual distribution of the National Rice Program budgets by AFMA major final output, 2011-16 (PhP M).

Component	2011	2012	2013	2014	2015	2016	Total	Annual average	%
Prod. Support Services	1,613	1,156	2,060	1,152	2,422	3,383	11,787	1,964	28
Market Dev't. Services	12	29	11	22	18	17	109	18	0
ESETS	877	823	942	1,232	985	803	5,662	944	13
R&D Services	993	792	895	1,214	1,400	1,251	6,545	1,091	16
Irrig. Network Services	585	618	1,281	1,143	1,338	1,198	6,163	1,027	15
Agric. Eqpt. and Facilities Support Services	241	2,588	2,198	2,141	851	807	8,826	1,471	21
Regulatory Services	111	47	125	41			323	54	1
Policy and Planning	454	522	550	537	508		2,571	428	6
Total	4,886	6,574	8,062	7,482	7,522	7,459	41,985	6,997	100

Note: Information Services Budget in 2009 was not included due to absence of data.
Data source: DA Budget Division.

The contrast in the NRP of the past two administrations discussed above is clearer in Figure 4.4.

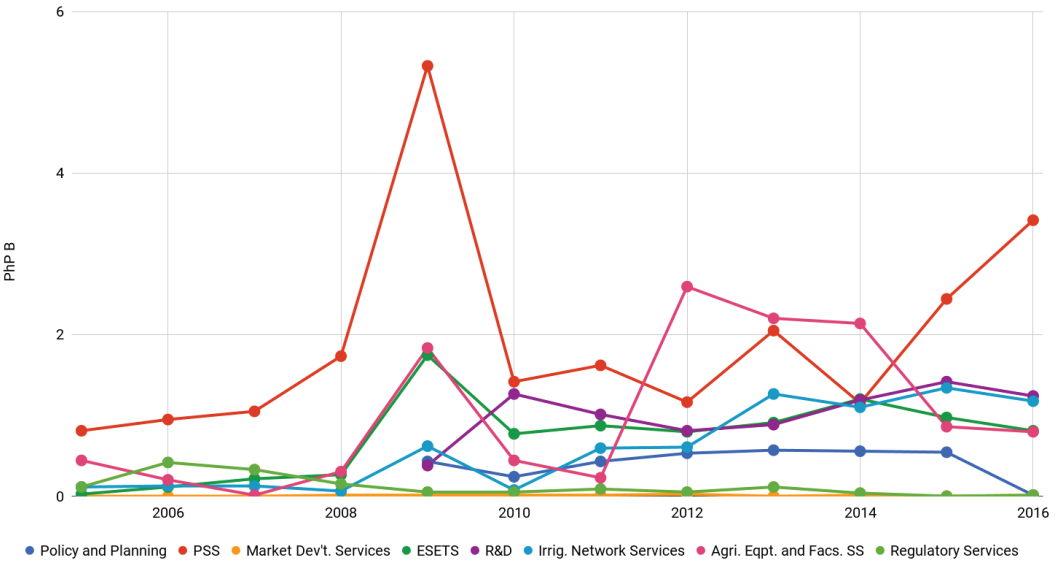
Fig. 4.4. Distribution of National Rice Program budgets according to AFMA components/major final outputs (MFOs), 2005-16.



Note: Information Services Budget in 2009 was not included due to absence of data.
Data source: DA Budget Division.

Figure 4.5 shows high variability from year to year, which indicates budget instability. The greatest variability occurs in the budget allocation for production support services and agricultural equipment and facilities. These are mostly private goods procured by the DA and distributed to recipients with or without counterpart resources. The DA treats these MFOs as forms of subsidies to accelerate use of new technologies to increase yields and total harvest. Concerns have been raised whether subsidies in the form of material technologies that are limited to few recipients are the most appropriate considering their limited effects on the sector. Such an approach is susceptible to rent-seeking behavior and will mainly benefit the better-off farmers or cooperatives. There are other methods of accelerating the use of technologies such as subsidized credit that are more equitable for target recipients and less prone to rent-seeking behavior and political patronage.

Fig. 4.5. Trends in National Rice Program budgets by AFMA component/major final output.



Note: There's no separate budget of R&D and policy and planning from 2005 to 2008; Information Services Budget in 2009 was not included.
Data source: DA Budget Division.

Deconstructing the National Rice Program Budget by Major Final Outputs of EOs 116 and 292

From 2009 to 2013, the DA listed three MFOs in compliance with the Department of Budget and Management (DBM) Budget Circular no. 532 (as of 28 November 2011) as shown in **Table 4.8**. The list of MFOs shows that the categories do not exactly cohere to the mandates of the DA specified in EO 116. In addition, the DA MFOs have overlapping categories, which makes it difficult to account for investment or allocation by policy instrument. For example, MFO 1.1 (Production Support Services) is listed in the same category as MFO 1.2 (Market Development Services), MFO 1.6 (ESETS), and MFO 1.7 (R&D). Production Support Services is a composite MFO that includes all support services in agriculture such as R&D, extension, and regulations shown in Table 13. In

addition, there are no clear or explicit MFOs on Investment and Policy Environment, which are mandated by EO 116. It is noted that the MFO 1.1 titled Production Support Services included budgetary items on the distribution of private goods such as seeds, fertilizers, and machinery, which are not ordinarily included in government budgets. As a matter of principle, the government must focus on the production and distribution of public goods and services.

EO 116 defines three major final outputs that the DA should focus government interventions on to achieve the goals of agricultural development. These MFOs are as follows: (1) agriculture and fisheries (AF) *support services*, (2) *investment* in AF public infrastructure, and (3) improving the *policy environment* to make agriculture efficient in the attainment of the goals of modernization. Each major MFO has sub-MFOs, as shown in **Table 4.8**. The list of sub-MFOs is based on good practices in other countries as documented in the literature, particularly the Organization for Economic Cooperation and Development and FAO (OECD 2016, Maunder 1998).

Table 4.8. Reconciling DA major final outputs (MFOs) to EO 116/292 MFOs.

DA MFOs, 2009-2013		EO 116/292
MFO 1	AF SUPPORT SERVICES DELIVERED	
MFO 1.1	Production Support Services	1a, 1b. 1e. 2a. 2b. 51. 5b, 5c, 5d, 5e
MFO 1.2	Market Dev't. Services	1a, 1b. 1e. 2a. 2b. 51. 5b, 5c, 5d, 5e
MFO 1.3	Irrigation Dev't. Services	1d, 2d
MFO 1.5	Other Infra. &/or Postharvest Dev't. Services	1b, 1e, 2d, 2e, 5c, 5d
MFO 1.6	ESETS	1b, 1e, 2d, 2e, 5c, 5d
MFO 1.7	Research & Development	1a, 1b. 1e. 2a. 2b. 51. 5b, 5c, 5d, 5e
MFO 2	REGULATORY, DEVELOPED, IMPLEMENTED, MONITORES AND ENFORCED	1c
MFO 3	PLANS & POLICIES DEVELOPED, IMPLEMENTED, MONITORED AND EVALUATED	1c, 3f, 4a, 4b, 4c

EO 116/292 MFOs
1. AF Support Services (Operations) a. R&D b. ICE (Info., Comm., Extension Services) c. Regulations d. Water & Irrigation Services e. Others
2. Public Investment in Human & Physical Infrastructure a. R&D b. ICE c. AF Regulatory d. Irrigation e. Farm to market road and other rural physical infrastructure
3. Policy Environment a. Regulatory & Market Policies b. Trade Policies c. Technology or Knowledge mgt. policies d. Partnership Policies e. Credit policies f. Others
4. Program Management, Monitoring & Evalutaion a. Program Management b. Planning, M&E c. Others
5. Others: Production & Distribution of Private Goods a. Seeds, Fertilizers & Pesticides b. Machineries/Equipment c. Structure d. Others

Sources: GAA; EOs 116 and 292.

To fully account for the allocation of resources by key policy instruments, the budgets of the DA NRP from 2005 to 2016 are being deconstructed according to the EO 116 MFOs following **Table 4.9.** Deconstruction of the NRP budget is limited to those years for which data are available.

Table 4.9. Budget breakdown by MFO of Executive Orders 116 and 292.

MFOs & Sub-MFOs of EO 116/292	Purpose
1. AF Support Services (Operations) a. R&D b. ICE (Info., Comm., Extension Services) c. Regulations d. Water & Irrigation Services e. Others	Cost of Operations
2. Public Investment in Human & Physical Infrastructure a. R&D b. ICE c. AF Regulatory d. Irrigation e. Farm to market road and other rural physical infrastructure	Cost of improving the Human & Physical Infrastructure towards greater resilience & effectiveness
3. Policy Environment a. Regulatory & Market Policies b. Trade Policies c. Technology or Knowledge mgt. policies d. Partnership Policies e. Credit policies f. Others	Cost of reducing or removing structural or organizational barriers of efficiency & effectiveness

In deconstructing the DA MFO budget in terms of EO 116 MFOs, some categories in the DA MFOs are not found in the latter MFOs. These are reflected in numbers 4 and 5, which are shaded in **Table 4.8**.

Deconstructed National Rice Program. This section deals with the deconstructed NRP budget in accordance with the development framework of EO 116 to better account for public spending. The key policy instruments for agricultural development are as specified by law. Deconstructing the budget is necessary in order to address the issue of overlapping categories in the MFOs used by the DA for the period covered.

From 2009 to 2015, the DA NRP budget totaled PhP 50.64 billion. **Table 4.10** shows the NRP bias toward production and distribution of private goods, which is an invalid MFO as far as EO 116 is concerned. It had the highest priority in the budget allocation. Meanwhile, the remaining balance of the budget had to be shared among the three legally valid MFOs, with AF Support Services getting the highest priority. This was followed by Investment in AF Public Infrastructure of capital outlay. There was hardly any budget for improving the Policy Environment (MFO 3).

Table 4.10. Deconstructed National Rice Program (NRP) budget by EO 116/292 MFOs, 2009-15 (PhP B).

Current DA MFOs / EO 116/292 MFOs	Plans, Policy, Prog. Coord., M&E	Prod. Support	Market Dev't.	ESETS	R&D	Irrig. Dev't	Other Infra/ Post-harvest & Farm Equipt.	Reg.	Others	TOTAL	%
1. AF Support Services	0.11	2.63	0.24	7.76	6.28	0.31	0.02	0.39	0.49	18.23	36
2. Public Investment in Human & Physical Infrastructure	0.01	0.28			0.16	5.32	2.64			8.41	17
3. Policy Environment	0.10								0.01	0.11	>1
4. Program Management, M&E	3.10									3.10	6
5. Others: Prod. & Dist. of Private Goods		12.44		>1			8.34			20.78	41
TOTAL	3.32	15.36	0.24	7.76	6.44	5.63	11.00	0.39	0.50	50.64	100
%	7	30	>1	15	13	11	22	1	1	100	

Note: Others = Expanded Modified Rapid Composting Program (2010); R&D includes PhilRice Budgetary Support & Income.
Data source: DA National Rice Program.

Deconstructed Budget for the Operational Expenses of Rice Support Services. In the operation of rice support services, which accounts for 36% of the total budget for rice during the period, the greatest allocation is on ICE/ESETS, followed by R&D (**Table 4.11**). These two sub-MFOs account for 92% of MFO 1. The highest priority given to ICE/ESETS shows the importance that the NRP gives to training and education as a key strategy to achieve yield targets and production. The rest of the sub-MFOs under this category had minimal allocation, ranging from 2% to 4%, which shows the lack of appreciation by the NRP.

Table 4.11. Deconstructed budget: provision of AF Support Services, 2009-16 (PhP B).

EO 116/292 MFOs	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL	Annual ave.	%
1. AF Support Services (36% of the total NRP budget)											
a. R&D	0.57	1.27	1.10	0.79	0.90	1.21	1.38	1.24	8.46	1.06	41
b. ICE/ESETS	2.18	1.29	1.58	1.01	1.21	1.34	1.03	0.81	10.46	1.31	51
c. Regulatory		0.03	0.18	0.05	0.12	0.04			0.42	0.05	2
d. Water & Irrig Services			0.04	0.07	0.11	0.06	0.04	0.04	0.35	0.04	2
e. Others	0.60					0.15	0.04		0.79	0.10	4
Total	3.35	2.59	2.89	1.92	2.33	2.81	2.49	2.09	20.47	2.56	100

Note: R&D includes PhilRice Budgetary Support and income except for 2015 and 2016, for which there are no data for PhilRice income.
Data source: DA National Rice Program.

Deconstructed budget for investment in physical and human infrastructure. The NRP's investment priority has largely concentrated on rural infrastructure such as farm-to-market roads and irrigation facilities. Investment toward the improvement of the human and physical infrastructure of support services to attain the desired level of effectiveness, efficiency, and resilience has been largely neglected. In the NRP budget from 2009 to 2016 as shown in **Table 4.12**, public investment on capital outlay totals PhP 8.41 billion, which accounts for a mere 17% of the total. Of this amount, irrigation accounts for 69%, followed by farm-to-market roads (FMR) at 27%. There is hardly any budget to improve the physical and human infrastructure of R&D, ICE, and regulations.

Table 4.12. Deconstructed budget: provision of investment in AF public infrastructure, 2009-16 (PhP B).

EO 116/292 MFOs	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL	Annual ave.	%
2. Public Investent in Human & Physical Infrastructure (17% of the total NRP budget)											
a. FMR & Rural Infra. Capital Outlay	1.27	0.40	0.07	0.46	0.22	0.10			2.52	0.32	27
b. R&D Capital Outlay	0.02		0.05				0.04	0.01	0.12	0.02	1
c. ICE/ESETS Capital Outlay				0.10	0.11	0.10	0.01	0.01	0.32	0.04	3
d. AF Reg. Capital Outlay											
e. Irrigation Capital Outlay	0.62	0.12	0.48	0.55	1.17	1.08	1.30	1.16	6.48	0.81	69
Total	1.92	0.52	0.59	1.10	1.51	1.28	1.35	1.18	9.45	1.18	100

Data source: DA National Rice Program.

Deconstructed Budget: Improved Policy Environment. The improvement of the policy environment to accelerate agricultural development is a widely accepted strategy in agricultural development (Armas et al 2012). In the NRP, unfortunately, this MFO has not been given the attention it needs; it is seriously underfunded (**Table 4.13**). There is hardly any budget to address the policy issues related to knowledge generation, knowledge dissemination, knowledge use, and marketing. It should be noted that the effectiveness issue of the devolved agricultural extension services has been cited in several studies (Ani and Correa 2016). Yet, there is no policy focus to address this strategic issue in the NRP except to provide incentives in the form of honoraria to LGU extension agents involved in the rice program. Equally troubling is the lack of attention to systematize the flow of farmers' rice knowledge and practices to the LGU extension system and finally to the research system so that NRP decisions are anchored on better data and information on field situations.

Table 4.13. Deconstructed budget: Improved Policy Environment, 2009-16 (PhP B).

EO 116/292 MFOs	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL	Annual ave.	%
3. Policy Environment											
(less than 1% of the											
total NRP budget)											
a. Regulatory Policies											
b. Trade Policies											
c. Technology Policies											
d. Partnership Policies											
e. Credit Policies											
f. Others		0.01	0.03	0.03	0.04	0.01			0.11	0.01	100
Total		0.01	0.03	0.03	0.04	0.01			0.11	0.01	100

Data source: DA National Rice Program.

Deconstructed Budget: Program Management and Monitoring and Evaluation. The budget for program management and monitoring and evaluation at 6% of the total NRP budget looks reasonable (**Table 4.14**). It is noted, however, that, despite the substantial budget for M&E, there is no evidence of external program management review (EPMR), impact studies, and research-based planning toward greater program effectiveness. M&E appears to be mainly physical monitoring of accomplishments.

Table 4.14. Deconstructed budget: Program Management, Monitoring & Evaluation, 2009-16 (PhP B).

EO 116/292 MFOs	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL	Annual ave.	%
4. Program Management, Monitoring & Evaluation (6% of the total NRP budget)											
a. Program Management	0.13	0.07	0.25	0.31	0.30	0.30	0.32		1.66	0.21	54
b. Planning, M&E	0.32	0.18	0.13	0.19	0.21	0.22	0.18		1.43	0.18	46
c. Others					>1	>1			>1	>1	>1
Total	0.45	0.24	0.38	0.49	0.51	0.52	0.50		3.10	0.39	100

Data source: DA National Rice Program.

Deconstructed Budget: Production and Distribution of Private Goods. The production and distribution of private goods account for up to 41% of the total NRP budget; this is a highly doubtful NRP investment in view of its lack of effectiveness in accelerating the spread of new knowledge and technologies. Besides, it is prone to rent-seeking activities as the PDAF has shown. In the last election, the distribution of private goods was linked to partisan political activities.

Table 4.15 shows that expenditure under this MFO consists of procuring and distributing seeds, fertilizer, and pesticide, but mostly seeds. The beneficiaries are limited, and it is an inefficient system to accelerate technology adoption by the greater rice farmer population. In addition, it is prone to rent-

seeking behavior. Several COA reports mentioned undistributed machinery and equipment, unverified beneficiaries, rotten seeds, and destroyed fertilizer in the DA warehouses. Recently, the new secretary of agriculture berated the RED of Region 12 because of undistributed and decaying agricultural equipment and machinery. They remain undistributed because of the failure of the recipients to come up with counterpart funds or the recipients did not have interest because the machines did not meet their needs.

Table 4.15. Deconstructed budget: Production & Distribution of Private Goods, 2009-16 (PhP B).

EO 116/292 MFOs	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL	Annual ave.	%
5. Others: Prod. & Dist. of Private Goods (51% of the total NRP budget)											
a. Seeds, Fertilizer, and Pesticides*	3.72	1.39	0.96	0.85	1.43	0.92	2.36	3.38	15.01	1.88	60
b. Machinery/Equipment	0.60	0.05	0.85	1.40	1.31	1.22	0.69	0.08	6.20	0.77	25
c. Structure	0.41		0.08	0.78	0.91	0.72	0.13	0.72	3.77	0.47	15
d. Others						>1			>1	>1	>1
Total	4.72	1.44	1.90	3.03	3.65	2.86	3.18	4.19	24.97	3.12	100

Note: *Budgets for Production Support Services from 2014 to 2016 were placed under (5.b) Seeds because there is no detailed breakdown from 2014 to 2015 and most of budget of the previous years consisted of seed distribution/production.
Data source: DA National Rice Program.

Summary

The rice sector is the top-priority commodity of the government. It receives a disproportionate share of the total agriculture budget, far exceeding its contribution to the total agricultural sector. This bias toward rice has been cited as the major reason for the anemic growth in tree crop diversification.

The budget for rice sector development has received much higher budget in real terms and in proportion to the total DA budget. However, the cost incurred to attain higher productivity and value added in the commodity has disproportionately increased over the past two decades, which brings the need to examine organizational and program effectiveness. There are serious issues in the allocation of resources in productivity-enhancing policy instruments, particularly R&D and ICE, which are still below the rule of thumb of 1% of the GVA for each.

Of serious concern is the high budget allocated to the production and distribution of private goods. The DA classifies this as subsidy aimed at accelerating the adoption of modern rice technology toward increased yield. Although the objective may be appropriate, there are serious issues in social equity and efficiency. Future programs must explore other proven, cost-effective means of accelerating technology adoption that will meet the criteria of social equity, cost effectiveness, and efficiency. The poor NRP investment portfolio reflects the lack of a solid framework and rigor in planning. The perpetuation of the type of planning that governs the NRP is indicative of poor M&E and problems of technical capacity and governance in the management of the NRP.

IRRI-Philippine Partnerships in the Past 30 Years

5

IRRI's Mission and Vision

IRRI was established in December 1959 "to do basic research on the rice plant and applied research on all phases of rice production, management, distribution, and utilization." The organizational purpose is clearly articulated in its mission of reducing poverty and hunger, improving the health of rice farmers and consumers, and ensuring environmental sustainability through research and development partnerships. The vision of "a strong, vibrant, creative, and energetic IRRI, synonymous with scientific excellence, … central to the world's commitment to eliminate the scourges of poverty and hunger" provides guidance for the organization's current and future courses of action. In the words of the last director general, Robert Zeigler (2015), in his exit seminar in December 2015, "IRRI's products will revolutionize agriculture and livelihoods in the rice-consuming world."

According to Zeigler (2015), this vision means making a difference, doing what no one else can or would do, being a leader who sets the agenda, and playing a pivotal role in research that transforms rice-based agriculture.

Box 5.1 highlights the key events or milestones for the organization since its inception until its implementation of the DA's Food Staples Sufficiency Program through seven projects in 2015.

Box 5.1. IRRI's brief history

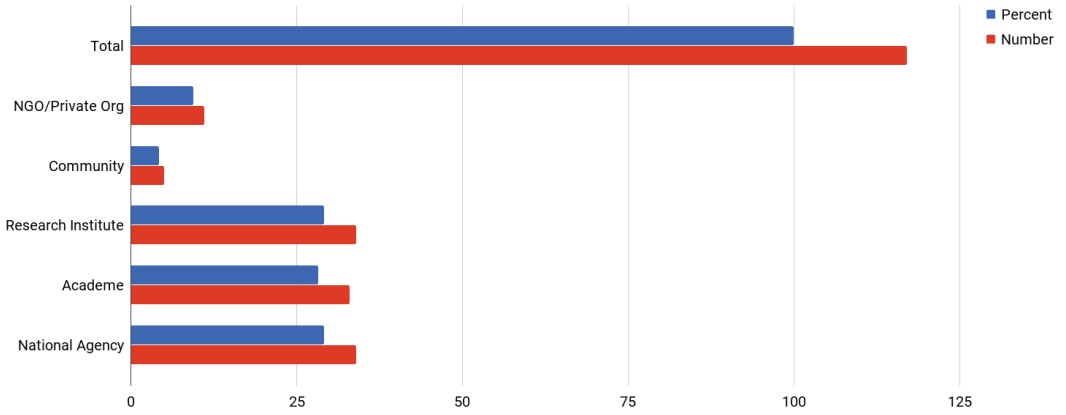
Period	History
1959-1966	• A Memorandum of Understanding between the Philippines and IRRI was signed • Sterling Wortman initiates the the world germplasm collection • Start of the first Green Revolution in rice thru the discovery in the F2 generation crosses • Announced the name of its first variety, IR8
1971-1986	• Rice breeding symposium kicked off, providing the most comprehensive treatment of rice breeding activities • The identification of the wild rice *Oryza nivara*, as a source of genetic resistance to grassy stunt virus • Development of IR24, IR26, IR28, IR29, IR30, IR32, IR34, IR36, IR38, IR40, IR42, IR43, IR44, IR45, IR46, IR48, IR50, IR52, IR54, IR56, IR58, IR60, IR62, IR64, and IR65 • The Philippines created the Philippine Rice Research Institute (PhilRice) with encouragement from IRRI in 1985 • Farm machineries are developed and widely used by farmers in tropical rice-producing countries
1987-2004	• Ratification of IRRI-Philippines MOA in 1995 • Development of genetic diversity and disease control in rice • IRRI and PhilRice found that the transgenic rice variety IR72 with the Xa21 gene (TT103) shows good agronomic performance • Development of salt-tolerant and tungro-resistant rice lines
2005-2015	• The Philippines ratified the 1995 Host Country Agreement with IRRI in 2005, 2006, 2008 • Launched the International Rice Genome Sequencing Project • IRRI's IR8 was featured in the magazine *Popular Mechanics* among the top 50 inventions that have "rocked the world" during the past half-century • Identified the *Sub1a* gene that was placed in IR64, which enabled rice to survive complete submergence for up to 17 days • Dissemination of submergence-tolerance rice varieties and associated new production practices • Formulation and dissemination of site-specific nutrient management (SSNM) through partnerships with national research and extension organizations and the private sector • Project on stress-tolerant rice for poor farmers in Africa and South Asia (STRASA) • Signing of MOA between IRRI and the country's Department of Agriculture. The agreement focuses on irrigation, technology, extension services, and credit support for farmers in the Philippines to address the ongoing rice crisis • Launching of C4 rice project of plant genes responsible for the greatest known efficiency of solar energy conversion in plant photosynthesis in 2009 • Availability on the web of a new decision tool, *Nutrient Manager for Rice*, which helps rice farmers in the Philippines optimize their use of nutrient inputs • Development and evaluation of Golden Rice as a potential tool to reduce vitamin A deficiency • Development of the *Nutrient Manager for Rice Application*, which enables farmers and extension agents to obtain site-specific fertilizer advice using a simple mobile phone • IRRI-Philippines' Food Staples Sufficiency Program (FSSP) was signed in 2012 • Creation of programs for more market development for rice breeding, crop health management research, and expanding into rice reproductive biology, plant architecture, and yield genes • Failure of first trial for Golden Rice research but IRRI will push through for more trials • *Rice Crop Manager* was launched in 2013 • IRRI-Philippines agreement for the mutual protection of elite breeding lines in the Philippines was signed in 2014 • Launching of the Heirloom Rice Project in Cotabato in 2015 • Renewal of Next-Gen Project (Accelerating the development and Adoption of Next-Generation Rice Varieties for the Major Ecosystems in the Philippines • The Philippine Rice Information System (PRISM) project held its first national convention

Source: IRRI (2016).

Trends of MOA/MOU between IRRI and Partners, 1959-2015

The mission and vision of IRRI define the partnerships that the organization forged. As of October 2015, IRRI had inked a total of 117 agreements with partners in the Philippines since its inception in 1959. These partners come from various types of institutions (**Fig. 5.1**). Two observations stand out: (1) IRRI's partnerships are concentrated and in almost equal number with three types of partners, academe, research institutions, and national government agencies, and (2) all the other partners appear nominal.

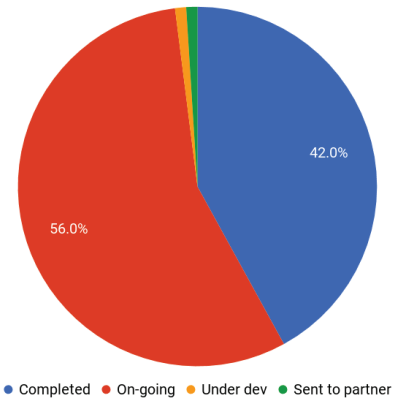
Fig. 5.1. Institutions in partnership agreements with IRRI, 1959-2015.



Data source: IRRI DRPC (2016).

Of the total Memorandum of Agreement (MOA)/Memorandum of Understanding (MOU), more than half are already completed while 42% are ongoing (**Fig. 5.2**). The rest are in process.

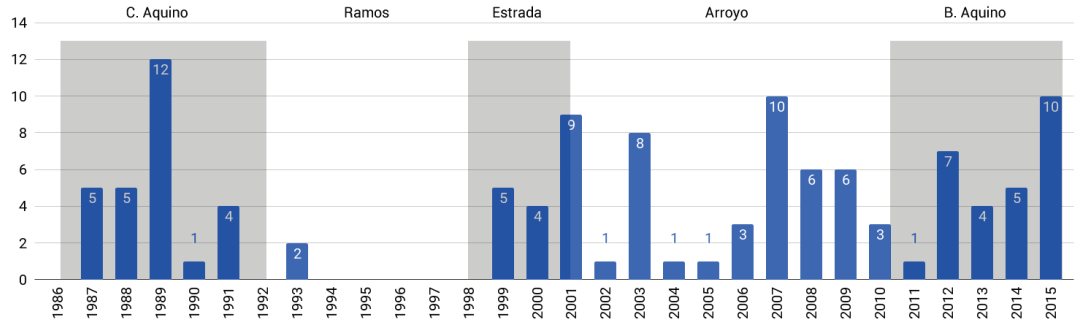
Fig. 5.2. Status of MOAs/MOUs signed between IRRI and Philippine partners, 1959-2015.



Data source: IRRI DRPC (2016).

In terms of number of agreements, **Figure 5.3** shows that IRRI has had many since the time of C. Aquino, with the exception of the Ramos administration. The agreements are evenly spread.

Fig. 5.3. Annual number of MOAs/MOUs between IRRI and Philippine partners, 1986-2015.

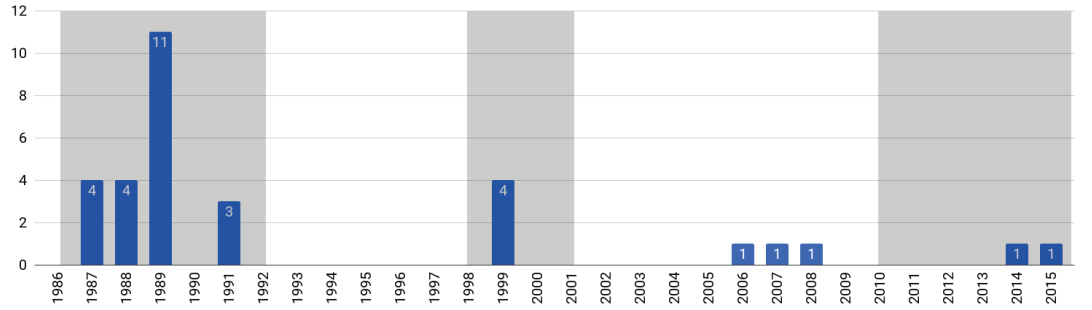


MOAs/MOUs	C. Aquino (1986-1992)	Ramos (1993-1998)	Estrada (1999-2000)	Arroyo (2001-2010)	B. Aquino (2011-2015)
TOTAL	27	2	9	48	27
DA: BAR, PhilRice, ATI, RFUs	24	0	5	14	16
Amount Involved (PhP M)				130	361
Other Partners: SCUs, DOST, Provate Sector, etc	3	2	4	34	11

Data source: IRRI (2016).

The partnership between IRRI and PhilRice as shown in **Figure 5.4** was quite active in the early years of the latter. It was, however, halted drastically in 1992 and has been limited and patchy since then. The Rice Self-Sufficiency Program (RSSP) and the Food Staples Sufficiency Program (FSSP) reestablished the formal partnership between these two organizations.

Fig. 5.4. Annual number of MOAs/MOUs between IRRI and PhilRice, 1986-2015.



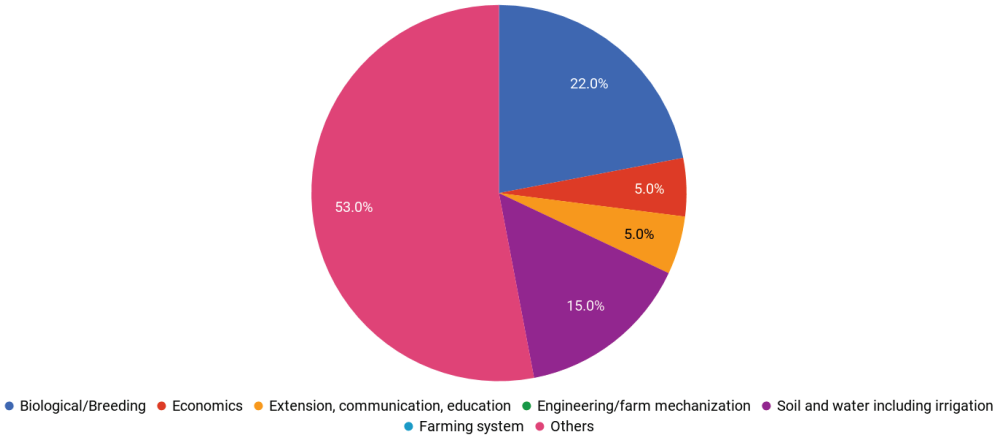
MOAs/MOUs	C. Aquino (1986-1992)	Ramos (1993-1998)	Estrada (1999-2000)	Arroyo (2001-2010)	B. Aquino (2011-2015)
TOTAL	22	0	4	3	2
Amount Involved (PhP M)				67.4	

Data source: IRRI (2016).

IRRI's Contribution to the Philippine Rice Sector

Classifying IRRI's partnerships into research areas, **Figure 5.5** shows the distribution of the research conducted with the partners from 1999 to 2003. Two areas form the bulk: biological/breeding research comprising more than one-fifth of the total and soil and water research comprising 15%.

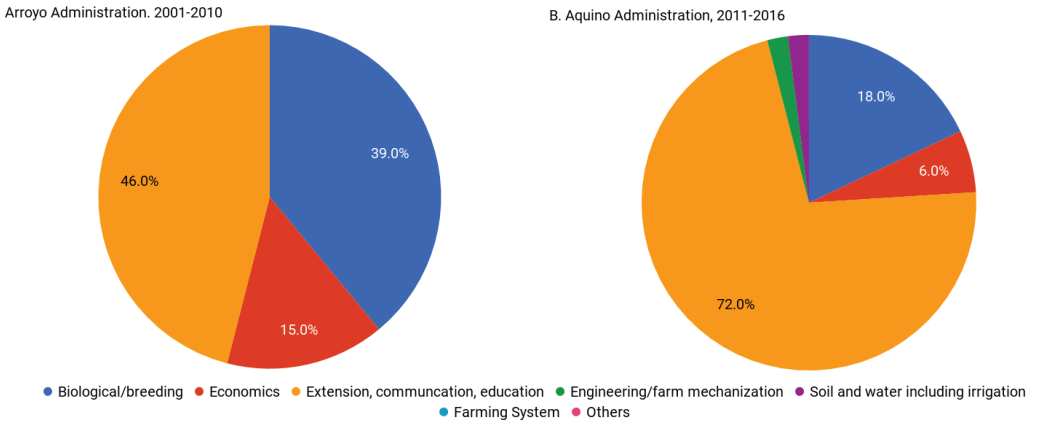
Fig. 5.5. Type of research covered by IRRI-Philippine partners, 1999-2003.



Data source: IRRI Annual Reports (various years).

The distribution of the type of research between two periods shows differences in emphasis (**Fig. 5.6**). In the Arroyo administration, extension, communication, and education are closely followed by biological/breeding research. In the Aquino administration, extension, communication, and education comprise the bulk of the funding.

Fig. 5.6. Type of research covered by IRRI-Philippine partnerships.



Data source: IRRI DRPC (2016).

IRRI-DA Partnership Projects: Food Staples Sufficiency Program (FSSP)

The recent partnerships with the Department of Agriculture are better illustrated in the following seven projects profiled in **Tables 5.1a** to **5.1g**: (a) benchmarking, (b) Philippine Rice Information System Management (PRISM), (c) Rice Crop Manager (RCM), (d) accelerating the development and adoption of next-generation rice varieties (Next-Gen), (e) accelerating the development and dissemination of associated rice production technologies (Associated-Tech), (f) improving technology promotion and delivery (IPaD), and (g) raising the productivity and enriching the legacy of heirloom/ traditional rice (Heirloom).

Table 5.1a. R&D partnership programs in support to FSSP: benchmarking.

Programs	Key objectives/goals	Major strategies	
Benchmarking Budgets PhilRice: 2014 = PhP 1,880,770 2015 = PhP 4,000,000 IRRI (released by BAR): 2013 = PhP 8,579,614 2014 = PhP 10,887,448 2015 = PhP 3,627,703 Project Site(s): NE Philippines, SB Thailand, CT Vietnam, WJ Indonesia, ZJ China, TN & HR India Period Duration: June 2013 – May 2016	Benchmarking the Philippine Rice Economy Relative to Major Rice-Producing Countries in Asia, which will generate and analyze detailed information on yield, input uses, production and marketing costs, crop management practices, labor-using and labor-saving practices, various support services provided by the government, gross marketing margin, and competitiveness of Philippine rice as compared to selected Asian countries; information on policies that can affect competitiveness of the rice industry of the covered countries; and cost and returns analysis for hybrid seed production.	• Examine and compare rice yield, input use, and marketing practices among selected Asian countries • Examine the production and marketing costs of commercial rice in selected Asian countries • Determine gov't policies in each country that affect the country's competitiveness in rice production and marketing • Examine the cost of producing HR seed in the PH compared with China and India • Determine competitiveness of PH in production & marketing of commercial rice and in production of HR seed	Output tables are already generated; expanded outlines are made and report writing is in progress • Preliminary printing of the monographs has been done • Key issues for each chapter have already been decided and these will be derived from the country monograph; write-ups have already been started • Data were gathered through key informant interviews and survey; outline of the chapter was made • Output tables have been generated; expanded outline completed; writing in progress; two policy briefs drafted, editing ongoing; scheduled for December 2015

Source: RDE Review & Planning, 1-2 October 2015.

Table 5.1b. R&D partnership programs in support to FSSP: PRISM.

Programs	Key objectives/goals	Major strategies	
Philippine Rice Information System Management (PRISM) Budgets PhilRice: 2013 = PhP 4,585,000 2014 = PhP 23,652,408 2015 = PhP 31,250,000 IRRI (released by BAR): 2013 = PhP 5,117,080 2014 = PhP 25,133,703 2015 = PhP 14,768,146 Project Site(s): Major rice-growing areas of the Philippines Period Duration: 2013 – 2017	Philippine Rice Information System Management (PRISM), which will deliver accurate, timely, and detailed data on rice area, seasonality, and yield in the form of maps, graphs, and tabulated data; as well as damage (including assessment reports) due to flood or drought; and reports on rice pest injuries and diseases by integrating remote sensing, crop modeling, and information and communication technology (ICT)	• A monitoring system to provide accurate and faster estimates of rice area, rice yield, and crop damage based on a combined remote sensing and crop modeling approach • Assessing pest injuries and characterizing production situations of rice-growing areas in the Philippines to provide information on pest risks and pest management strategies	• Monitored 310 rice fields across 7 regions, 12 provinces, 19 municipalities in 2014; 780 rice fields across 15 regions, 35 provinces, 37 municipalities in 2015 WS • Acquired 187 SAR images in 2014; 256 acquired and planned in 2015 WS • Mapped 482,876 ha of rice – 18% of the national WS rice area with 74% to 88% accuracy based on 1,036 ground observations. In the DS, accuracy was 60% to 84% based on 881 ground observations. • Estimated yield and compared with official estimates. • Accuracy compared with crop cuts at municipal level was 70-99% in the WS and 75-100% in the DS • Mapped areas damaged by flood and drought. Submitted four damage assessment reports: Typhoon Glenda (Bicol), Typhoon Mario (Nueva Ecija), and Typhoon Ruby (Laguna) and drought in Mindanao • Designed and constructed database structure • Conducted on-farm trials on four research stations of PhilRice for four consecutive seasons • Regional training workshops were conducted in all regions except Regions X and XI

Source: RDE Review & Planning, 1-2 October 2015.

Table 5.1c. R&D partnership programs in support to FSSP: RCM.

Programs	Key objectives/goals	Major strategies	
Rice Crop Manager (RCM) Budgets PhilRice: 2013 = PhP 2,852,879 2014 = PhP 5,445,232 2015 = PhP 7,853,551 IRRI (released by BAR): 2013 = PhP 6,252,705 2014 = PhP 10,010,788 2015 = PhP 20,951,000 Project Site(s): IRRI, PhilRice, and six rice-growing provinces: Isabela, Nueva Ecija, Oriental Mindoro, Northern Samar, Agusan del Norte, and Pangasinan Period Duration: April 2013 – September 2015	Rice Crop Manager, a decision support tool that has been field-tested and evaluated in diverse fields and contributed to the implementation of appropriate "modern precision farming" by providing farmers with personalized crop and nutrient management recommendations matching their location-specific rice-growing conditions	• Overall objective: Provide Rice Crop Manager (RCM) with an accompanying Rice Health Care (formerly Rice Advisor and Rice Doctor) as field-tested and verified decision tools for use through personal computers and smartphones in rice-growing regions. • Collect essential data for enhancing RCM for irrigated and rainfed rice and preparing an accompanying Rice Adviser (now called Rice Health Care) • Release an upgraded version 2.0 of RCM and release an accompanying Rice Adviser (now called Rice Health Care) • Provide technical expertise on RCM to DA-RFOs and partners in the regions in use and promotion of RCM • Maintain uninterrupted operation of RCM and provide DA-RFOs with information on use of RCM • Build capacity of PhilRice staff in the development and testing of RCM	• 648,002 printed RCM recommendations through LGUs to farmers, which resulted in increased average grain yield by 370 kg/ha and increased added net benefits to farmers by 4,337 PhP/ha. • Field trials and data collection completed for 4 seasons of research. Data used to upgrade RCM. Field trials in season 5 are done. Data from PRISM are used to prepare Rice Health Care • RCM version 1 released in November 2013. RCM regularly upgraded. Version 1.2.2 released in August 2015. Version 2 scheduled for late 2015. Rice Health Care planned for late 2015 • IRRI ensured continuous operation of RCM and access by DA to statistics and information on RCM use. IRRI enabled release and operation of SMS advisory service from June 2015

Source: RDE Review & Planning, 1-2 October 2015.

Table 5.1d. R&D partnership programs in support to FSSP: Next-Gen.

Programs	Key objectives/goals	Major strategies	
Accelerating the Development and Adoption of Next-Generation Rice Varieties (Next-Gen) Budgets PhilRice: 2014 = PhP 21,034,387 2015 = PhP 47,500,000 IRRI (released by BAR): 2014 = PhP 15,302,018 2015 = PhP 32,967,000 Project Site(s): National Period Duration: 2014 – June 2015	Accelerating the Development and Adoption of Next-Generation Rice Varieties for the Major Ecosystems in the Philippines, which will fast-track the breeding, introduction, and adoption of higher-yielding rice varieties and hybrids with resistance to/tolerance of biotic and abiotic stresses with the use of new methods of speeding up adoption of these varieties through multi-environment testing and faster production of high-quality seeds within and for an ecosystem	• New elite inbreds and hybrids with higher yields, tolerance of biotic and abiotic stresses for the irrigated and rainfed ecosystems developed (PhilRice, IRRI, UPLB) • QTLs and genes for MAS validated and introgression into elite breeding lines (PhilRice, IRRI) • National evaluation and release of new varieties and hybrids streamlined and new mega-varieties developed (PhilRice, IRRI, DA-RFO) • High-quality seeds of inbred and hybrid parents disseminated to farmers (PhilRice, IRRI, DA-RFO) • Skills and knowledge of researchers enhanced and in-country collaboration on rice varietal development strengthened (PhilRice, DA-RFO)	• 2014: 24 new promising inbreds and hybrids approved by the RTWG for commercialization (5 irrigated inbreds, 14 irrigated hybrids, 2 saline-prone, 3 upland and/drought-prone; 2015: 21 promising inbreds and hybrids recommended for RTWG approval • Screened 90 GSR lines for drought, 40 lines for salinity, and 65 INGER/ MET lines. Salinity: 14,000 entries; submergence: 1,045 lines at the seedling stage; 533 plants selected (173 in drought, 189 in irrigated, and 171 in saline-prone) for the development of GSR populations • Characterized tungro viruses in hot-spot areas in the Philippines. • 2014: Generated breeder and foundation seeds amounting to >3,000 kg (IRRI) and >5,000 kg (PhilRice). These seeds were distributed to RFOs of the Dept. of Agriculture

Source: RDE Review & Planning, 1-2 October 2015.

Table 5.1e. R&D partnership programs in support to FSSP: Associated Tech.

Programs	Key objectives/goals	Major strategies	
Accelerating the Development and Dissemination of Associated Rice Production Technologies (Associated-Tech) Budgets PhilRice: 2013 = PhP 8,045,282 2014 = PhP 10,959,358 2015 = PhP 15,000,000 IRRI (released by BAR): 2013 = PhP 1,191,060 2014 = PhP 1,209,404 2015 = PhP 4,296,428 Project Site(s): 2014 =Regions 2, 3, 6, & 12 2015 = All Regions Period Duration: 2013 – 2016	Accelerating the Development and Dissemination of Associated Rice Production Technologies that are Resource-Use-Efficient by studying, promoting, and disseminating through technology demonstration farms the alternate wetting and drying (AWD) technique and other appropriate associated technologies on water management – water-saving technologies, reduced tillage, crop establishment - mechanized direct seeding, use of drum seeder and MP Seeder, nutrient management such as LCC, MOET, and RCM, and other technologies in PalayCheck system such as weed and pest management; mechanized harvest and postharvest options and mechanization.	• Increase yield and area harvested to rice in irrigated ecosystems and including other crops in rainfed lowland ecosystems • Increase water productivity and reduce rice yield variability between irrigated and rainfed ecosystems with or without supplemental irrigation • Promote and improve awareness on proven technologies that are resource-use-efficient • Investigate related scenarios on changes brought about by adoption of direct seeding and AWD, particularly on weed shifts • Refine existing technologies adaptable to ecological conditions, especially in direct-seeded rice in rainfed areas	• S&T updates (regional): 2013 = 4, 2014 = 9, 2015 = 6 • On-site briefings (no. of farmers): 2013 = 465, 2014 = 1,338, 2015 = 1,810 • TDFs/PTDs: 2013 = 9, 2014 = 193, 2015 = 55 • Established field trial for two wet and two dry seasons for weed shift experiment (ongoing) in Nueva Ecija; and one wet and one dry season in Bicol (ongoing) • Technical paper is being drafted, to be submitted for journal publication by December 2015 • Established field trials for two wet and two dry seasons in Nueva Ecija (ongoing); and two seasons in Kalinga under rainfed conditions • Developed and fabricated the prototype of the reduced-till planter, ready for field trial • New prototype prepared for field test, transferred to Ilocos Norte for fabrication

Source: RDE Review & Planning, 1-2 October 2015.

Table 5.1f. R&D partnership programs in support to FSSP: IPaD.

Programs	Key objectives/goals	Major strategies	
Improving Technology Promotion and Delivery (IPaD) Budgets PhilRice: 2014 = PhP 21,941,743 2015 = PhP 27,600,000 IRRI (released by BAR): 2014 = PhP 23,125,185 2015 = PhP 31,587,000 ATI: 2014 = PhP 8,000,000 2015 = PhP 3,000,000 Project Site(s): PhilRice Nueva Ecija (main); Nationwide Period Duration: 2014 – 2016	Improving Technology Promotion and Delivery through Capability Enhancement of the Next Generation of Rice Extension Professionals and Farmer Intermediaries, which will develop and improve the capacity-building framework for the next generation of rice extension professionals & other intermediaries, pilot-test the developed training curriculum/ program, create and train 117 new breeds of organized extension professionals/practitioners called AgriDOCs (agricultural development officers of the community), designate/pilot-test and modify knowledge-sharing and learning (KSL) activities for other strategic extension intermediaries, continuously improve the available ICT tools such as text centers, Pinoy Rice Knowledge Bank, and e-Ext., and craft a policy paper with recommendations to invigorate the extension system	• To develop a capacity-building framework for/definition of the Next-Gen rice professionals & other intermediaries, including participant selection criteria • To enhance enabling mechanisms for rice extensionists and other intermediaries to effectively perform their roles • To document, monitor, and evaluate strategies to serve as bases for improvements	• A new training curricula, with courseware designed/pilot-tested for at least 25 trainees in 2014, and further modified/tested in 2015 with another 25 participants, and available for use/up-scaling in 2016 • A knowledge-sharing and learning (KSL) activity designed/pilot-tested for other strategic extension intermediaries in 2014; and further modified/tested and replicated in 2015 & 2016 • Available ICT tools such as text centers, Pinoy Rice Knowledge Bank, and e-Ext. continuously improved to respond to needs and recognized as main source of rice information and technologies; access and resources/content increased by 50% (from 2013 to 2016); new tools developed • Library and info exchange institutionalized among partners/ DA family and selected SCUs in 2015 • Cost-benefit analysis report of AgriDOC training & KSL activities Q3 of 2015; socioeconomic impact Q3 2016

Source: RDE Review & Planning, 1-2 October 2015.

Table 5.1g. R&D partnership programs in support to FSSP: Heirloom.

Programs	Key objectives/goals	Major strategies	
Raising Productivity and Enriching the Legacy of Heirloom/ Traditional Rice Budgets IRRI (released by BAR): 2014 = PhP 9,018,396 2015 = PhP 15,632,000 Project Site(s): Region CAR & Cotabato Province Period Duration: 2014 – 2015	Raising Productivity and Enriching the Legacy of Heirloom/ Traditional Rice through empowering communities in unfavorable rice-based ecosystems, and characterized 80 collected heirloom varieties actively grown by farmers through the established varietal performance trials for basic agro-morphological characterization, purification, and participatory varietal selection; geo-tagging and mapping areas planted to various heirloom rice varieties and their biophysical data; organize, assess, and capacitate the participating farmers/self-help groups for the modified season-long training on highland/upland rice production and entrepreneurship; develop the Farmer Field School Curriculum Guide and modify Palay Check System for highland rice production areas; conduct value addition of varietal products in terms of information on shelf-life, suitable packaging material, and attractive and informative product label and market linkage activities for both domestic and international markets	• Varietal product development through characterization of existing heirloom/ traditional/ landrace varieties • Enhancing local capacity and enterprise building in farming communities • Value addition and market linkages for heirloom/traditional rice using value chain analysis • Documentation, knowledge management, and participatory M&E	• Collected and catalogued heirloom rice varieties (HRVs) from 17 target sites/municipalities in Cordillera Region • Geo-tagging and mapping of collected HRVs completed • First field trial initiated in North Cotabato • Identified 74 variants from 41 HRVs • 74 HRVs planted and harvested in the respective provinces where they were collected • Participatory on-site characterization done based on standard morpho-agronomic traits • 20 to 25 participating farmers (PFs) from 14 identified target SHGs with potential to become farmer trainers organized for the modified season-long training on highland rice production and entrepreneurship • Baseline grain quality analysis revealed different physical traits, cooking quality, nutrient composition, physicochemical properties, and active biomolecules of selected HRVs from farmers' harvests

Source: RDE Review & Planning, 1-2 October 2015.

Partners and Funding Source, 2001-15

From 2001 to 2015, the 40 MOAs/MOUs had a total funding of close to half a billion pesos (**Table 5.2**). The bulk of this funding came in 2014-15 although there were substantial amounts in 2009 and 2013.

Table 5.2. Annual budgets of IRRI-Philippines partnerships covered by MOAs/MOUs, 2001-15.

Year	No. of MOAs/MOUs	Amount (USD 000)	TOTAL VALUE (equivalent to PhP 000)
2001	1	44.30	2,257.00
2002			
2003			
2004	2	93.60	5,244.00
2005			
2006	1	69.00	3,543.00
2007			
2008	1	28.30	1,261.00
2009	4	1,443.40	68.76
2010	5	641.90	28,957.00
2011			
2012	1	92.20	3,894.00
2013	5	903.20	44,072.00
2014	10	2,333.70	102,564.00
2015	10	4,746.50	205,859.00
Total	40	10,396.00	466,414.00

Data source: IRRI (2016).

Partnerships and funding sources appear to be synonymous in the case of a number of Philippine agencies. **Table 5.3** shows the agreements with six agricultural bodies in the past 15 years. The Bureau of Agricultural Research (BAR) may largely be a source of funds while the rest may actually have participation in the actual research. It is apparent that the number of partners and the amount of funding have grown over time. The RSSP launched by the Arroyo administration led to the 2009 and 2010 partnerships with BAR and PhilRice, which show substantial funds flowing to IRRI. The FSSP launched in 2010 by the Aquino administration resulted in the 2012-16 partnerships with BAR and the DA regional field units (RFUs).

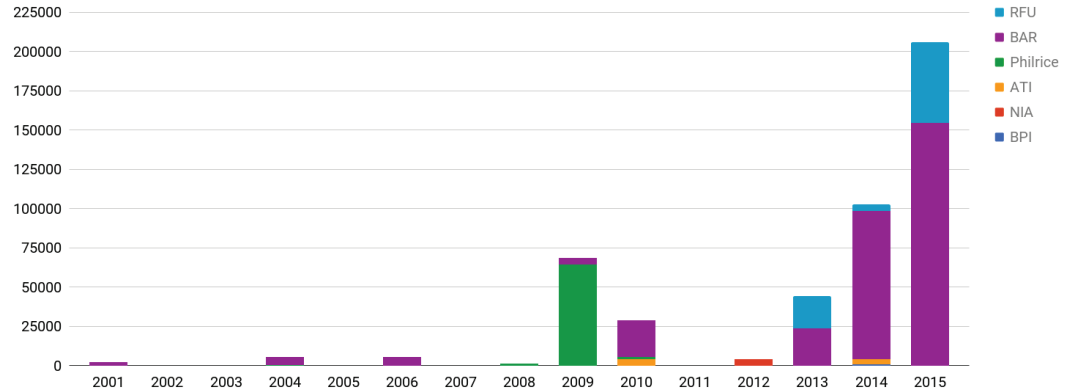
Table 5.3. IRRI-Philippines partnership budget by source of funds, 2001-15 (PhP 000).

Year	BAR	PhilRice	ATI	NIA	BPI	RFU
2001	2,257.00					
2002						
2003						
2004	5,044.00	201.00				
2005						
2006	3,543.00					
2007						
2008		1,261.00				
2009	4,308.00	64,454.00				
2010	23,613.00	1,497.00	3,847.00			
2011						
2012				3,847.00		
2013	23,500.00					20,572.00
2014	94,687.00		3,020.00		905.00	3,952.00
2015	154,557.00					51,305.00

Data source: IRRI DRPC (2016).
Note: Data from DA BAR are used for 2013-15.

Figure 5.7 shows the annual total funding coming from Philippine partner agencies from 2001 onward. The two flagship programs of the DA contributed to the substantial rise in funding in the last few years.

Fig. 5.7. IRRI-Philippine partnership annual budget by funding source, 2001-15 (PhP 000).



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
RFU													20,572	3,952	51,305
BAR	2,257			5,044		5,543			4,308	23,613			23,500	94,687	154,557
PhilRice				201				1,261	64,450	1,497					
ATI										3,847				3,020	
NIA												3,894			
BPI														905	

Data source: IRRI DRPC (2016).

The 2013 to 2016 funding for rice R&D is intended to increase factor productivity in the sector (see **Table 5.4**). The annual average partnership budget in the last administration increased by fivefold compared with that of the Arroyo administration. To put the research funding that flowed into IRRI in perspective, **Table 5.5** gives some estimates of research intensity ratios (research spending relative to GVA) between two periods.

Table 5.4. Total budget breakdown of FSSP projects (PhP M).

FSSP project	2013	2014	2015	2016	Overall total		PhilRice % of total	IRRI % of total
					Amount	%		
Benchmarking	9	13	8		29	4	20	80
PRISM	24	53	128	66	270	34	34	66
RCM	9	15	29	33	86	11	19	81
Next-Gen		36	80	55	172	22	57	43
Associated-Tech.	9	12	16	12	49	6	90	10
IPaD		53	62	30	145	18	34	66
Heirloom Rice		9	16	15	39	5	0	100
Overall total	51	192	339	210	790	100	38	62

Data source: IRRI DRPC (2016).

The DA's increased investment in R&D shows commitment to improving productivity. The rise in research intensity ratio to 0.02% indicates the Department's commitment to spurring innovation through basic or applied research. However, although the research intensity ratio is almost three times in the Aquino administration compared with that of Arroyo, the change is miniscule. Relative to the DA's R&D budget, the IRRI partnership budget has correspondingly also tripled.

Table 5.5. IRRI partnership budget as percent of palay GVA, 2001-15.

Items	Arroyo	B. Aquino
	(2001-10)	(2011-15)
Annual Ave. Palay GVA (PhP M)	145,777	297,182
Annual Ave. IRRI Partnership Budget		
(PhP M)	13	72.2
IRRI Partnership Budget as Percent of Palay GVA (%)	0.0089	0.0243
Annual Ave. Rice R&D Budget (PhP M)	543	1,057
IRRI Partnership Budget as Percent of Rice R&D Budget	2.4	6.8

Data sources: PSA for palay GVA (2016); IRRI DRPC for partnership budgets (2016).

Summary

IRRI's mission is to reduce poverty and hunger, improve the health of rice farmers and consumers, and ensure environmental sustainability through research and development partnerships. IRRI has an established record as a center of excellence in international rice research. Its R&D work in the production of international public goods on rice, especially the development of high-yielding varieties (HYVs), has been cited as the single most important factor that enabled Asia to modernize rice production and thus, in the process, achieve record levels not possible in traditional rice varieties.

IRRI's R&D work in the Philippines has evolved in response to the changing issues and needs of the country. IRRI, in partnership with PhilRice and other Philippine institutions, is currently focused on developing high-performing yet resilient rice in difficult environments. IRRI's partnership projects in the Philippines are concentrated in two areas: biological/breeding research and soil and water research.

IRRI is involved in seven projects under the FSSP, and in the evaluation of this study all except one are anchored on the comparative advantage of IRRI as an international rice research center.

Toward a More Resilient and Competitive Rice Sector: Areas of Reform and Partnerships

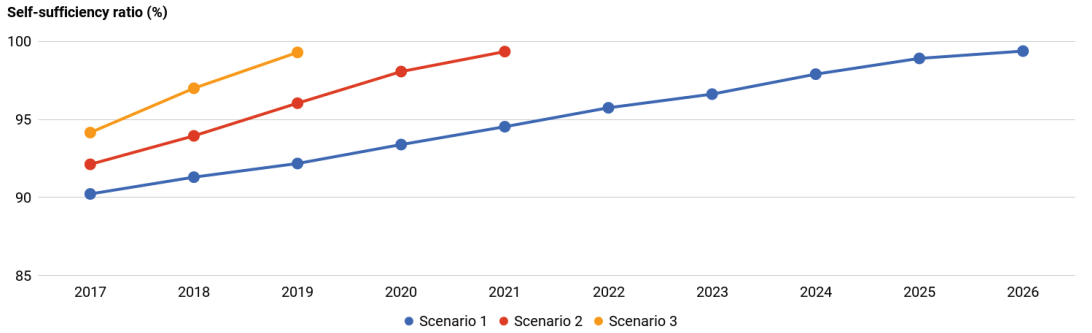
6

The aim of achieving rice self-sufficiency during the past three decades has been elusive for the Philippines. Although the country has missed its target in all five administrations from C. Aquino to B. Aquino, the Philippines has achieved remarkable progress, especially from 2011 to 2015, with self-sufficiency levels above 90%. This is by no means a small feat. There is much wisdom to preserve the current gains, and for the new administration to give equal or more attention to the critical issues of food and malnutrition, food availability and affordability, and the anemic growth of agriculture and its lack of impact on rural poverty—issues for which the Philippine government during the past three decades has experienced serious difficulties.

Given the large population of the country, the relatively high population growth, and the limited area for rice farming, it is unwise for the Philippines to aim for 100% self-sufficiency in the short term. Such a strategy is a repeat of the rice-centric agricultural development in the past that resulted in the concentration of more than half of the government resources on rice, which resulted in unbalanced national agricultural development and its concomitant anemic growth. This is characterized by the lack of commodity diversification, especially tree crops, which would have given Filipino farmers higher income and greater resiliency from climate change and weather disturbances.

A rice self-sufficient Philippines is theoretically possible according to the computations made in this study under three scenarios (see Appendices 2 to 4). The results are briefly summarized below in these projections from 2017 to 2025 (**Fig. 6.1**).

Fig. 6.1. Rice paddy performance projections, 2017-26.



Explanatory notes:

Scenario 1: **"FSSP Scenario, Business as Usual."** Average yield of 2015 as base yield and incremented yearly by rate of change of yield from 2010 to 2014. Self-sufficiency may occur in 2026.

Scenario 2: **"Highly Optimistic."** Average yield of 2015 as base yield and incremented yearly by rate of change of yield plus ½ standard deviation of rate of change of yield from 2010 to 2014. Self-sufficiency may occur in 2021.

Scenario 3: **"Extremely Optimistic."** Average yield of 2015 as base yield and incremented yearly by rate of change of yield plus 1 standard deviation of rate of change of yield from 2010 to 2014. Self-sufficiency may occur in 2019.

Data sources: PSA CountryStat and authors' calculations.

We need to remind the DA that the self-sufficiency possibilities above could happen only under a certain set of conditions as reflected in the assumptions. These projections should serve only as guides, rather than as targets, in crafting the rice development policies, the required structural reforms, and the necessary investments to attain the goals of rice development. The target outcomes and the corresponding outputs or the major final outputs (MFOs) of the rice sector should focus on the provisions of pertinent laws, for example, EO 161/292 and RA 8435. These are mandates that the DA should comply with as a matter of obligation to the Filipino people. Interestingly, these laws also provide a sound socioeconomic framework that should underpin the restructuring of the rice program of the country.

In compliance with pertinent laws of the country and in recognition of the realities of the industry, the objectives of the rice sector could be reduced to two strategic goals:

1. **Competitiveness**. This means that the Philippine rice sector can produce local rice in quality and price that can compete with rice from other countries. Competitiveness also means that the sector continues to provide profit incentives to rice producers and other rice entrepreneurs in the value chain. Underpinning the competitiveness of the sector is the technological and knowledge edge of the rice industry, which is able to provide continuing improvements of its product in both quality and price because of a robust rice research and extension service.

2. **Resilience**. This means the ability of the rice sector not only to recover from the effects of climate change but also the ability to attain continuing technological and economic advancements despite climate change. A fundamental principle in resilience is sustainability in the use of finite resources, which means that resilience is an outcome of sustainable development. As in competitiveness, resilience will benefit from the continuing advancement in knowledge and technology. R&D provides the sector with increasing capacity not only to adapt to climate change but also sustained progress toward the attainment of the goals of agricultural development.

In pursuit of the strategic objectives of the rice industry, the Philippines has to undertake the necessary organizational, programmatic, and funding transformations of the National Rice Program. In this regard, the Department of Agriculture may wish to engage IRRI's technical assistance or participation in undertaking the following major reforms of the rice sector program.

1. Suggested Reforms in the Rice Research System of the Country

The reforms are meant to achieve system effectiveness and efficiency. The reforms will focus on the following strategic issues:

a. **The need for greater coherence and integration of the rice R&D system to attain higher effectiveness and efficiency.** Structurally, organizationally, and programmatically, the rice research system is in many ways fragmented, especially at the regional and provincial levels. The DA has no institutionalized mechanisms to bring about greater coherence in setting the R&D agenda, monitoring and evaluation, and implementing projects based on a long-term program of work. Currently, the relationship between the PhilRice Central Experiment Station and the Regional Integrated Agricultural Research Centers (RIARCs) is ad hoc and project-based. Similarly, the relationship between the PhilRice Regional Experiment Stations and the RIARCs is also project-based and, therefore, ad hoc in character.

   An important facet of a well-integrated and well-defined rice R&D system is a clear understanding and definition of the roles of international agricultural research centers (IARCs) and private rice research versus that of the government. As a matter of principle, the comparative advantage of the IARCs and the private sector must be well understood so that government rice research can fully take advantage of their resources to address the total technology and knowledge needs of the rice industry. Toward this end, the NRP must take the leadership to bring together all R&D players for better complementation of roles and responsibilities.

   In pursuit of the objectives of greater integration toward greater effectiveness of the rice R&D system, the DA must review and examine the current institutional arrangement as well as the funding mechanism of public rice research agencies such as PhilRice, the RIARCs, state colleges and universities of agriculture, and the provincial LGUs.

b. **To determine a long-term system of funding R&D to provide stability in the implementation of R&D programs and to raise the level of funding for rice research operations to at least 1% of rice GVA.** A long-term system of funding R&D as a percentage of its value added, as the accepted rule of thumb, needs to be developed with the DBM and Congress because the current level of R&D funding stood at an annual average of 0.36% of rice GVA from 2001 to 2015. This is only one-third of the minimum budget required.

   The current system of funding research through the annual cycle of budgeting and programming needs to be revisited. It contributes to instability and short-term emphasis. Strategic and basic research, which are fundamental to long-term competitiveness and sustainability of the rice sector, are often neglected in favor of short-term objectives in support of the political agenda of the administration in power (see past research agenda and budget of PhilRice). Too often, the rice research system rides on the political bandwagon as a way to survive and augment the research budget.

c. **The need to develop a medium-term strategic plan for rice R&D, which should cohere to the policy instruction of the president of the country.** Having a strategic plan for the R&D function in the NRP brings greater system effectiveness, accountability, and impact. PhilRice has its own strategic plan but there is none for the whole rice R&D system, which includes the RIARCs and key partner SCUs.

d. **To develop in the medium term an agenda and program to modernize the human and physical infrastructure of the rice R&D system of the country. This is to address underinvestment in research capacity development in such items as state-of-the-art laboratories and experiment stations, modern communication infrastructure, and highly trained human resources.** This investment is essential in building the country's research infrastructure to achieve excellence in the pursuit of the long-term competitiveness of the rice industry. From Section 4 of this report, the deconstructed budget for the rice program from 2009 to 2016 shows that the investment to modernize the rice research system infrastructure has been severely underfunded, comprising a mere 1% of the total capital outlay. This translates to an annual average budget of PhP 0.02 billion. Given the historical neglect in building the capacity of the rice research system, the DA should consider investing 1% of rice GVA annually or an annual budget of PhP 1.6 billion during the next 6 years to build a modern public rice research infrastructure. If the DA invests the same amount for rice research operations, then the total rice R&D budget is about 2% of the GVA or PhP 3.2 billion annually, which is within the recommended minimum funding level for research in a commodity to make it competitive.

e. **To develop a national rice technology, yield performance, and profitability tracking system.** This should be urgently developed in conjunction with the agencies involved in the rice extension function, especially the LGUs. The aim is to have up-to-date information and assessment on the spread or the adoption of rice technology in farmers' fields and corresponding yield performance and profitability. The sampling frame should be at least a congressional district. This should be developed in cooperation with the PSA, LGUs, and SCUs. The results of the technology, yield, and profitability tracking system will provide an important basis for developing a more responsive NRP.

f. **To develop a long-term agenda and program for basic and strategic research on rice.** The long-term competitiveness and the aim of increasing resilience of the rice sector depend on the ability of the rice research system, both public and private, to sustain robust technological innovations. It means pushing the frontiers of knowledge of rice research through the use of new science, informatics, and other new scientific tools. Knowledge from basic research is a public good that serves as the foundation for robust technology development. A strong basic research program will likely attract greater private-sector investment in proprietary technology development, which will offer opportunities for the private sector to make profit from its investment such as the case for hybrid rice (James 1996).

   To provide meaningful resources for a basic and strategic research program of the NRP, the DA may want to allocate at least 30% of the recommended 1% from rice GVA for the annual operational expenses of rice research, which translates to about PhP 480 million annually. To upgrade the infrastructure needed for basic and strategic research, the DA may want to consider allocating during the next 10 years at least 60% of the additional 1% from rice GVA to build the country's basic and strategic rice research infrastructure, which should include specialized training for rice scientists in the most advanced

laboratories or research universities in the world. In peso figures, this translates to about PhP 960 million annually.

The recommended level of investment in basic and strategic research is substantial. But, the need for robust growth in technology development, which is central to making the rice industry competitive and resilient, is a national interest. Rice is a major staple of the Filipino diet, demand is rising, and rice farming is a major source of livelihood among the small and poor farmers.

To give a head start in the implementation of the program on basic and strategic rice research of the country, the DA may want to take advantage of the comparative advantage of IRRI and other CGIAR research centers and institutes; these institutions have superior physical facilities and human resources. In this regard, the country may want to draw lessons from Brazil's EMBRAPA, one of the world's most advanced national research systems in agriculture that is credited with making Brazil's agriculture one of the most technologically advanced and economically robust in the world. To promote the flow of research knowledge between Brazil and the world's most advanced agricultural research centers, EMBRAPA established foreign laboratories (Laboratorios no Exterior, LABEX), starting with the United States in 1998 (GAIN Report: BR16005, 2016).

2. Suggested Reforms in the Rice Extension System of the Country

The reform in the rice extension system of the country is meant to increase rice program effectiveness in accelerating the speed with which appropriate research knowledge gets into the hands of rice producers as a key strategy to increase technical efficiency and total factor productivity. The reforms will cover the following important areas:

a. **The need for greater coherence and integration of the rice extension system in both structure and programs to attain higher effectiveness and efficiency.** Structurally, organizationally, and programmatically, the rice extension system is highly fragmented, starting with the agencies in the DA that are involved in rice extension and going to the DA's regional offices and finally to the provincial and municipal extension offices. The DA has failed to develop an institutionalized mechanism to bring about effective interface among DA agencies, especially between ATI, PhilRice, and the Regional Field Offices. The same situation exists between the DA agencies and the provincial LGUs. Currently, the relationship among DA institutions is project-based and therefore ad hoc. In the same manner, the extension relationship between the R-ATI and RFOs is also ad hoc as well as their relationship with the LGUs. The RFOs and ATI work separately on rice extension. An AMIA study on extension (Baconguis 2016) revealed duplication or overlap in their extension activities.

b. **Develop an effective system of strategic planning for the rice extension system in the medium term to coincide with the term of the president of the country.** The aim is to bring greater system effectiveness, accountability, and impact. The ATI has its own strategic plan but there is none for the whole rice extension system, which should include the RIARCs, key partner SCUs, and LGUs.

c. **Establish a long-term system of funding rice extension to provide stability in the implementation of programs and to bring the level of operational funding to at**

least 1% of rice GVA. As with R&D, there is a need to develop a long-term system of funding rice extension as a percentage of rice GVA. This is important to address the quality, adequacy, and effectiveness of rice extension. The funding solution has to be developed, of course, with the DBM and Congress. Currently, extension funding is 0.35% of rice GVA. To raise the level of funding for operations to 1% of the GVA means trebling the current level of funding to about PhP 1.86 billion annually.

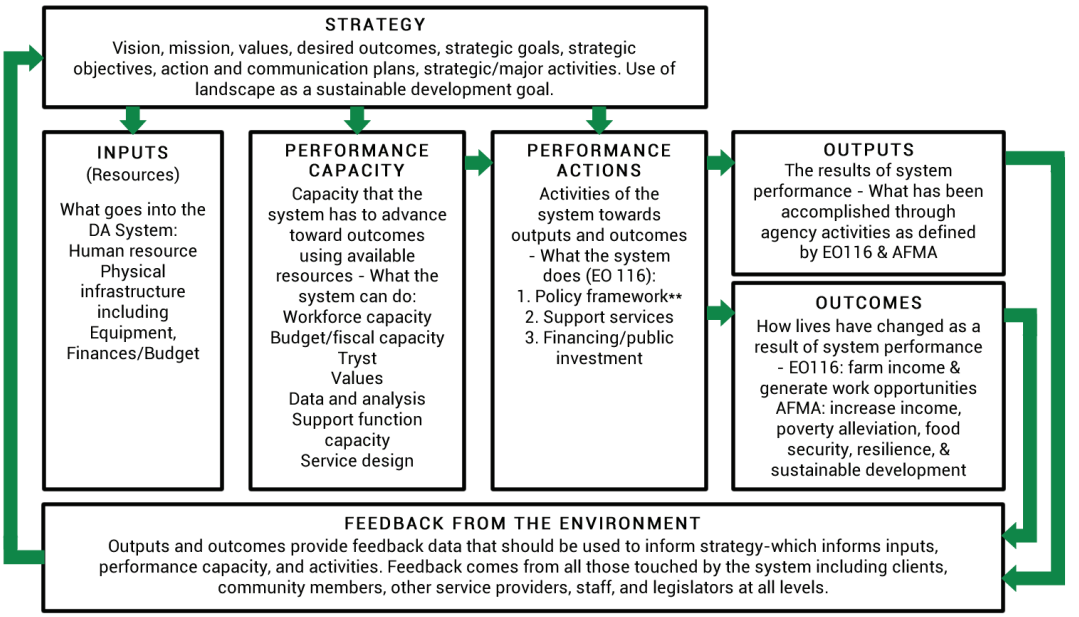
d. **Develop for the medium term an agenda and program to modernize rice extension human and physical infrastructure to address the need for long-term competitiveness of the rice industry.** Of critical importance and as provided for in EO 116/262 is investment in LGU rice extension physical and human infrastructure, which is deteriorating, especially in fourth- to sixth-class LGUs. As the deconstructed budget shows in this study, investment to modernize the infrastructure of the rice extension system has been severely underfunded. Table 18 shows that the annual budget for this purpose from 2009 to 2015 was only PhP 0.04 billion (3%) out of the total annual capital outlay of PhP 1.18 billion.

3. The Rice Strategic Plan

There is an immediate need to improve the plan and the planning system of the NRP to improve overall effectiveness to provide guidance to all agencies involved and to better direct government investment to key policy instruments that are central to the goals of competitiveness and resiliency. The key reform areas include the following:

a. The need for a system-wide quality planning framework, as illustrated in the diagram below (**Fig. 6.2**), to better address the issue of organizational effectiveness of the DA in planning and implementing the NRP.

Fig. 6.2. Suggested National Rice Program (NRP) organizational effectiveness framework diagram.

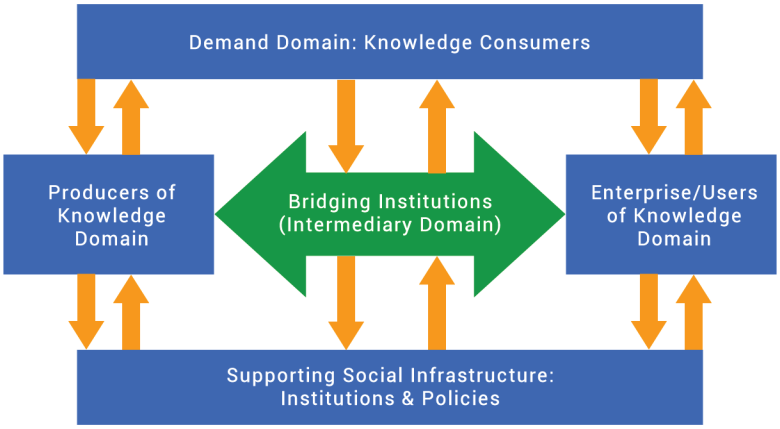


b. The need for a system-wide strategic plan is illustrated in **Figure 6.3** below. Planning for the NRP in the medium term needs to be crafted as a strategic plan to better define strategic issues, strategic goals, and objectives with their corresponding metrics to provide clearer directions and guidance to all agencies concerned. In compliance with the pertinent laws, the SP has to focus on the key MFOs of the DA as provided for in EO 116. To provide better policy coherence and guidance, the SW NRP must be translated into the strategic plans of the key policy instruments of the DA such as R&D, ICE, regulatory and trade, and water and irrigation services.

Fig. 6.3. NRP system-wide strategic plan diagram.

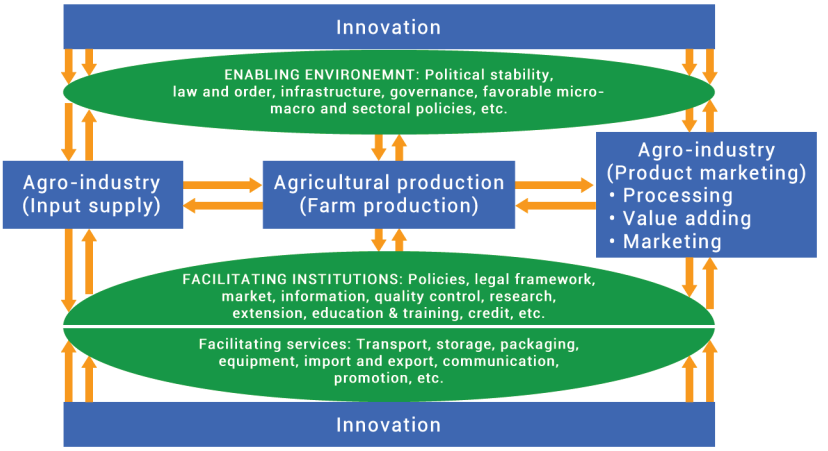
c. The need to better define the NRP strategic framework regarding the National System of Rice-Based Innovation is illustrated in **Figures 6.4** and **6.5**.

Fig. 6.4. National system of agricultural innovation.



Data sources: Adapted from Arnold and Bell (2001), Birner and Speilman (2008), Rajalahti et al (2008).

Fig. 6.5. Rice-based innovation system.



Source: Adapted from Anandajayasekeram and Gebremedhin (2005).

4. Use the Landscape as a Planning Framework for the Rice Strategic Plan

On January 23, 2013, the DA secretary issued a Department Memorandum that the DA should migrate its planning from commodity to landscape to better address climate change. Operationally, nothing happened with the memorandum. It remained unimplemented as of July 31, 2016, due to the capacity of the Planning & Monitoring Service to put it into operation. There have been no guidelines set until now. A set of guidelines for landscape planning has been developed by the Landscape Planning Project under the DA AMIA, with which the authors of this study were involved. The Landscape Guidelines included a section on strategic planning. It is recommended that, in planning for rice sector development in this administration, the NRP plan should be in the form of a strategic plan.

5. Recommendations on RDE Priority Areas

a. Determining and mapping the rice landscapes of the country that show or define their competitiveness and vulnerabilities to serve as guides to local rice development planning.

b. Defining and pilot-testing a decentralized funding mechanism for financing more robust LGU rice programs based on the New Public Management principle "The national government steers; the local government rows." The result of the pilot-testing is central to the issue of decentralizing agricultural development in compliance with the 1991 Decentralization Law.

c. Institutionalizing and expanding the use of extension technologies pilot-tested under the DA-IRRI FSSP project.

d. Designing and pilot-testing the establishment of a Philippine virtual rice research laboratory in IRRI similar to EMBRAPA's Laboratorios no Exterior (LABEX). If found successful, replicate the laboratories in other countries with a robust rice industry such as China, Japan, Taiwan, and Thailand. This proposal is contingent upon increasing the level of funding for rice research to about 2% of rice GVA.

6. Recommendations on DA-IRRI Partnerships

6.1 Rice Information System (PRISM)

From the standpoint of meeting the information needs of the NRP and its partner agencies, PRISM has strong potential and promise. Its website can be expanded to include a number of important information needs, which can be accessed on the PRISM website:

a. The "National Rice Technology, Yield Performance, and Profitability Tracking System (NRTYP2TS)," which was recommended earlier in this report. Adoption of rice technologies and use of good agricultural practices such as varietal selection, nutrient management, water management, postharvest management, and farm mechanization.

b. Yield performance at least by congressional districts (better yet, by major rice municipalities), provinces, and types of landscapes.

c. Price and profitability at the farm, village, municipal, and congressional district level; results of mapping the rice landscapes of the country. Maps can show or define rice competitiveness and vulnerabilities.

For better management and more defined accountability, it may be appropriate for PRISM to be classified as a service under MFO Support Services, as part of the sub-MFO 1 information, communication, and extension (ICE).

To address the issue of institutionalization of PRISM, the DA must define the appropriate institutional arrangements, funding, staffing, and budget.

6.2 Next Generation (Next-Gen)

Given the new administration's policy pronouncement that, effective in 2017, the Philippines will remove quantitative restrictions (QR) on rice importation, the framework for rice development will have to be anchored on competitiveness and resiliency as suggested earlier in this report. In this regard, there is a need to re-examine and reframe the framework and objectives of the Next-Gen project.

The DA may want to reformulate Next-Gen as the umbrella program on basic and strategic research. The aim is to generate national public goods that will accelerate technology development by both the public and private sector. Of special interest to the public sector is the development of more resilient rice in terms of productivity performance under adverse weather conditions. The private sector's participation and investment in rice research is expected to focus on the development of proprietary technologies that will allow it to recoup its investments. Private-sector research is expected to concentrate on breaking the yield barrier and improving rice grain quality to meet the demands of consumers for quality rice or rice with special properties to meet dietary and health objectives.

6.3 Rice Crop Manager (RCM)

RCM is essentially a rice extension strategy on precision farming, which has a lot of potential to improve the quality of rice extension in the country. For RCM to work nationwide, the DA must address its institutionalization not just in the DA but also in the LGUs from the provinces to the municipalities. This will require well-defined systems and procedures at all levels of

implementation, assured financial support on the part of the DA to the LGUs, the identification and training of the personnel involved, a funding mechanism, the signing of an MOA between the DA and the LGUs, and a DA administrative order to define the functions of the various offices in the whole Department of Agriculture from the national level to the Regional Field Offices.

6.4 Benchmarking

Benchmarking is essentially completed, and there is a proposal to have another phase, which this report supports with some suggested modifications. Given the suggested revision of the goals of rice development in this country from self-sufficiency to competitiveness and resilience, it is suggested that the benchmarking examine competitiveness from a perspective of strength of the Philippine rice industry by examining the following:

- Rice production in areas/landscapes of comparative advantage or strength.
- Premium rice as a competitive strength of the Philippine rice industry, e.g., heirloom rice, Philippine hybrid rice (Jasponica and Miponica), organic rice, and unpolished rice.
- Rice for special purposes.
- Multipurpose rice.

6.5 Heirloom Rice

This is a completed study, and there is a proposal to continue. Given the cultural value of heirloom rice, its preservation objectives must be examined under a more encompassing framework of understanding the ecosystems and their functions, biophysically, culturally, and economically, in the various ecosystems where it has been produced for generations. The study should be able to provide insights toward sustainable preservation as well as the objective of socioeconomic growth in the communities where it is produced.

6.6 IPaD

This project is essentially extension research, and it captures many of the issues that affect the rice extension system of the country. It has a very clear conceptual framework, which sets it apart from other FSSP projects. However, there is a need to reexamine this project, and determine the possibility of expanding its scope in light of the earlier recommendation in this study to strengthen rice extension delivery by focusing on the structural barriers to knowledge flow and use. Unless the structural issues take into consideration the political realities and the importance of professionalization of the extension system, extension innovations are likely to be short-lived in their success.

6.7 Associated Technology

This project looks into more extension in its objectives and activities rather than research. It's difficult to decipher how this project takes advantage of IRRI's strength.

6.8 General Comments on the FSSP Projects

Except perhaps for **Associated Technology**, the individual projects by themselves show specific innovations that are easy to appreciate in terms of their potential contributions to the goals of the NRP. But, taken as a whole, there appears to be a lack of a solid conceptual framework that ties all these projects into a meaningful whole, which partner agencies can understand and relate to. This was confirmed during the field visits of the study leaders. Some agencies simply see them as IRRI projects. This should be given special attention in the extension of DA-IRRI partnership projects.

Summary

The National Rice Program must refocus its goal from self-sufficiency to resilience and competitiveness to better meet the provisions of pertinent laws on agriculture, particularly EO 116/292, RA8435, the Climate Change Act, and DRRM. The fundamental importance of research knowledge and technology toward the attainment of these goals requires transformational reforms in the rice RDE system of the country. The reforms should focus on the following issues:

a. Organizational restructuring (system-wide) toward greater effectiveness: coherence, integration, efficiency, responsiveness, and accountability of the rice RDE system.
b. Installation of a long-term, stable system of funding RDE. It is important to raise the level of funding during the next five years to at least 4% of rice GVA; 2% each for R&D and extension. Of the 2% for each function, the government should allocate 1% for each function to address historical neglect in capacity development toward increased effectiveness of the human and physical infrastructure of the RDE system.

Improve the quality of planning of the NRP toward greater effectiveness and efficiency by adopting the following reforms:

a. Adopt an organizational effectiveness framework as a basis for planning and determining the required investment in the NRP to make the plan more responsive to the mandates of relevant laws and to provide a comprehensive system of planning toward organizational effectiveness.
b. Implement a system-wide quality planning process; develop a dynamic rice database to serve planning, among others.
c. Focus on improving M&E toward increased NRP effectiveness and accountability.
d. Adopt a strategic planning framework in the development of the NRP plan to better provide direction and guidance to all units and functions in the DA, system-wide.
e. Use the landscape as a planning framework to make the Rice Strategic Plan more responsive to climate change.
f. Adopt the principles of New Public Management (NPM) to better define the government's role in the NRP, particularly that of the DA.

IRRI is a resource that the Philippines should fully harness in the pursuit of a successful rice development program. The Philippine government may want to take steps to broaden the partnership between IRRI and the DA in terms of the issues and reforms suggested above. In addition, the DA may want to use IRRI in terms of the following specific suggestions:

a. The development of the Philippine basic and strategic research program on rice for both the medium and long term.
b. The establishment of a virtual Philippine Rice Laboratory in IRRI similar to the EMBRAPA laboratory in the USDA (Laboratorios no Exterior, LABEX) to facilitate the exchange of ideas and the flow of knowledge between Philippine scientists and IRRI.

The current partnership between the DA and IRRI in the FSSP is recommended for extension to preserve and expand the gains achieved in support of the objectives of the FSSP. The exception is the project Associated Technology. Specific suggestions for each project are contained in the full report.

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Appendices

Appendix 1. Three Scenarios for Rice Self-Sufficiency

Scenario 1: "FSSP Scenario, Business as Usual": Self-sufficiency can be achieved in 2026 if the increase in yield achieved during the B. Aquino administration (2010-14) will continue. This means an annual increase of 0.1133 t/ha for irrigated systems and 0.0416 t/ha for rainfed systems. Therefore, from 2017 to 2026, yield will reach 5.01 t/ha.

Scenario 2: "Highly Optimistic": Self-sufficiency can be achieved in 2021 if the increase in yield achieved during the B. Aquino administration (2010-14) will increase by 1/2 standard deviation. This means an annual increase of 0.1578 t/ha for irrigated systems and 0.0882 t/ha for rainfed systems. Therefore, from 2017 to 2021, yield will reach 5.37 t/ha.

Scenario 3: "Extremely Optimistic": Self-sufficiency can be achieved in 2019 if the increase in yield achieved during the B. Aquino administration (2010-14) will increase by 1 standard deviation. This means an annual increase of 0.2023 t/ha for irrigated systems and 0.1349 t/ha for rainfed systems. Therefore, from 2017 to 2019, yield will reach 5.24 t/ha.

Assumptions across scenarios

- The base year used is 2014 instead of 2015 to exclude the effects of El Niño in 2015.
- The increase in area harvested of both the irrigated and rainfed systems follows the linear trend of the period from 1970 to 2014.
- For the conversion of palay to rice, milling recovery of 65.4% (the usual standard for conversion of palay to rice) was used.
- The national rice requirement will be based on the linear trend of the period from 1990 to 2014.

Appendix 2. Rice paddy performance projections, 2017-26: Scenario 1.

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Irrigated palay										
Yield (t/ha)[d]	4.65	4.77	4.88	4.99	5.11	5.22	5.33	5.45	5.56	5.67
Area harvested (million ha)[e]	3.34	3.39	3.44	3.48	3.53	3.57	3.62	3.66	3.71	3.75
Production (million ha)[f]	15.57	16.16	16.77	17.39	18.01	18.65	19.30	19.96	20.63	21.31
Rainfed palay										
Yield (t/ha)[g]	3.15	3.19	3.24	3.28	3.32	3.36	3.40	3.44	3.48	3.53
Area harvested (million ha)[h]	1.52	1.54	1.55	1.57	1.58	1.60	1.62	1.63	1.65	1.66
Production (million ha)[f]	4.79	4.90	5.02	5.14	5.26	5.38	5.50	5.62	5.74	5.87
All palay										
Yield (t/ha)[a]	4.19	4.28	4.37	4.46	4.55	4.65	4.74	4.83	4.92	5.01
Area harvested (million ha)[b]	4.86	4.93	4.99	5.05	5.11	5.17	5.23	5.30	5.36	5.42
Production (million ha)[c]	20.36	21.07	21.79	22.52	23.27	24.03	24.80	25.58	26.37	27.18
Rice production (million t)[i]	13.31	13.78	14.25	14.73	15.22	15.71	16.22	16.73	17.25	17.77
Rice requirement (million t)[j]	14.69	15.02	15.35	15.68	16.01	16.34	16.67	17.00	17.33	17.66
Imports (million t)[k]	1.38	1.24	1.10	0.95	0.79	0.63	0.45	0.27	0.08	
Exports (million t)[l]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Self-sufficiency ratio (%)[m]	90.60	91.70	92.80	93.90	95.10	96.20	97.30	98.40	99.50	100.00

Notes:

a. Area harvested × production.
b. Sum of irrigated and rainfed area harvested.
c. Sum of irrigated and rainfed palay production.
d. Irrigated yield of 2014 (4.43 t/ha) as base; annual increment is the rate of change of irrigated yield from 2010 to 2014 (0.1133 t/ha).
e. Irrigated harvested area of 2014 (3.25 million ha) as base; annual increment is the rate of change of irrigated area from 1970 to 2014 (0.0456 million ha).
f. Yield × area harvested.
g. Rainfed yield of 2014 (3.07 t/ha) as base; annual increment is the rate of change of rainfed yield from 2010 to 2014 (0.0416 t/ha).
h. Rainfed harvested area of 2014 (1.49 million ha) as base; annual increment is the rate of change of rainfed area from 1970 to 2014 (–0.01619 million ha).
i. Palay production less 65.4% milling recovery.
j. National rice requirement = average of total use less ending stocks from 1990 to 2014; linear trend was used for succeeding years; this takes into consideration the increase in population and change in per capita consumption over time.
k. Rice requirement = rice production – exports.
l. Used 2014 data.
m. Self-sufficiency ratio = production/(production + imports – exports) × 100.

Sources: PSA CountryStat and authors' calculations.

Appendix 3. Rice paddy performance projections, 2017-25: Scenario 2.

	2017	2018	2019	2020	2021	2022	2023	2024	2025
Irrigated palay									
Yield (t/ha)d	4.74	4.90	5.06	5.22	5.37	5.53	5.69	5.85	6.01
Area harvested (million ha)[e]	3.34	3.39	3.44	3.48	3.53	3.57	3.62	3.66	3.71
Production (million ha)[f]	15.86	16.62	17.38	18.16	18.96	19.76	20.59	21.43	22.28
Rainfed palay									
Yield (t/ha)[g]	3.25	3.33	3.42	3.51	3.60	3.69	3.77	3.86	3.95
Area harvested (million ha)[h]	1.52	1.54	1.55	1.57	1.58	1.60	1.62	1.63	1.65
Production (million ha)[f]	4.93	5.12	5.31	5.50	5.70	5.90	6.10	6.31	6.51
All palay									
Yield (t/ha)[a]	4.28	4.41	4.55	4.69	4.82	4.96	5.10	5.24	5.37
Area harvested (million ha)[bh]	4.86	4.93	4.99	5.05	5.11	5.17	5.23	5.30	5.36
Production (million ha)[c]	20.79	21.73	22.69	23.66	24.65	25.66	26.69	27.73	28.79
Rice production (million t)[i]	13.60	14.21	14.84	15.48	16.12	16.78	17.45	18.14	18.83
Rice requirement (million t)[j]	14.69	15.02	15.35	15.68	16.01	16.34	16.67	17.00	17.33
Imports (million t)[k]	1.09	0.81	0.51	0.20					
Exports (million t)[l]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Self-sufficiency ratio (%)[m]	92.60	94.60	96.70	98.70	100.00	100.00	100.00	100.00	100.00

Notes:

a. Area harvested × production.
b. Sum of irrigated and rainfed area harvested.
c. Sum of irrigated and rainfed palay production.
d. Irrigated yield of 2014 (4.43 t/ha) as base; annual increment is the rate of change of irrigated yield from 2010 to 2014 (0.16 t/ha).
e. Irrigated harvested area of 2014 (3.25 million ha) as base; annual increment is the rate of change of irrigated area from 1970 to 2014 (0.0456 million ha).
f. Yield × area harvested.
g. Rainfed yield of 2014 (3.07 t/ha) as base; annual increment is the rate of change of rainfed yield from 2010 to 2014 (0.0416 t/ha).
h. Rainfed harvested area of 2014 (1.49 million ha) as base; annual increment is the rate of change of rainfed area from 1970 to 2014 (–0.01619 million ha).
i. Palay production less 65.4% milling recovery.
j. National rice requirement = average of total use less ending stocks from 1990 to 2014; linear trend was used for succeeding years; this takes into consideration the increase in population and change in per capita consumption over time.
k. Rice requirement = rice production – exports.
l. Used 2014 data.
m. Self-sufficiency ratio = production/(production + imports – exports) × 100.

Sources: PSA CountryStat and authors' calculations.

Appendix 4. Rice paddy performance projections, 2017-25: Scenario 3.

	2017	2018	2019	2020	2021	2022	2023	2024	2025
Irrigated palay									
Yield (t/ha)d	4.83	5.04	5.24	5.44	5.64	5.84	6.05	6.25	6.45
Area harvested (million ha)[e]	3.34	3.39	3.44	3.48	3.53	3.57	3.62	3.66	3.71
Production (million ha)[f]	16.16	17.07	17.99	18.94	19.90	20.88	21.88	22.89	23.93
Rainfed palay									
Yield (t/ha)[g]	3.34	3.47	3.61	3.74	3.88	4.01	4.15	4.28	4.42
Area harvested (million ha)[h]	1.52	1.54	1.55	1.57	1.58	1.60	1.62	1.63	1.65
Production (million ha)[f]	5.07	5.33	5.60	5.87	6.14	6.42	6.70	6.99	7.28
All palay									
Yield (t/ha)[a]	4.37	4.55	4.73	4.91	5.10	5.28	5.46	5.64	5.83
Area harvested (million ha)[bh]	4.86	4.93	4.99	5.05	5.11	5.17	5.23	5.30	5.36
Production (million ha)[c]	21.23	22.40	23.59	24.80	26.04	27.30	28.58	29.88	31.21
Rice production (million t)[i]	13.89	14.65	15.43	16.22	17.03	17.85	18.69	19.54	20.41
Rice requirement (million t)[j]	14.69	15.02	15.35	15.68	16.01	16.34	16.67	17.00	17.33
Imports (million t)[k]	0.80	0.37							
Exports (million t)[l]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Self-sufficiency ratio (%)[m]	94.50	97.50	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Notes:

Area harvested × production.

b. Sum of irrigated and rainfed area harvested.

c. Sum of irrigated and rainfed palay production.

d. Irrigated yield of 2014 (4.43 t/ha) as base; annual increment is the rate of change of irrigated yield from 2010 to 2014 (0.20 t/ha).

e. Irrigated harvested area of 2014 (3.25 million ha) as base; annual increment is the rate of change of irrigated area from 1970 to 2014 (0.0456 million ha).

f. Yield × area harvested.

g. Rainfed yield of 2014 (3.07 t/ha) as base; annual increment is the rate of change of rainfed yield from 2010 to 2014 (0.0416 t/ha).

h. Rainfed harvested area of 2014 (1.49 million ha) as base; annual increment is the rate of change of rainfed area from 1970 to 2014 (–0.01619 million ha).

i. Palay production less 65.4% milling recovery.

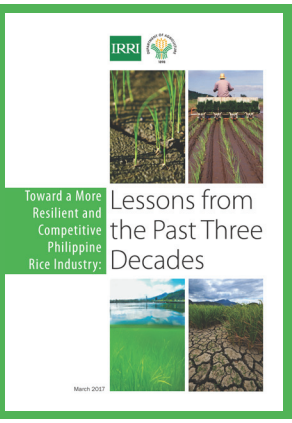
j. National rice requirement = average of total use less ending stocks from 1990 to 2014; linear trend was used for succeeding years; this takes into consideration the increase in population and change in per capita consumption over time.

k. Rice requirement = rice production – exports.

l. Used 2014 data.

m. Self-sufficiency ratio = production/(production + imports – exports) × 100.

Sources: PSA CountryStat and authors' calculations.



Toward a More Resilient and Competitive Philippine Rice Industry: Lessons from the Past Three Decades

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