

Philippine Rice Trade Liberalization

Impacts on Agriculture and the Economy, and Alternative Policy Actions

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Quantitative restriction (QR) on rice import has been a longstanding instrument of the Philippine government that regulated the importation of rice, protected rice farmers and supported the drive for rice self-sufficiency of the country. However, with the passage of the Republic Act No. 11203 or the *Philippine rice trade liberalization law* in February 2019, the QR was lifted and replaced with import tariffs instead. This policy shift can have far-reaching impacts not only to rice and agriculture but to the entire economy and to the global rice market as well – with important implications to the general welfare, nutrition and food security of the country.

Hence, an *ex-ante* impact assessment study aimed at simulating, quantifying and understanding the effects of rice liberalization on farmers, consumers and various stakeholders can assist the government in proactively crafting and putting in place appropriate investment and policy interventions, while transitioning from QR and moving toward longer-term rice and food security.

This policy note includes:

- background studies on price instability, implicit tariff, climate change, and projections of world price of rice – that set the policy environment for the lifting of QR on rice trade and likely to continue to affect its implementation;
- comparative analysis of QR and 35% tariff policies to evaluate the impacts of liberalization; and
- alternative investment and policy options for enhancing the competitiveness of the rice industry.

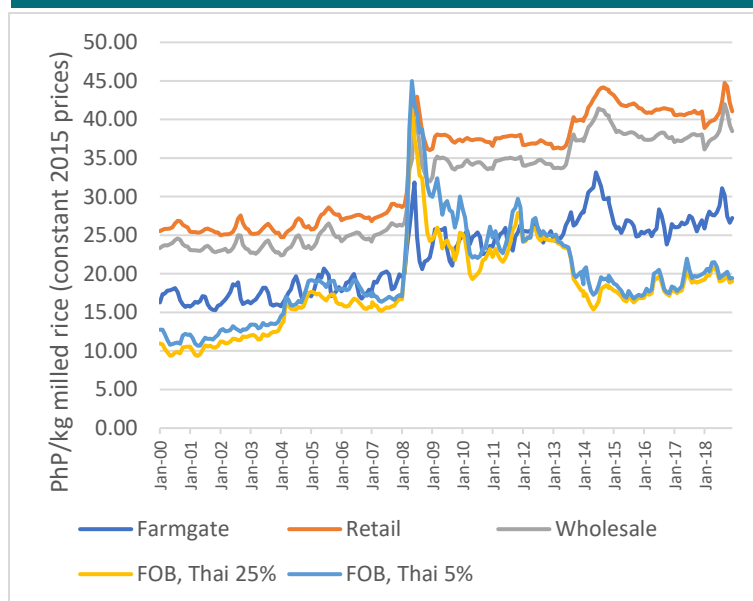
I. BACKGROUND STUDIES

INSTABILITY OF RICE PRICES

Two of the stated goals of QR policy were to stabilize domestic rice prices, and to shield consumers from perceived instability in world rice prices by deliberate adjustments in the volume of imports.

Figure 1 graphically illustrates the monthly instability and volatility of rice prices in the global and domestic markets, and shows that the country's stabilization objective has had modest success in stabilizing retail and wholesale prices, but not in stabilizing farmgate prices. It also shows that farmgate prices had been historically higher than world prices, except during 2008–2010 when world prices spiked

Figure 1. Monthly prices of rice, in constant 2015 prices, 2000–2018.



Source: PSA OpenStat: farmgate, wholesale, and retail prices of well-milled rice; FAO, GIEWS FPMA Tool online: FOB Thailand 5% and 25% broken

Note: Farmgate prices are for milled rice equivalent; all prices are in PhP/kg deflated to constant 2015 prices.

higher than farmgate prices. Monthly data from 2000 to 2018 also revealed that farmgate rice prices were higher by 23 percent compared with FOB Thai rice (25% broken) and 13 percent higher than FOB Thai rice (5% broken).

IMPLICIT TARIFF EFFECT OF QR

While farmers were modestly shielded from cheaper imported rice by QR, consumers were facing higher domestic prices of rice. Figure 2 compares the domestic (wholesale) prices with landed (CIF) prices of imported rice, which in effect were implicit tariffs to rice consumers, including rice farmers who were net buyers of rice. Wholesale prices of rice were at times (2014 and 2015) more than twice that of comparable imported rice, but on average were 90 percent higher.

BOX 1 METHODOLOGY: IMPACT AND DCGE MODELS

The main economic tools applied in the study are the International Food Policy Research Institute (IFPRI) International Model for the Policy Analysis of Agricultural Commodities and Trade (IMPACT)* model and the Philippine Dynamic Computable General Equilibrium (Phil-DCGE) model. These tools were also used in simulating the effects of climate change on Philippine agriculture. IMPACT is a global partial equilibrium model with a country-level module specifically calibrated for the Philippines. It is a suite of interlinked bio-physical and economic models that integrates crop, water, and climate modules into the core economic food model, to serve as additional supply-curve shifters reflective of climate change (Robinson and others 2015; Rosegrant and IMPACT Development Team 2012).

Phil-DCGE, on the other hand, is a computable general equilibrium (CGE) model specifically developed for the Philippines by IFPRI that extends climate change and policy simulations beyond the agricultural sector to other sectors of the economy, and tracks each variable through annual time-steps. The model captures the direct and indirect linkages of policies focusing primarily on macroeconomic performance, effects on long-term growth and structural change, including shifts in factor inputs such as labor and land, and changes in the distribution of income (Lofgren, Harris, and Robinson 2002; Diao and Thurlow 2012).

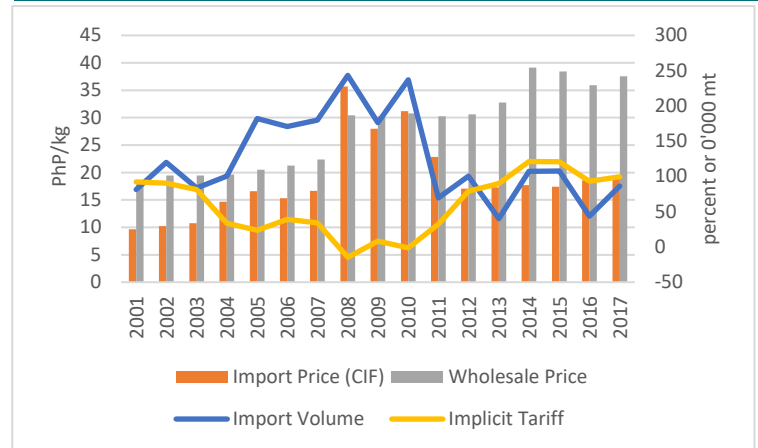
Both models have been extensively used in global, regional and country studies including in the Philippines (Perez, *et al* 2018; Perez and Rosegrant 2018; Rosegrant *et al* 2014).

*More information and documentation of IMPACT are found in: <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129825>

IMPACT OF CLIMATE CHANGE ON AGRICULTURE

Climate change is projected to have significant impacts on agriculture worldwide, through changes in crop productivity

Figure 2. Implicit tariffs on rice, Philippines, 2001–2017.



Source of basic data: PSA OpenStat: wholesale prices. ITC 2019 Trade Map online: CIF prices and volume of Philippine rice imports.

Note: Prices are in current Php/kg; import volume in ten thousand mt; CIF price is the sum of cost (FOB price), Insurance and Freight, which is the landed price at the border. Implicit tariffs are estimated as percentages of wholesale prices to CIF prices.

caused by heat and water stresses. Changing patterns of temperature and precipitation to 2100 projected by different climate models are expected to intensify exponentially in later years (IPCC 2014). However, their effects on agriculture are already negatively influencing the global food systems which are only to further increase in significance by 2040, as simulated in this study.

Effects on Global Yield and Prices

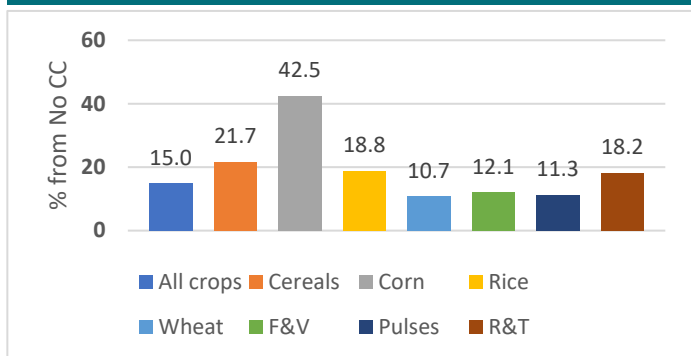
Simulations to 2040 show that, on average, global yields of agricultural crops are likely to decline by 4.94 percent by 2040 under climate change compared to the no climate change scenario. Consequently, declines in yields are projected to depress production by 3.54 percent and to increase world prices by 15 percent (Figure 3). World prices of corn are estimated to escalate the most, at 42.5 percent, followed by rice at 18.8 percent, and by the roots and tubers food group at 18.2 percent

Effects in the Philippines

Average yields for all-crops in the Philippines are projected to decline by 4.42 percent owing to climate change, with corn affected the most with 13.63 percent decline. Rice is also to be negatively affected with 2.20 percent average decline in yield (Figure 4). Impacts on crop yields are subsequently translated to changes in production and prices.

Changes in crop yield and world price parameters from IMPACT are transmitted into Phil-DCGE as climate shocks. Comparisons of the crop-yield and world-price shocks in

Figure 3. Projected changes in world prices of food commodities due to climate change, 2040

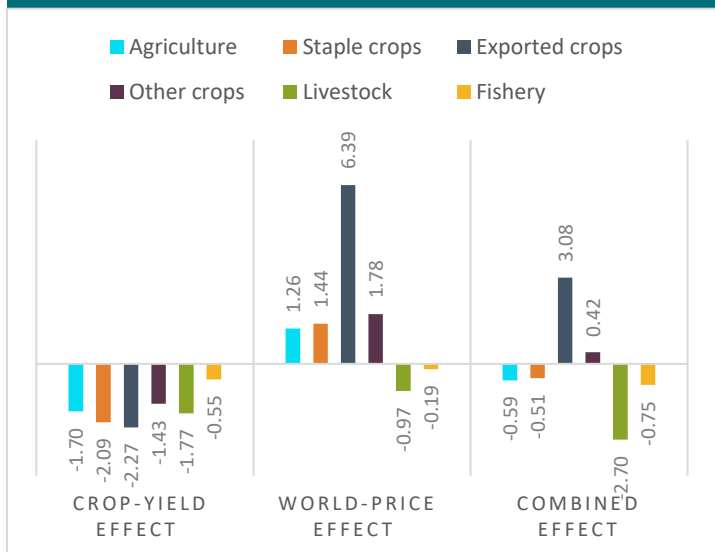


Source: IMPACT simulation results.

Note: F&V = fruits and vegetables; R&T = roots and tubers; Production and yield were estimated under a climate-change (CC) scenario and presented as percentage changes from a no climate-change (No CC) scenario.

Figure 5 show that the positive world-price effect on agricultural production compensated for the negative impacts of crop-yield effect, so that production of exported crops increased by 3.08 percent despite the -0.59 percent combined-effect to total agricultural production.

Figure 5. Projected impacts of climate change on agricultural production



Source: Phil-DCGE simulation results

This positive trend is an opportunity for the country to achieve higher returns from exported commodities. Although the challenge still lies in the production of staple crops which is projected to decline by 0.51 percent, the rice liberalization policy can be a way to optimally adapt to climate change by moving resources from low, e.g., rice, to high value export crops.

PROJECTIONS OF WORLD PRICE OF RICE

Historical and trend world prices of rice from 2000 to 2015 and IMPACT's projections for 2016 to 2040 are presented in Figure 6, superimposed with historical instabilities that can

Figure 4. Projected impacts of climate change on crop yields, Philippines, 2040

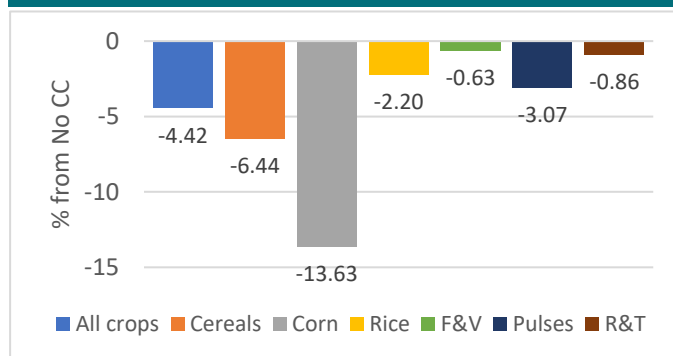
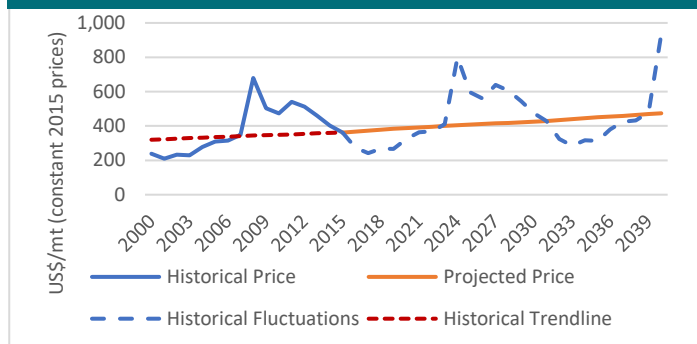


Figure 6. Historical and projected annual average world prices of rice under climate change and QR regimes, 2000–2050



Sources: 2000–2015: FAO, GIEWS FPMA Tool online: FOB rice prices; 2016–2040: IMPACT simulation results.

Note: mt = metric ton. Historical and projected rice prices are averages of FOB prices for 5% and 25% broken rice from Thailand and Vietnam.

continue to have influence on prices. World prices of rice are projected to follow an increasing trajectory, from US\$362 per metric ton (mt) in 2015 to US\$474 in 2040.

Implications to Rice Liberalization

Findings of these studies are expected to influence major aspects of rice liberalization.

- Historical instabilities in the world and domestic prices of rice are expected to continue to 2040.
- Implicit tariff on rice, estimated at 90 percent, serves as baseline for comparisons with 35% and other tariff scenarios.
- Climate change will continue to affect the productivity and the relative profitability of the rice industry.
- The projected world prices of rice will influence the production, consumption and import decisions of farmers, consumers and traders.

II. IMPACT OF PHILIPPINE RICE TRADE LIBERALIZATION

To evaluate the impact of rice trade liberalization, simulations and comparative analyses of quantitative restrictions (QR) and liberalization (35% tariff) policies were carried-out. The former assumes for the QR on rice to continue, while the latter replaces the QR with 35% tariffs. Both simulations assume that the influence of climate change will continue; and maintained all prices and currencies (i.e., US\$ and PhP) at 2015 constant prices.

IMPACT AND POLICY IMPLICATIONS

The main findings of this study show that within 3-5 years of implementation of the liberalization policy:

- *Rice imports are projected to increase to 3.97 million mt by 2025 – an increase of 2.34 million mt from QR level.*
- *At equilibrium import volumes,¹ consumer and producer prices of rice are to drastically decline by 26 percent, with minimal increase of 0.64 percent in world prices.*
- *Domestic rice production is to decline by as much as 9.7 percent (1.3 million mt) from 7.2 percent reduction in harvested area (342,000 hectares).*
- *Rice consumption per capita is to increase by 6.3 percent to 120 kg/year.*
- *Nutrition status of the country is to improve with 2.1 million less hungry people and malnourished children.*
- *Tariff receipts from rice imports can exceed the PhP10 billion annual allocation for Rice Competitiveness Enhancement Fund (RCEF).*

Table 1. Comparative impact of rice liberalization on the rice sector, under climate change, 2025 and 2040.

Indicators	Units	2025		Change (+/-)	% Change	2040		Change (+/-)	% Change
		QR	35% Tariff			QR	35% Tariff		
World price	US\$/mt	409	412	2.6	0.64	474	477	3.3	0.70
Imports	000 mt	1,633	3,968	2,335	143	1,080	3,831	2,751	255
Consumer price	US\$/mt	1,011	750	-260	-26	1,171	870	-301	-26
Producer price	US\$/mt	777	577	-200	-26	901	669	-231	-26
Area	000 ha	4,752	4,410	-342	-7.2	4,892	4,535	-357	-7.3
<i>irrigated</i>		3,285	3,072	-212	-6.5	3,386	3,163	-223	-6.6
<i>rainfed</i>		1,467	1,338	-130	-8.8	1,506	1,372	-134	-8.9
Production	000 mt	13,501	12,187	-1,315	-9.7	16,254	14,658	-1,597	-9.8
Yield	mt/ha	2.84	2.76	-0.08	-2.7	3.32	3.23	-0.09	-2.7
<i>irrigated</i>		3.16	3.07	-0.09	-2.9	3.73	3.62	-0.11	-2.9
<i>rainfed</i>		2.13	2.06	-0.06	-2.9	2.41	2.34	-0.07	-2.9
Population	million	118	118	-	-	139	139	-	-
Total demand	000 mt	14,780	15,800	1,020	6.9	16,980	18,134	1,154	6.8
Import share of demand	%	11.1	25.1	-	14.1	6.4	21.1	-	14.8
Per capita consumption	kg/year	113	120	7.1	6.3	110	117	6.8	6.2
Calorie consumption	Kcal/day	2,611	2,682	70.9	2.7	2,725	2,793	67.6	2.5
Malnourished children	million	2.84	2.76	-0.08	-2.8	2.42	2.36	-0.07	-2.8
Pop. at risk of hunger	million	12.4	10.7	-2.0	-15.4	11.5	10.1	-1.9	-14.4
% at risk of hunger	%	10.5	9.1	-1.4	-13.7	8.3	7.3	-1.0	-12.3

Source: IMPACT simulation results.

Note: mt = metric ton; ha = hectare; kg = kilograms; kcal = kilocalories.

¹ Equilibrium import is the quantity of import where there are no rents (excess profit) accruing to importers, while receiving nor-

mal returns to their investment, capital, labor, and management. Equilibrium is achieved as the import market approaches perfect competition among importers.

They are summarized in Table 1 showing the short-term and longer-term results for 2025 and for year 2040 to coincide with the Ambisyon Natin 2040 Program of the country².

Impact on Prices and Inflation

Note that increases in world prices of rice, declines in domestic prices, reduction in production and land area, and increases in demand are simultaneously derived in IMPACT model, as they are in the economy, with imports initiating the movement toward equilibrium conditions.

Rice liberalization encourages the importation of rice into the country, which in turn pushes down the domestic prices of rice by 26 percent. Since rice constitutes 20 percent of consumers' food budgets, such reduction in prices can dampen food inflation to normal levels.

World prices, however, are least influenced by surge of imports with potential increase of 0.64 percent.

Impact on Demand and Domestic Production

The estimated 26 percent reduction in producer prices of rice can result to 9.7 percent decrease in rice production, while similar decline in consumer price can increase the total demand for rice by 6.9 percent. The dual effects of production shortfall and demand hike are projected to more than double the volume of rice imports – equivalent to 3.97 million mt in 2025 and 3.83 million mt in 2040. Thus, effectively increasing the share of imports to domestic demand from 11 percent to 25 percent in 2025 and from 6 percent to 21 percent in 2040.

Impact on Rice Farms and Rice Producers

With the implementation of rice liberalization, low-yielding rainfed and irrigated rice farms are expected to struggle to stay profitable. Similarly vulnerable, are high-yielding irrigated rice farms with high production costs. Around 212,000 hectares of irrigated rice and another 130,000 hectares of rainfed rice are estimated to be moving out of rice production as the price of rice falls. In effect, 342,000 hectares of rice farms are projected to be out of rice production by 2025.

Regional disaggregation in Table 2 estimates that in terms of percentages, the highest reductions in area are to come from the Visayas, where 13.9 percent of irrigated and 62.3

Table 2. Regional disaggregation of displaced rice farmers due to rice liberalization, 2025.

Indicators	QR	35% Tariff	Change (+/-)	% Change
Area (000 ha)	4,752	4,410	-342	-7.2
Irrigated	3,285	3,072	-212	-6.5
Luzon	2,191	2,102	-89	-4.1
Visayas	634	546	-88	-13.9
Mindanao	460	424	-35	-7.6
Rainfed	1,467	1,338	-130	-8.8
Luzon	626	592	-35	-5.5
Visayas	313	118	-46	-62.3
Mindanao	528	480	-48	-9.2

Source: IMPACT simulation results.

percent of rainfed lands are to become non-competitive in rice production. These are followed by Mindanao where declines of 7.6 percent in irrigated farms and 9.2 percent in rainfed rice areas are expected. In terms of hectareage, more irrigated land from Luzon (89,000 hectares) and rainfed land from Mindanao (48,000 hectares) are expected to be out of rice production by 2025.

Implications for Crop Diversification and Allocation of Resources

While low farm prices can render the rice industry less profitable, they also allow agricultural resources such as land, labor, and capital to be allocated to relatively more profitable production systems.

Tables 3 presents the food commodities enhanced by rice liberalization. Production of oilseed crops and coconut, fruits and vegetables, sugarcane and pulses are projected to be produced in increasing land areas, due to shifting from less profitable crops such as rice to these relatively more profitable commodities. With 7.2 percent projected decline in harvested area for rice, the area for corn is to increase by 1.2 percent, for fruits and vegetables by 1.5 percent, for oilseed crops by 3.3 percent, and for pulses and sugarcane by around 3.0 percent by 2025.

Results from Phil-DCGE confirm this finding, where increased production of exported crops followed the reduction in staple crops production across regions (Figure 7). The Phil-DCGE also captures the spillover effect from agriculture to the non-agricultural sector, complementing the results from IMPACT analysis.

² AmBisyon Natin 2040 represents the collective long-term vision and aspirations of the Filipino people for themselves and for the country in the next 25 years. It describes the kind of life that people want to live,

and how the country will be by 2040. As such, it is an anchor for development planning across at least four administrations (NEDA).

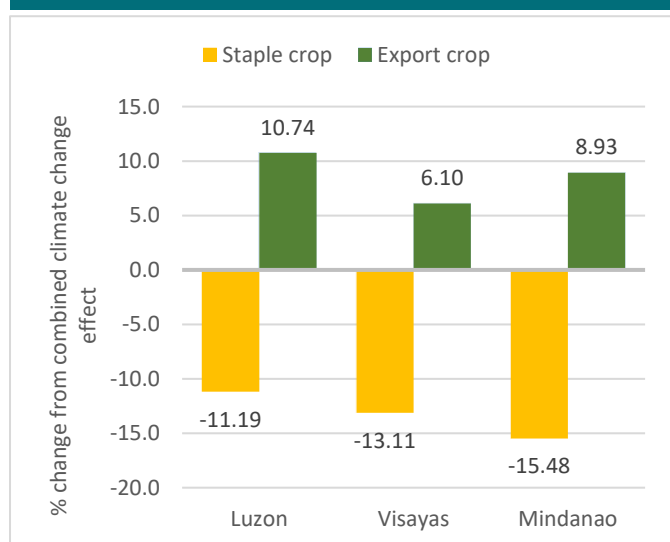
Table 3. Impact of rice liberalization on harvested area of major food crops in the Philippines, 2015–2040

Commodity	2025				2040			
	QR	35% Tariff	Change		QR	35% Tariff	Change	
Area	000 ha		(+/-)	%	000 ha		(+/-)	%
All Crops	14,472	14,338	-134	-0.9	15,324	15,184	-140	-0.9
Corn	2,725	2,756	31	1.2	2,855	2,885	30	1.1
Rice	4,752	4,410	-342	-7.2	4,892	4,535	-357	-7.3
Cacao	11	11	0	2.0	12	12	0	1.9
Coffee	136	139	3	2.0	149	151	3	1.9
Fruits & Vegetables	1,974	2,003	29	1.5	2,227	2,257	30	1.4
Oilseed crops	3,567	3,683	116	3.3	3,718	3,840	121	3.3
Pulses	74	76	2	3.0	77	79	2	2.7
Roots & Tubers	365	368	3	0.7	371	373	2	0.7
Sugarcane	523	539	16	3.1	622	642	20	3.2

Source: IMPACT simulation results.

In the Phil-DCGE simulations of rice liberalization, labor movement is crucial in driving the structural transformation process. Figure 8 shows how labor demand in the agricultural sector decreases when the country’s rice market is liberalized from quota restrictions.

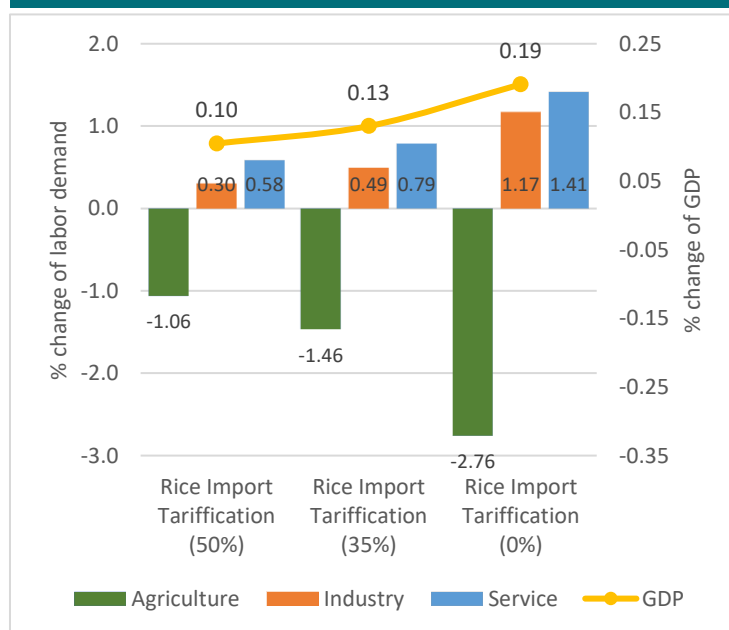
Figure 7. General equilibrium impact of rice liberalization on staple and export crop production, 2040



Source: Phil-DCGE simulation results

On the other hand, the greater demand for labor observed in both industry and services suggests that labor moves from low-paying agriculture to the higher-paying non-agricultural sector. This pattern shows that rice liberalization policy promotes a structural transformation process which increases gross domestic product (GDP) across tariff rates.

Figure 8. General equilibrium impact of rice liberalization on labor demand and gross domestic product, 2040



Source: Phil-DCGE simulation results

For 35% tariff rate, GDP is seen to increase by 0.13 percent in 2040.

Impact on Welfare

The overall impact of rice liberalization on social welfare, as measured by the economic surplus framework from IMPACT and by absorption value from Phil-DCGE, is shown in Table 4 for the 35% tariff and alternative 50% and 0% tariff rates.

Table 4. Welfare effects of rice tariffication in the Philippines by tariff rate, 2020–2040

Tariff scenario	Welfare measure, IMPACT			Welfare measure, Phil-DCGE	
	Producer surplus	Consumer surplus	Economic surplus	Absorption change, 2040	Absorption change, 2020–2040
Reference: CC/QR			<i>US\$ million</i>		
0% tariff rate	-47,452	92,564	45,112	2,803	71,123
35% tariff rate	-29,728	50,714	20,985	2,217	56,720
50% tariff rate	-21,005	34,203	13,198	1,963	48,771

Source: IMPACT and Phil-DCGE simulation results.

With a 35% tariff policy, producers are set to lose US\$29.73 billion while consumers are to gain by US\$50.71 billion for the 20-year period 2020–2040. Society’s net gain is estimated at US\$20.99 billion for the period, equivalent to US\$1.19 billion per year. As tariff rate increases, social welfare decreases. In all three tariff scenarios, producers lose while consumers gain in economic welfare.

Welfare measure in general equilibrium analysis refers to absorption value, which consists of aggregate consumption and investment values under GDP components, excluding the net trade value. The welfare results follow the same trend in the IMPACT model, with increasing value as tariff rate falls. However, the magnitude is higher than in IMPACT, after considering the spillover effects from the non-agricultural sector. Overall, under the 35% tariff rate, welfare is projected to increase by US\$2.2 billion in 2040. When we consider welfare accumulation over time, the net welfare is expected to reach US\$56.7 billion over a span of 20 years.

Impact on Food Security

Lifting QR increases availability and access to more affordable rice, so that per capita consumption of rice and daily calorie consumption are anticipated to improve, contributing to better food security and nutrition for the country.

Per capita rice consumption is expected to increase by 6.3 percent to 120 kilogram/year by 2025 and to fall slightly to 117 kilogram/year by 2040. The corresponding daily calorie consumption is most likely to increase by 2.7 percent to 2,682 kilocalories and to continue to increase to 2,793 kilocalories by 2040. The enhanced availability of and accessibility to staple food is projected to cut the degree of child malnutrition and chronic hunger in the country by 2.8 percent and 15.4 percent, respectively, by 2025; and by similar percentages of 2.8 and 14.4, respectively, by 2040.

Tariff receipts from imports

The establishment of a Rice Competitiveness Enhancement Fund (RCEF) mandated in RA 11203 with PhP10 billion annual budget for the next six years (starting in 2020) is predicted on the assumption that such an amount is attainable from rice import tariff receipts. Any excess is to be added to the RCEF, while any shortfall is to be augmented from national budget appropriations.

Estimates of potential tariff receipts are presented in Table 5, with the caveats that these are subject to fluctuations in world price and in the attainment of the annual equilibrium import volume of rice.

They show that the annual RCEF of PhP10 billion can be sourced from rice import tariffs from 2020 to 2040. At equilibrium import levels, average tariff receipts for the 35% tariff scenario represent PhP27 billion per year.

Table 5. Potential tariff receipts from rice liberalization at equilibrium import volume, Philippines, 2020–2040

Year	World prices	Import volume	35% Tariff receipts	
	<i>US\$/mt</i>	<i>000 mt</i>	<i>US\$ million</i>	<i>PhP billion*</i>
2020	391	3,559	487	21.9
2025	412	3,968	572	25.7
2030	428	4,027	603	27.1
2035	454	3,977	631	28.4
2040	477	3,831	640	28.8

Source: IMPACT simulation results.

Note: Prices and receipts are in constant 2015 prices. *2015 Foreign exchange rate of US\$1.00 = PhP 45.00.

III. ENHANCING THE COMPETITIVENESS OF THE RICE INDUSTRY

ENHANCING PRODUCTIVITY

The types of rice farms and farmers that can be displaced from rice production due to trade liberalization include: (a) less productive rainfed lands; (b) less productive irrigated lands; and (c) productive irrigated lands with high production costs. Investment in irrigation expansion can benefit group (a) farms and farmers, while all farms can benefit from investment in agricultural research & development and extension (R&DE). R&DE can further improve the productivity and competitiveness of those farms that remain profitable despite rice liberalization. These are long-term investment options where benefits take time to be fully realized.

Investment scenarios for long-term competitiveness of the rice sector include:

Investment in agricultural research and development and extension (R&DE)

- to develop climate-resilient technologies, increase yields, and actively promote the adoption of these technologies. This level of investment in R&DE is expected to increase the average yields of rice by 15 percent in the 20 years from 2020–2040;

Investment in selective irrigation expansion (IREXP)

- to increase irrigated land areas by additional 10 percent in the 20 years from 2020 to 2040. Priority is given to rainfed areas suitable to rice production

with respect to climatic and geographic location and market conditions; and application of cost-effective irrigation system; and

Combined investment in R&DE and IREXP

- assumes additive investment in R&DE and IREXP, to enhance average rice yields by 15 percent and allows for an additional 10 percent expansion in irrigated lands in the 20 years from 2020 to 2040.

All scenarios operate under the 35% tariff policy regime, which serves as baseline for comparisons, together with the QR policy.

IMPACT ON COMPETITIVENESS OF THE RICE SECTOR

Investment in R&DE includes development of productivity-enhancing technologies which increase farm yields, and cost-saving farm management technologies which increase yields and minimize production costs. Agricultural extension, on the other hand, may not necessarily increase yield nor reduce production costs as does R&D. However, by promoting the wider adoption of existing yield-enhancing and cost-saving technologies, the average yields of rice farms are increased, and average costs of production decreased, in addition to raising the productivity and reducing the production costs of individual farms.

Investment in both agricultural R&DE and selective irrigation expansion (IREXP) under liberalized rice trade:

- *Can boost the competitiveness of rice as an import substitution industry – thereby*
 - *reducing dependence on rice imports from around 3.9 million mt to 460 thousand mt by 2040, equivalent only to 2.5 percent share of domestic demand;*
 - *restoring the profitability and the competitiveness of 334,000 hectares (94 percent) of displaced farms;*
 - *increasing production to 18.1 million mt, exceeding the QR value by 1.8 million mt.*
- *Maintain domestic prices within the liberalized levels – thus*
 - *protecting the food security and nutrition gains from rice liberalization.*

The impacts of investment in R&DE and IREXP on the competitiveness on the rice sector and food security are presented in Table 6 and on society's welfare in Table 7.

Impact on Yield, Area and Production

If investments in R&DE and irrigation expansion were started by 2020, benefits from them should already begin to accrue after 3-5 years, with the full benefits by 2040.

The major impact of R&DE is on increasing yield levels, estimated to be enhanced by 14.2 percent by 2040, thus directly increasing production by 17.6 percent. Irrigation

Table 6. Impact of investment in R&DE and irrigation on the rice sector, Philippines, 2040

Indicators	Units	2040					% change from 35% Tariff		
		QR	35% Tariff	R&DE	IREXP	R&DE + IREXP	R&DE	IREXP	R&DE + IREXP
World price	US\$/mt	474	477	474	476	473	-0.7	-0.2	-0.9
Imports	000 mt	1,080	3,831	1,277	3,139	459	-66.7	-18.1	-88.0
Consumer prices	US\$/mt	1,171	870	864	868	862	-0.7	-0.2	-0.9
Producer prices	US\$/mt	901	669	665	668	663	-0.7	-0.2	-0.9
Area	000 ha	4,892	4,535	4,672	4,726	4,869	3.0	4.2	7.4
<i>irrigated</i>		3,386	3,163	3,247	3,364	3,456	2.7	6.3	9.3
<i>rainfed</i>		1,506	1,372	1,424	1,362	1,414	3.8	-0.7	3.0
Production	000 mt	16,254	14,658	17,239	15,358	18,066	17.6	4.8	23.3
Yield	mt/ha	3.32	3.23	3.69	3.25	3.71	14.2	0.5	14.8
<i>irrigated</i>		3.73	3.62	4.13	3.62	4.13	14.1	0.0	14.1
<i>rainfed</i>		2.41	2.34	2.69	2.34	2.69	14.7	0.0	14.7
Total demand	000 mt	16,980	18,134	18,161	18,142	18,170	0.1	0.0	0.2
Import share of demand	%	6.4	21.1	7.0	17.3	2.5	-	-	-
Per capita consumption	kg/year	110.3	117.1	117.2	117.1	117.3	0.1	0.0	0.2
Calorie consumption	kcal/day	2,725	2,793	2,795	2,793	2,795	0.1	0.0	0.1
Malnourished children	million	2.4	2.4	2.4	2.4	2.4	-0.1	0.0	-0.1
Pop. at risk of hunger	million	11.5	10.1	10.1	10.1	10.1	-0.3	-0.1	-0.4
% at risk of hunger	%	8.3	7.3	7.3	7.3	7.3	-0.3	-0.1	-0.4

Source: IMPACT simulation results.

Note: R&DE = Research and Development and Extension; IREXP = Irrigation Expansion; mt = metric ton; ha = hectare; kg = kilograms; kcal = kilocalories.

expansion, on the other hand, is to increase total rice area by 4.2 percent by 2040, and to directly influence expansion in production by 4.8 percent. Their combined effects are additive, showing improvement in yields, with synergies in area and production; values indicate an increase of up to 23.3 percent in production, 14.8 percent in yields, and 7.4 percent in rice areas by 2040.

Impact on Imports and Prices

Investment in combined R&DE and irrigation are shown to reduce the country's dependency on imported rice without increasing domestic prices. Rice imports under this investment scenario are projected to decline by 88.0 percent, with minimal decline in consumer price of 0.9 percent by 2040. Comparisons with 35% tariff and with QR further reveal that investment in combined R&DE and irrigation expansion results in maintenance of the benefits derived by consumers from 35% tariffication, while at the same time it restores areas and production to QR levels.

Impact on the Economy and Welfare

At the macro level, efficiency gain in the agricultural sector from combined R&DE+IREXP leads to higher agricultural

Table 7. Welfare effects of investments in R&DE and irrigation, 2020–2040

Investment scenario	Welfare measure		
	Producer surplus	Consumer surplus	Economic surplus
Reference: CC and 35% Tariff	<i>US\$ million</i>		
R&DE	5,794	729	6,523
IREXP	1,545	236	1,782
R&DE + IREXP	7,313	1,389	8,702

Source: IMPACT simulation results.

Note: CC= with climate change; R&DE = Research and Development and Extension; IREXP = Irrigation Expansion.

value by an added 2.85 percent in 2040 (Figure 9). A spillover effect across sectors is also observed and is shown by an increase in industry and value-added services. This spillover effect comes mainly from the resource allocation process, as more labor is able to move out of agriculture to earn a higher income in non-agricultural sectors higher income in non-agricultural sectors. Overall, the simulation results

show that a potential increase in GDP of 0.31 percent could be attained by combining both interventions.

Welfare analysis also suggests that both producers and consumers benefit by investment in R&DE+IREXP, with producers benefiting the most, thereby counteracting the negative welfare effects of rice liberalization (35% tariff) on rice producers.

Implication to the Rice Industry

One policy implication of these results is that investments in R&DE+IREXP can enhance the competitiveness of the rice sector as an import substitution industry where increases in domestic production substitute for increasing import demands. This results in domestic prices being kept at reasonable levels for both consumers and producers, resulting in better food security and nutrition for the country.

BOX 2 TRANSITION PHASE: FROM QR TO 35% TARIFF REGIME

World prices, volume of imports, consumer and producer prices, consumption and domestic production are simultaneously derived from the IMPACT model, as they are in the economy. The initial level of import sets the market in motion toward equilibrium—with iterative adjustments along the way—until it settles to equilibrium.

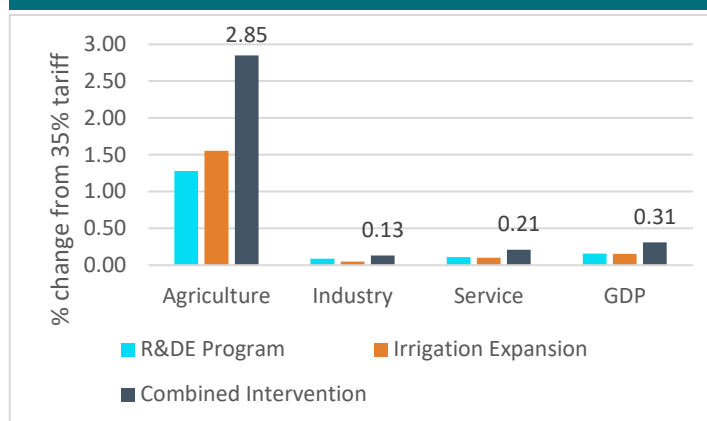
It may take 3-5 years for the economy, the rice market, and the food system to stabilize and settle to dynamic equilibrium (steady-state) conditions. In lifting the QR on rice, the function of importing rice shifted from National Food Authority to private entrepreneurs or enterprises whose collective actions in the rice trade market determine the pathway to equilibrium conditions.

Figure B1 depicts the movement of prices in the opposite direction to the volume of imports and farm areas phasing out of rice production.

At 50 percent equilibrium import, there was no large decline (-4 percent) in consumer prices compared to QR conditions. At 60 percent equilibrium import there was a 9 percent decline; and at 80 percent equilibrium import there was an 18 percent decline. Similar trends are projected for producer price and harvested area; only graduated declines are expected from gradual movement toward a volume of imports that is in equilibrium.

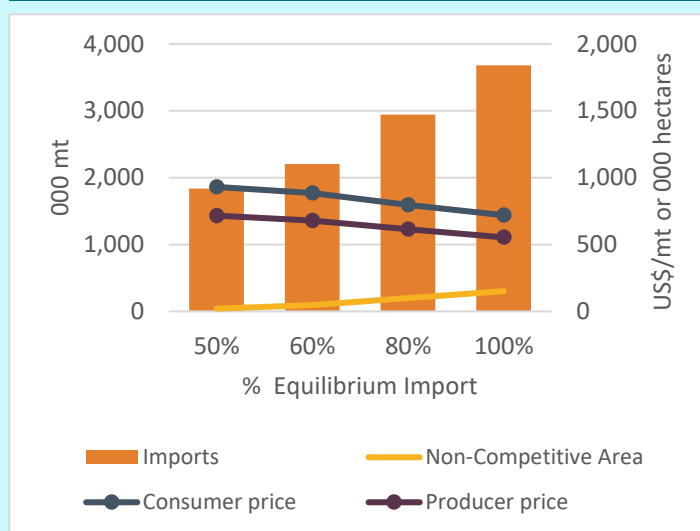
This section emphasizes that ample time is needed for the economy and the rice market to stabilize and settle to equilibrium conditions and that projected reductions in domestic prices and rice area may not be realized in the next two

Figure 9. Projected impact of policy intervention on value added across sectors.



Source: Phil-DCGE simulation results

Figure B1. Changes in domestic prices and rice area corresponding to adjustments in import levels in the transition period prior to 2025.



Source: IMPACT simulations.

to three years, until equilibrium import volumes are achieved.

The policy implications during the transition period are two-fold:

- policies that can hasten and smoothen the transitioning from QR to 35% tariff, especially for the rice trade, should be put in place; and
- investment for enhancing the competitiveness of the rice sector can already be started during the transition period when import volumes are still below equilibrium and domestic prices have not yet drastically gone down.

POLICY RECOMMENDATIONS

ENHANCING THE COMPETITIVENESS OF THE RICE SECTOR AS AN IMPORT-SUBSTITUTION INDUSTRY

Investment in R&DE

Investment in agricultural R&DE can be used to develop climate-resilient technologies and increases in yields. The National Agricultural Research System (NARS) and national research institutions such as PhilRice, the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) and agricultural extension agencies, whether national or local government unit (LGU) -based can take the lead, not only in technology development, but also in technology transfer and adoption.

Selective investment in irrigation expansion

An expected result from this study pertains to the rainfed rice farms that can be put out of rice production by liberalization. An unexpected result is that some rainfed farms are more productive and profitable than others, and remain in business while some irrigated farms fail. These productive rainfed farms should take priority when choices are made about selective expansion of irrigation.

Combined R&DE and IREXP

There are synergies that can be achieved with combined investment in R&DE and irrigation, so that wherever applicable, investment on both is recommended.

Strengthening ancillary services to agricultural production

This was not covered by this study, but a separate study on investment in food security (IFPRI 2018) found that providing support and ancillary services (e.g., seed industry; post-harvest processing and storage facilities; crop insurance; credit; and internet or phone-based transactions and delivery of extension services) all work to enhance productivity, reduce post-harvest losses, and lower marketing costs.

IMMEDIATE-TERM POLICIES: TRANSITIONARY STRATEGIES

- *Development of rice trade market to perfect competition among rice importers*

Rice liberalization should aim not only to facilitate importation but also to make it profitable for importers and beneficial to consumers.

Policies that can hasten and smooth the transition from QR to a 35% tariff, especially for the rice trade, should be put in place. Policies that remove barriers to entry and exit from the import market; reduce transaction costs; eliminate preferential treatment of sources of imports and preferential tariff rates; and that improve market information are to be encouraged.

- *Cash or income transfer to affected rice farmers*

In the immediate and short term, cash or income transfers to affected rice farmers are preferred over any form of price support or subsidy. This includes price support by NFA in procuring local rice for its buffer-stocking function.

- *Promotion of diversification to high-value crops*

The period when farmers start moving to more profitable farm commodities or enterprises is also the time to promote high-value crop production by providing new technologies and the appropriate training and skills.

- *Laying the foundations for transforming the rice sector into an import-substitution industry*

During the transition period, when import volumes are yet well below equilibrium, domestic prices may remain high and rice production profitable, there may be a tendency to dismiss the projected declines in prices and production presented in this study.

Instead, this should be the time to start the investment into R&DE and irrigation, and the establishment of ancillary and support industries, because it takes time to realize the full benefits from these investments.

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