

Transforming Philippine Agriculture

During Covid-19 and Beyond

JUNE 2020



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Chapter pages: Department of Agriculture, Philippine Rural Development Project

Acknowledgments

This report was produced by a team from the World Bank Group, led by Eli Weiss and co-led by Anuja Kar, and comprising John Nash, Steven Jaffee, Roehl Briones, Carolina Figueroa-Geron, and Paula Beatrice Macandog. Additional inputs were received from Joop Stoutjesdijk, Maria Theresa Quinones, Roberto Martin N. Galang, and Victor Dato. The assessment related to agricultural extension was prepared by a team from the Food and Agriculture Organization (FAO) of the United Nations, led by John Preissing and comprising Jim Hancock, Katarzyna Pankowska, and Alberto Tordesillas Torres. Kathryn Swartz and Kelly Cassaday edited, and Herbert Navasca formatted the report. Mildren Penales and Elezor Trinidad provided administrative and logistical support. Madhur Gautam, Michael Morris, and Stephen Mink suggested improvements through peer review comments. Additional guidance was received by Clarissa Crisostomo David and David Llorico Llorito. Dina Umali-Deininger, Madhu Raghunath, and Achim Fock provided oversight for the work.

The team would like to thank the Department of Agriculture (DA) for the excellent collaboration, including organization of the mission and meetings, and provision of the information and inputs requested. Special thanks go to the Office of Policy and Planning and the Office of Regional Field Operations. Finally, the team would like to thank all of the focal points and staff of the various agencies and all other actors from the public and private sector as well as from academia, who were engaged, participated in the various meetings and phone calls, and provided written and oral inputs for this report.

Currency Equivalent

Exchange rate effective as of June 3, 2020

Currency unit	= Philippine peso (PHP)
US\$1.00	= 50.0

Acronyms and Abbreviations

ADB	Asian Development Bank
AI	Artificial insemination
ALPAS-COVID-19	Ahon Lahat, Pagkaing Sapat (ALPAS) Kontra sa COVID-19 ("Plant, Plant, Plant," the Philippine government's response to the COVID-19 pandemic)
AMAS	Agribusiness and Marketing Assistance Service
ASA	Advisory Services and Analytics
ASEAN	Association of Southeast Asian Nations
AFSIS	ASEAN Food Security Information System
ATI	Agriculture Training Institute
BAI	Bureau of Animal Industry
BAR	Bureau of Agricultural Research
BFAR	Bureau of Fisheries and Aquatic Resources
BPI	Bureau of Plant Industry
CARP	Comprehensive Agrarian Reform Program
CPAR	Community-based Participatory Action Research
CQ	community quarantine
CSA	Climate-smart agriculture
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DILG	Department of the Interior and Local Government
DIS	Direct Income Support
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
ECQ	Enhanced community quarantine
FAO	Food and Agriculture Organization (FAO),
FERG	Foodborne Disease Burden Epidemiology Reference Group
FPA	Fertilizer and Pesticide Authority
FSRF	Financial Subsidy to Rice Farmers
FSSP	Food Staples Sufficiency Program
GAA	General Appropriations Act
GDP	Gross domestic product
HVCDP	High-Value Crops Development Program
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
LGU	Local Government Units
MOM	Management, operation, and maintenance
NACCFL	Nepal Agricultural Cooperative Central Federation
NCCAP	National Climate Change Action Plan
NEAP	National Extension Agenda and Programs
NFA	The National Food Authority
NFRDI	National Fisheries Research and Development Institute
NGO	nongovernmental organizations
NIA	National Irrigation Authority
NMIS	National Meat Inspection Service

NSIC	National Seed Industry Council
OECD	Organisation for Economic Co-operation and Development
OSec	Office of the Secretary, Department of Agriculture
PAFES	Province-led Agriculture and Fisheries Extension Systems
PCAF	Philippine Council for Agriculture and Fisheries
PCC	Philippine Carabao Center
PCIP	Provincial Commodity Investment Plan
PES	Payment for ecosystem services programs
PhilFIDA	Philippine Fiber Industry Development Authority
PhilMech	Philippine Center for Postharvest Development and Mechanization
PhilRice	Philippine Rice Research Institute
PHP	Philippine peso
PRDP	Philippine Rural Development Project
PRIME	Pest and Disease Risk Identification and Management
PSA	Philippine Statistics Authority
R&D	Research & Development
RCM	Rice Crop Manager
RFO	Regional Field Office
SFLF	Small Farmers, Large Field program
SOE	state-owned enterprises
SPS	sanitary and phytosanitary
TFP	Total factor productivity

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Executive Summary

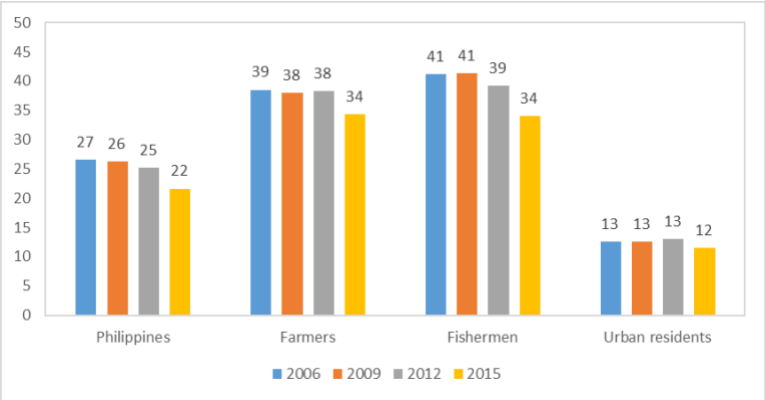


Executive Summary

Agriculture is critically important, but sectoral performance has been dragged down

Transforming Philippine agriculture into a dynamic, high-growth sector is essential, not only because of its connection to food security and the agri-food system, but also for poverty reduction. Poverty among farmers and fisherfolk has fallen over time, but it remains far higher than the national average, and nearly three times greater than poverty among urban households (Figure 0.1).

Figure 0.1: Poverty incidence (%) by basic sector, 2006–15



Source: PSA.

Notwithstanding the importance of the sector, agricultural policy has been manifestly unsuccessful in sparking dynamic development. While the overall economy has remained on a sustained growth trajectory, posting 6.4% growth between 2016 and 2019, this economic growth was largely powered by industry and services. Growth in agriculture was an anemic 1.3% over that period. Total factor productivity (TFP) in agriculture has not been entirely stagnant—rising by about 32% over two decades—but this growth has been painfully slow compared to the TFP growth in regional neighbors such as Vietnam (73%), Indonesia (50%), and Thailand (67%).

Sectoral growth was dragged down by several factors, but two stand out. One factor is the low productivity in rice, with yields far below the average for Southeast Asian comparator countries, despite the significant resources and policy attention to production. Another factor is the failure of the sector to diversify into high-value-added products for local consumption and export, and to integrate farmers into value chains. This situation stands in contrast to the experience of other successfully transforming agricultural sectors. The share of high-value crops in Philippine agriculture rose only slightly over the last two decades—from 19.6% in 2000 to 20.6% in 2018 and 22.9% in 2019. The promotion of diversification has been an explicit policy goal, at least since the “High Value Crops Development Act” of 1995, but progress has been strikingly limited. Looking forward, the importance of a healthy and vibrant agricultural sector will be amplified in the aftermath of the pandemic and during the recovery period. Both farmers and the off-farm economy will be impacted by the crisis. The maintenance of livelihoods and creation of jobs will be even more important in rural areas, where more of the population is already living on the margin of subsistence.

Policies are changing and the government's strategies are now based on new ideas

Policies being put in place by the current government are based on a “New Thinking” for Agriculture with eight paradigms for sectoral development and modernization: agricultural modernization, industrialization, export promotion, farm consolidation, roadmap development, infrastructure development, securing budget and investments, and legislative support. Underpinning these eight paradigms are the four pillars of the Department of Agriculture's (DA's) agro-industrial strategy: inclusive sector, utilization of science-based tools, market-oriented interventions, and resilience to climate risks. This policy reorientation holds promise for transformational change that will produce a more resilient, inclusive, competitive, and environmentally-sensitive sector.

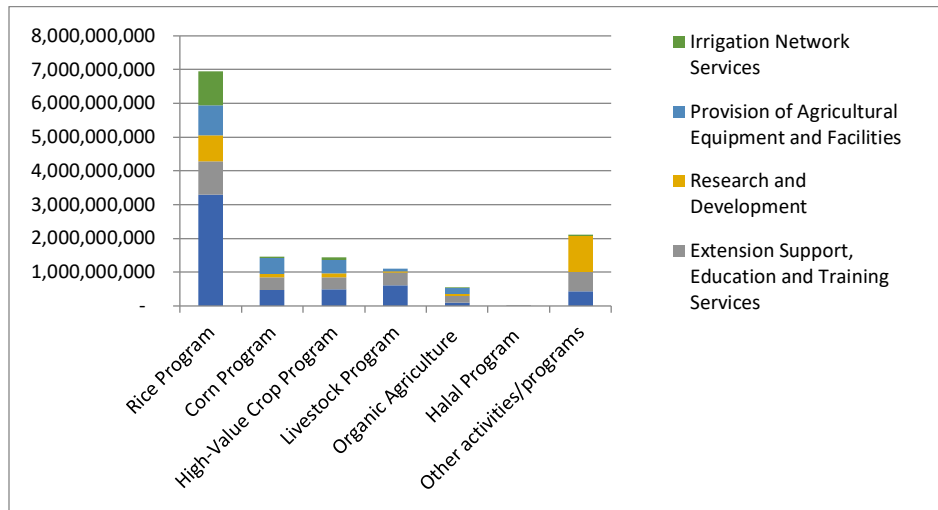
The Rice Liberalization Act (RA 11203), which abolished the quota system (a long-standing instrument of protecting rice production), is indicative of this strategic shift. The act opened up the importation of rice to private traders and limited the mandate of the National Food Authority (NFA) to domestic procurement of *palay* (unhusked rice) from farmers and maintenance of national rice stocks as an emergency safeguard. This reform was an important step toward leveling the playing field for non-rice agriculture. In fact, in 2019, there was some indication that it may have had an impact, as the share of high-value crops rose by 2.3 percentage points, with the biggest movement toward diversification occurring in rainfed areas.

There is still a danger that achievement of the “New Thinking” objectives may be obstructed by legacy policies

This review of the DA's programs found substantial evidence that a focus on rice growing still pervades government policies and spending decisions. Among the commodity-based banner programs, a disproportionate share of supports is still targeted to rice farmers. Under the DA's FY2020 budget, the rice program received 48% of the budget appropriated for production support services; 53% of extension support, education, and training services; 35% of the budget for provision of agriculture equipment and facilities; 49% of the budget for R&D; and 88% of the budget for irrigation services (Figure 0.2). The vast majority of the budget of the National Irrigation Agency is devoted to single-crop rice production schemes. All of this support is for a crop that comprises only about 18% of the value of production. Meanwhile, the budgets for some categories of expenditure on public goods that will be important to attain the policy goals of the “New Thinking”—such as research, market development (other than roads), and extension—seem to be relatively low and declining.

The influence of legacy policies is also evident in policy instruments. Support continues to be provided through high tariffs on imports and subsidies to private goods, such as fertilizers and chemical inputs, costs of irrigation, and mechanization services. Experience has shown that these mechanisms are generally not efficient means of supporting farmers nor promoting competitiveness.

Figure 0.2: Appropriations (in PHP) for DA operations by program, FY2020



Source: Department of Agriculture

Progress has been temporarily interrupted by the COVID-19 pandemic

The advent of the COVID-19 pandemic required the government to focus its full attention on urgent responses to: (i) keep the supply lines for food open (from domestic sources and imports); (ii) ensure that farmers continue to have access to inputs and services needed to prepare for the next harvest; and (iii) prevent primary producers and workers all along the value chain from suffering devastating income losses due to measures intended to reduce the spread of the virus. The DA’s emergency response to enhance and facilitate the movement, trucking, and marketing of food from the producers/provinces (through Kadiwa ni Ani at Kita, in partnership with the Local Government Units (LGUs) and the private sector) has demonstrated visible benefits for both farmers and consumers. The government’s response has effectively managed potential disruptions to the local food supply chain. Meanwhile, global food markets are, so far, holding up well in the crisis, and supplies are good. The DA also announced a massive expenditure outlay under its ALPAS-COVID-19¹ response initiative, with a supplementary budget of PHP32B to help farmers and agribusinesses. Some of these emergency measures—including reliance on subsidies and direct provision of inputs, as well as direct government procurement and marketing of products—will likely have significant downsides if maintained beyond the pandemic. These kinds of measures would need to be dismantled as soon as possible after the crisis passes to resume the progress being made on the reform agenda.

Planning beyond the crisis

Looking ahead, policy makers are planning beyond the crisis with an initial framework developed by the Interagency Task Force, “We Recover as One.” Planning for the post-COVID-19 rebuilding is challenging, yet it presents a unique opportunity to promote the reconstruction of an agriculture and food system that is more resilient, inclusive, competitive, and environmentally sustainable than it was before. In this effort, much can be learned from international experience. In fact, transformational change in agricultural policy

¹ Ahon Lahat, Pagkaing Sapat (ALPAS) Kontra sa COVID-19 ("Plant, Plant, Plant").

has often taken place in the context of crises, which tend to undermine the coalitions that oppose changes to the status quo.

Successful sectoral transformations have required two levels of complementary changes. The first is a seismic shift in sector-wide policy orientation. This kind of “big bang” reform program changes the overall incentive structure and, in turn, conditions the behavior of farmers and other sectoral players. This shift has also generally involved changes in policy instruments. This report looks at major reform programs that demonstrated transformative results over a long period (Chile, New Zealand, Turkey), and that seem relevant to the Philippine experience. All of these examples involved big shifts away from policies aimed at protecting particular products (usually import substitutes) using highly inefficient support tools, and in all cases, the reforms paid off in high and sustained sectoral growth.

The second change is that high-level reform must also be accompanied and followed up by many lower-level subsectoral policies and investments to catalyze the transformation. Experience has shown that overarching reforms must go hand-in-hand with micro-level changes in a complementary manner. This report looks at lessons from reforms and innovations in other countries that are useful to consider in operationalizing the “New Thinking” in Philippine agriculture through consolidation, modernization, and industrialization.

Policy options and recommendations

Sector-wide reorientation and reforms

Shift the overall strategic approach from protecting specific products (rice, sugar) to improving the overall resilience, competitiveness, and sustainability of the sector as a whole, while ensuring that the approach meets the needs of a wide set of stakeholders:

- *The sector should shift implicitly from a supply-oriented to a demand-driven agriculture.* Rice will remain a vital food staple for the country, yet the bulk of the income-earning and job creation opportunities for the sector going forward will be generated in other non-rice sub-sectors.

Adjust the modalities of government support:

- *Focus on fewer and more outcome-based and holistic programs to achieve sector objectives.* The DA may move away from managing many smaller projects that are agency-based and mainly work in “silos,” toward fewer and larger programs that are outcome-based and adopt a more holistic but simpler mechanism to achieve higher impact. Given that agricultural support services are a local government mandate, the programs also need to drive the incentives for LGUs to spend effectively. The Philippine Rural Development Project (PRDP) is a good example. The project has introduced a science-based and multi-stakeholder planning framework to develop high-potential agricultural value chains and incentives for LGUs to formulate and implement investments plans to achieve agreed agricultural targets. With two types of subprojects, rural infrastructure and enterprise development, the PRDP helped to strengthen food supply chains, working from inputs, production, aggregation, processing, and marketing to logistics and rural infrastructure, thereby giving smallholders the opportunity to access more lucrative markets and creating rural jobs. With this mechanism the PRDP has also strengthened the planning and implementation capacities of LGUs and producer organizations, while increasing convergence at the local level.

- *Move toward more public goods.* In the past, a significant proportion of public spending has gone toward commodity price supports and input subsidies, so-called “private goods,” to meet social goals. Global experience and evidence are quite clear that reorienting government expenditures toward investments in public goods—including research and development (R&D), infrastructure, innovation systems, market information systems, and biosecurity systems—generates higher returns and is a far superior method for inducing productivity gains, poverty reduction, and overall modernization of agriculture.
- *If farmer support is needed, rely on some form of “decoupled payments.”* In circumstances where farmers continue to struggle to earn a livelihood from production and market engagement, there may remain justifications for direct support. In that case, a preferable option is to rely on some form of “decoupled payments,” such as those used in the EU, Mexico, Turkey, the US, and elsewhere as part of their reform programs. These cash payments go directly to farmers, usually on a per hectare basis, and the amount of the payment is not dependent on production or input use. Decoupled payments have many advantages, including giving farmers more choices and encouraging private sector development in upstream (inputs and agricultural services) and downstream (processing, marketing) markets, thereby helping farmers connect to value chains. In addition, support can be made conditional on actions by the recipients that are in the public interest, or in other words, which generate positive externalities. For example, farmers can be paid to provide environmental services. While cash transfers are the most efficient way of providing “decoupled” benefits, a system of e-vouchers would be a second-best alternative, and would also be a great improvement over direct provision of inputs by the government (fertilizer, chemicals, seeds, mechanization services, credit), provided that the payments are decoupled from input use and production.
- *Address market failures with matching grants to producer organizations through productive alliances.* Often smallholders struggle to access inputs and output markets, while for buyers, such as agribusinesses and wholesalers, it is difficult to get the quantity and quality of the produce they need on a consistent and timely basis. Government support is therefore justified to facilitate overcoming this market failure by bringing together buyers and producer organizations and providing support for the preparation and implementation of profitable business plans. This response can include investments and technical assistance to strengthen the organizational and entrepreneurial capacity of producer organizations, their market-led production, access to input and output markets, and access to technical, social, and financial services. These are the arrangements used by programs that have successfully implemented the productive alliance model (Bolivia, Brazil, Colombia, Vietnam, and others), even (through the PRDP) the Philippines.

Strengthen evidence-based decision-making:

- *The establishment of reliable databases and analytical capacity in DA are critical for timely and appropriate policy formulation and decision-making, for ensuring that programs are being implemented effectively and having the desired results, and, in the context of limited resources, enabling regulatory units to allocate their personnel and facilities appropriately.* The DA (and other departments) should be required to carry out benefit-cost analyses in designing major programs and projects, as well as periodic impact evaluations during and after implementation. It should also enhance real-time digital information systems to inform policy decisions. For instance, a tool for processing price and production data from market players (including farmers, buyers, truckers, end-customers) in real time will allow DA to respond to changing market outcomes. A Farmer Registry

should be established and updated to provide a farmer database with agrometric and geospatial data, socio-economic profiles, cultural practices, and other key production and market information. This registry could enable more targeted design and provision of services and farm support (such as e-vouchers, decoupled payments) as well as better analysis of agricultural policy and program impacts on farmers.

Subsectoral and thematic interventions to support transformational change

Consolidation

- *Land consolidation.* The Philippines can learn from other countries about testing different approaches to consolidate individual farm plots, facilitating an agricultural land leasing market, and improving block or cooperative farming schemes involving the smallholder owners. Several models are discussed in the report: (i) Consolidation to increase the average size of farms into viable commercial units, through sale or lease. China has been particularly active in promoting consolidation, and evidence suggests that it has led to increased investment for agricultural production and facilitated temporary or permanent migration to urban areas by people who no longer wish to remain on the land. Prior to reforms under which certificates were issued to confirm a person's title to land, farmers were reluctant to migrate for fear of losing their land to expropriation. The new system permits sale and lease of land rights. Around 25% of rural households have rented out their cultivated land. (ii) Consolidation to reduce fragmentation of smallholder plots. In Vietnam, a model called "big tenant, small landlord" has been developed to consolidate small pieces of land into large fields. In Uttar Pradesh in India, a government program straightened field boundaries to reshape holdings into rectangular form as much as possible. and (iii) Cooperative farming, in which individual farmers retain ownership of their land but farm it jointly. Joint farming can be done informally, by producer organizations, or through government initiatives. An example of informal coordination by smallholders comes from southern Cambodia, where the use of combine harvesters for paddy increased rapidly a decade ago. Under the large field (SFLF) program in neighboring Vietnam, Vietnamese farmers integrate their small rice areas into one large field, operated under a variety of arrangements. This system gives farmers greater bargaining power with buyers and input suppliers, increases the use of on-farm and postharvest mechanization, yields an aggregated supply of just one rice variety, and has improved storage. And several countries, including Nepal and Malaysia, have launched joint-farming initiatives, whereby farmers pool their resources, including land, under a central management unit.
- *Aggregation and collective action for coordinated and inclusive value chains.* Currently there are too many small-scale farms that are not organized into groups and cooperatives and not involved in coordinated aggregation/distribution channels. While contract farming is not widely applied in the Philippines, the above-mentioned productive alliances can foster the horizontal (collective action) and vertical (in the value chain) integration of farmers. The government can facilitate effective partnerships between producer organizations, buyers, technical service providers, and financial lenders. There may be a strong rationale for continued government assistance to help strengthen such entities, including ensuring fair and objective agribusiness venture agreements and contracts, as well as for supporting farmers in moving up the value chain ladder, including the production of inputs, marketing, processing, and logistics.

Modernization

- *Modernization of extension.* Paradigm shifts are recommended to better cater to the needs of farmers for an increasingly diversified agricultural sector. Agricultural advisory services can no longer be an exclusive public sector “one-size-fits-all” approach. Instead they need to be tailored or modified to fit diverse circumstances and needs. Following good international practice, this paradigm shift would be multi-faceted, involving shifts from: (i) supply-driven to demand-driven; (ii) a narrow (primary rice productivity) focus to featuring much more diverse (farm, natural resource, risk, and marketing management) content; (iii) a public service to a pluralistic system involving the public and private sector, non-governmental organizations (NGOs), and other players; (iv) predominantly person-to-person contact to featuring multiple delivery modes; and (v) outdated technologies to use of digitally enabled tools in order to improve the adoption of research results and the reach of extension. To move forward, it is recommended for Philippine stakeholders to undertake a strategic assessment of the evolving extension landscape and to chart out a suitable roadmap. The new extension policy would help to delimit the areas where the government will need to continue to provide extension services, while pinpointing areas where the government role will be more to broker or enable other players to step up their advisory services. While the Filipino extension services are already decentralized and multiple players are involved in service delivery, room for improvement remains. Globally, a key concept to understanding extension provision in today’s context is the fact that financing sources are separated from the provision of services. Public funds can be used for the provision of services by producer organizations, NGOs, or private service providers. Some successful examples of countries that outsourced their extension services (either partially or fully) include Chile, France, Mexico, Peru, and Uganda. This approach would strengthen coordination between multiple players to avoid the duplication of services and ensure the efficient allocation of funds to competing needs. Consequently, the delivery of extension services would be more targeted and likely more efficient, timely, and inclusive.
- *Irrigation modernization.* The modernization of the irrigation system will have benefits both in raising productivity of rice and in opening opportunities for farmers to diversify. Modernization will involve institutional, organizational, and technological changes and reforms. The National Irrigation Authority (NIA) and DA should gain knowledge and experience with new design principles and the use of modern technologies. There is potential to design new irrigation schemes for a variety of crops, with appropriate extension and other support. Adequate funding for management, operation, and maintenance of irrigation and drainage systems will be key to ensure their longer-term sustainability, while the reintroduction of a “user pays principle” would be best practice.
- *Facilitation of e-commerce development.* E-commerce could play an important role in restoring more normal market function during crisis-related disruptions, and it could make marketing more efficient in the longer term. The DA, Department of Trade and Industry (DTI), and Department of Information and Communications Technology can act as facilitators and strengthen linkages with private sector actors (banks, logistics companies), LGUs, and producer organizations in order to market produce through e-commerce and digital platforms.
- *Improvement of road infrastructure.* Key areas for improvement include better coordinated planning across LGUs and national government agencies); completing the Geographic Information System (GIS) mapping of all local roads, especially rural barangay (village) roads; application of available planning tools; improving LGU capacity in road planning and traffic management; and

more transparent project prioritization. Through PRDP, some of these best practices have already started to be mainstreamed into the DA.

Industrialization

- *Improvement of market networks and infrastructure.* In consultation with the private sector, the government should develop a national strategy or master plan for the development or modernization of urban wholesale markets and rural aggregation centers.
- *Investment in agribusiness incubation and education.* Explore with Philippine universities, research centers, and private industry the potential for developing an Agribusiness Innovation and Education Center. This center could support agribusiness start-ups and agri-food technology R&D (related to postharvest management, food processing, and packaging), provide technical and business support services to existing companies, and provide short course and degree programs related to different aspects of agribusiness management. Consider providing seed capital to such a center, although the bulk of start-up costs could be mobilized from non-governmental sources, and the center should be self-sustaining via its fees for services and training.
- *Upgrading of agricultural quarantine, food safety, and animal health frameworks.* It is recommended to develop new biosecurity legislation, which is necessary to integrate the quarantine and food safety functions of the Bureau of Animal Industry, Bureau of Plant Industry, Bureau of Fisheries and Aquatic Resources, and the National Meat Inspection Service into a single regulatory body dealing with all biosecurity concerns. In addition, a national multisectoral agricultural quarantine and food safety strategy could be developed to set priorities, address institutional strengthening and coordination needs, and establish approaches for private sector collaboration and consumer engagement.
- *Promotion of cluster development and agricultural commodity differentiation.* The concept of world-class agricultural clusters seeks to realize economies of scale and agglomeration, foster rapid learning among farmers and firms, and crowd in new investment to raise the competitiveness of focal value chains. The Philippines has already embraced the concept of spatially clustered initiatives centered on specific commodities, as embodied in the Provincial Commodity Investment Plans (PCIPs) introduced by PRDP. Many of these plans have provisions for infrastructure development and technical support to farmers. Taking this to the next level may require more attention to facilitating the emergence or local entry of pertinent business development services, facilitating private investment in infrastructure for distributing or processing the commodities, and efforts to begin to differentiate these commodities and clusters (perhaps through geographic indications, the production of distinctive varieties or breeds, application of certifiable production standards, or other means). In other words, infuse some of the existing spatial cluster strategies with a much stronger commercial orientation. Different clusters will find themselves competing with one another as well as with imported products. Raising their game will be essential. In addition, a review of existing experience and the feasibility of expanding the application, both for domestic and international markets, of various institutional tools for differentiating Philippine commodities could be developed.

1

Introduction



Chapter 1. Introduction

Context

Like other rapidly growing and urbanizing middle-income countries, the Philippines is experiencing a structural transformation of its economy. As part of that transformation, the share of agriculture in national gross domestic product (GDP)² declined from 13% to 9.3% between 2008 and 2018, while the share of services increased. Agriculture’s declining share of the macroeconomy need not and should not signal that the sector is stagnating or declining. During structural transformation, a vibrant agricultural sector has much to contribute to the economy, social stability, and resilience of a nation.

Structural transformation has progressed slowly in the Philippines, however, indicating that Philippine agriculture is not performing to its potential and therefore not fully delivering to the national (and rural) economy. Both in absolute terms and relative to regional peers, Philippine agriculture is experiencing slow output, productivity, and trade growth and limited structural and technological change. Downstream dimensions of the agri-food system, including agro-processing and the food services industry, appear to be exhibiting much greater dynamism than primary production or agricultural support services. This dynamic may lead Philippine farmers and agro-entrepreneurs to miss out on emerging market opportunities and expose the sector to a higher level of both production-related and commercial risk in the coming years. Recent shocks, including adverse weather events, outbreaks of foodborne illness and African swine fever, and the COVID-19 (coronavirus) pandemic, with its disruption of production and markets and the associated economic slowdown, all highlight the vulnerabilities of the Philippine agro-food system.

The new strategic vision for the agricultural sector is “a food-secure and resilient Philippines with prosperous farmers and fisherfolk.” This “New Thinking” for accelerating agricultural transformation recognizes both the limitations of and potential for the agricultural sector in the COVID-19 context (Figure 1). It includes a revised set of strategic goals and outlines priorities for government programs and spending. Operationalizing this vision will require considerable work on policy formulation and implementation. The strategies will be developed in five-year rolling plans, considering individual commodities and locations as well as the annual budget processes. This Advisory Services and Analytics (ASA) task was designed to provide critical support to the government in fleshing out the details and developing the roadmap for this process.

Objectives, Audience, and Scope of the Report

This report outlines policy and investment options to promote the development of a more diversified agriculture and food system that will enhance the welfare of the rural population and improve food security for the population at large. This approach would shift the strategic focus from rice self-sufficiency to nutrition security for all Filipinos through the development of an agricultural sector that is resilient, inclusive, competitive, and environmentally sustainable. Reflecting the government’s “New Thinking” for

² Agriculture, forestry, and fishing, value added (% of GDP).

agriculture, the options set out in this report are based on the paradigms of consolidation, modernization, industrialization, export orientation, and infrastructure development.

Figure 1: Food Security Development Framework of the Department of Agriculture, Philippines



Source: DA, May 2020.

The primary audience for the report is the community of policy makers and development practitioners involved in formulating and implementing agricultural policy in the Philippines, including the associated investment program. While the key agency is the Department of Agriculture (DA), the findings and the conclusions of the report should interest a number of other agencies and development partners. These agencies include, among others, the Department of Agrarian Reform (DAR), the Department of Trade and Industry (DTI), Congress, and development partners such as the Food and Agriculture Organization (FAO) of the United Nations, the International Fund for Agricultural Development (IFAD), the Asian Development Bank (ADB), and bilateral agencies working on agriculture and rural development.

In view of how the COVID-19 crisis is affecting agriculture and the national food system, the scope of this report was expanded to address immediate crisis management needs as well as longer-term measures for the social and economic recovery and reconstruction of the agri-food system in the wake of the crisis:

- *The short-term crisis response* includes measures that can be put in place immediately to minimize the pandemic’s adverse impacts on the health, food security, and economic well-being of the population. In the agri-food sector, these measures aim to (i) keep the supply chains for food open (from domestic sources and imports); (ii) ensure that farmers continue to have access to inputs and services to prepare for the next harvest; and (iii) prevent primary producers and workers along agricultural value chains from suffering devastating job and income losses due to measures intended to reduce the spread of the virus.
- *The longer-term recovery and rebuilding of the agricultural sector* ideally will make it more resilient, inclusive, competitive, and environmentally sustainable than before. Fortunately, the elements of

a good long-term strategy for agriculture and food coincide with most key elements of a post-COVID rebuilding strategy for the sector.

- *Because of the report's hybrid nature, some parts are more relevant to either the shorter or longer timeframe.* The report explicitly recognizes that some actions necessitated by the urgency of the COVID-19 threat could undercut rebuilding over the longer term if they were to be maintained. Chapter 4 deals mainly with the longer-term lessons of experience in other countries that have undertaken policy reforms and successfully achieved the agricultural transformation goals of the “New Thinking.”

Approaches and Methodologies

This report considers the major programs of the DA and trends in spending patterns over the last few years, although it is not a comprehensive review of agricultural policies and public expenditures, owing to a lack of data. Instead the report adopts two methodologies to derive conclusions and recommendations on programming and spending in agriculture. The first methodology is to use the experience of similar programs from other countries that offer more evidence to draw inferences regarding impacts and costs of programs and policies in the Philippines. The other methodology is to benchmark actual spending levels against the relative priorities indicated in the government’s “New Thinking” strategy.

To inform the “New Thinking,” with its potentially significant policy and institutional paradigm shifts, the study team reviewed and synthesized important international experiences. The review included examples of agricultural policy reform and a wide range of experiences geared toward fostering institutional development and innovation in thematic areas associated with consolidation, modernization, and industrialization in agriculture. For these examples, the team drew upon a range of recent regional and global studies done by the World Bank and other development partners. Many other middle-income countries, especially in Asia and Latin America, are facing similar challenges and opportunities in their agri-food systems, and the Philippines can also learn much from how these countries are addressing them.

This report comprises five chapters. Following this introductory chapter, Chapter 2 provides an overview of the agricultural sector, highlighting important trends over time, the current situation, and challenges. It includes information on production and market development, differentiation among regions, and the socio-economic condition of farmers. It also elaborates on how the pandemic has affected food markets—both domestic and global—and explores the implications for the crisis response in the Philippines.

Chapter 3 reviews programs of the DA and attached agencies, including the major “banner programs.” It describes the purposes of those programs, examines trends in allocations among programs, and where possible draws attention to ways of improving spending effectiveness. The analysis includes the recent supplemental spending allocation to respond to the COVID-19 pandemic, summarized in Box 1. At the request of the DA, a special in-depth analysis looks at programs supporting the extension system and suggests how they might best contribute to the new transformational agenda for agriculture and food.

Chapter 4 discusses policy reforms, institutional changes, and investments that have produced transformational change in the agri-food sector in other countries and explores how the Philippines can use lessons from these experiences. It presents examples of “big bang” episodes of reform that represent

large-scale strategic paradigm shifts, as well as more thematic micro-level reforms, both of which are necessary to catalyze transformational improvements in sectoral performance.

Chapter 5 presents recommendations for future policy directions. As noted, these recommendations include urgent policy responses to the pandemic and longer-term post-crisis policies to rebuild a sector that is stronger, more prosperous, and more sustainable than it was before.

Box 1: The Government of the Philippines responds to COVID-19 impacts on the agri-food sector

The Government of the Philippines rapidly enacted a host of measures to mitigate the damage arising from the COVID-19 pandemic and set the stage for recovery in the agri-food sector, including actions to:

- Promote commodity diversification to increase supply of nutritious food.
- Build the capacity of farmers and fisherfolk to process and add value to their produce.
- Link farmers to supply chains for government feeding programs and relief operations.
- Promote urban agriculture and community gardening.
- Strictly enforce national policy measures to ensure the continuity of agri-food production and the supply chains, including simplified procedures for the accreditation of “food lanes” for truckers/suppliers, listing of allowed food supplies, and allowed all farming and fishery activities (from planting to trading).
- Frequently monitor prices of food and other essential commodities, consistent with the Price Act.
- Use the Supply Chain Regulatory Impact Assessments and Supply Chain Analysis Dashboard to monitor and address supply bottlenecks across the country.

The DA also received a supplemental budget of some PHP32B to ramp up specific programs. Together, these actions seem to have been very effective so far in preventing major disruptions to the food supply chain and in minimizing negative impacts on the agri-food sector in general. Moving forward into the sector’s post-crisis recovery and reconstruction, it will be essential to recognize that some of the policy instruments required in times of crisis will not be cost-effective in achieving the government’s strategic objectives of agricultural growth and rural poverty reduction. Such policies may have unintended adverse consequences, such as crowding out private sector investments and other more efficient forms of public spending. Some design features can ensure that crisis-response policies are temporary in nature and can mitigate deleterious side-effects. Examples include:

- **Direct government provision or subsidy of inputs (including fertilizers, chemicals, seeds, mechanization services, soft loans).** This form of support is included in the government relief package. In an emergency, when normal markets are not functioning and farmers cannot procure inputs to prepare for the next harvest, it may be necessary for the government to provide inputs free or at subsidized prices. But global evidence from such programs indicates that they are not cost-effective ways of raising productivity in the longer term and have many negative collateral effects, including crowding out the development of the private sector input market and incentivizing environmentally harmful over-use. Any such programs initiated or expanded during the crisis should be terminated as soon as feasible, and authorizing decrees or legislation should include a “sunset clause” directing that they be terminated by a specific date, unless action is taken to extend them. Other methods of supporting farmers can be substituted, as discussed in Chapter 5.
- **Untargeted and undifferentiated across-the-board income support for producers.** Part of the government response to the crisis was to provide emergency payments to all farmers “across the board.” Some producers may suffer serious reductions in income as a result of a crisis like COVID-19, and they may need emergency income support comparable to that provided to workers in other sectors to compensate them partially when businesses are forced to shut down. But compensatory payments to producers should be designed keeping in mind that not all producers will lose equally, with some losing more than others. For example, if processing plants and transportation and distribution channels for raw materials and inputs are functioning reasonably efficiently, disruptions in supply chains for non-perishable products (for example, rice) should be minimal. Rice producers may even benefit from higher

global prices. Conversely, even relatively minor delays in transport and distribution—national or international—may seriously affect the livelihoods of producers of high-value products (such as vegetables, fruits, seafood, meats) and export products. Any payments to compensate for supposed income losses should go to producers who have demonstrably suffered such losses, or for whom there are good reasons to expect that they will.

- **Expanding the role for “Kadiwa ni Ani at Kita” to include direct commercial marketing activities.** Kadiwa is a market system that sells major agricultural goods at reasonably low prices to help poor Filipino households. The DA’s Kadiwa Program has been a good tool to facilitate marketing through its matchmaking functions, and its role has been expanded in the context of the enhanced community quarantine (ECQ). Kadiwa has been effective in bringing the harvest of producers to urban centers to serve urban consumers directly with fresh, affordable produce. This feat is performed at a high cost in transport and logistics shouldered by the DA, however. It cannot be sustainable in the long run, and risks crowding out private sector marketers. Post ECQ, the best option is for Kadiwa to withdraw from its role as a direct marketing agency and to focus instead on strengthening its role as the marketing facilitator between producer groups and the large-scale buyers: local governments (for their relief operations), public markets, and private businesses such as supermarkets, hotels, restaurants, and resorts. The Kadiwa online platform is already a good step in this direction by making it possible for e-platforms and e-commerce to support both producer groups and private traders.

Summary

This report is motivated by considerable evidence that the agri-food sector in the Philippines has not been performing up to its potential for many years now, and it has not achieved many of its expected objectives. The chapters that follow will analyze the reasons for this performance and identify ways to move forward with the “New Thinking” for developing and modernizing Philippine agriculture.

Philippine Agriculture: A Glass Half Full



Chapter 2. Philippine Agriculture: A Glass Half Full

Key Messages

As part of structural transformation, agriculture's share in GDP has been declining, but its growth in the past decade seems unusually weak, partly owing to low growth in productivity.

Geography has been a key driver of agricultural outcomes, more so in an era of climate change.

Landholdings have become even more fragmented, while mechanization continues to lag in the Philippines compared to other countries.

Agricultural households increasingly rely on non-farm sources of income to supplement earnings from farming.

Among agricultural households, poverty has been declining. Agriculture remains the biggest source of income, and cultivation of traditional crops remains the dominant agricultural activity.

The Philippines has adopted one of the world's most stringent quarantine measures in response to the COVID-19 crisis. These measures initially disrupted the food supply chain, but disruptions have been largely resolved. The more lasting concern is on the demand side, as the looming income contraction further reduces access by the poor to nutritious food.

Economy-wide and Sector Trends

Growth and structural transformation

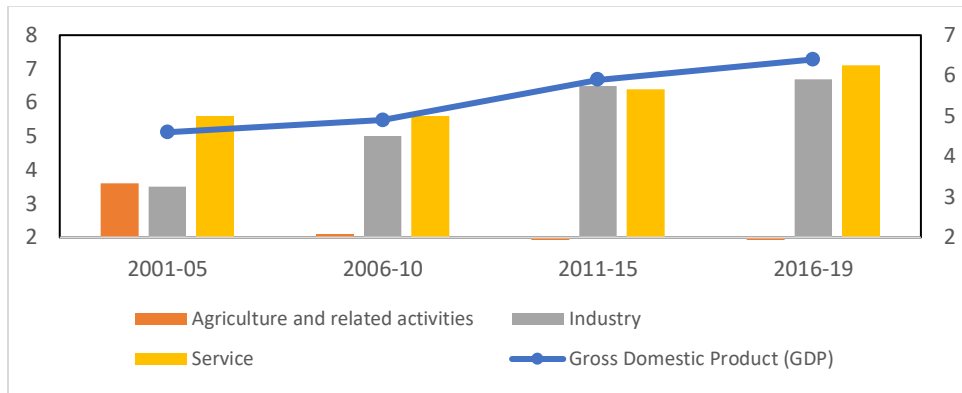
The Philippines has recently transformed into a dynamic emerging economy that sustained a growth trajectory of 6.4% between 2016 and 2019. Services and industry have grown much faster than agriculture since the mid-2000s (Figure 2), and the share of agriculture in gross domestic product (GDP) was just 9% in 2018. These trends are expected in transforming economies, but even so the performance of agriculture seems far from vibrant over the past decade. Growth in all sectors will of course be strongly affected by the pandemic, but it remains to be seen how the impact will vary by economic sector.

Growth in agriculture is held back by relatively weaker growth in total factor productivity. Total factor productivity (TFP) in agriculture is measured by growth in output, net of growth in inputs. For the past two decades, TFP has risen by 32% in the Philippines, which is much lower than TFP growth in neighboring countries such as Vietnam (73%), Indonesia (50%), and Thailand (67%).

Rice has long commanded more attention from policy than any other crop, benefitting from enormous budgetary support and protection through import restrictions—with underwhelming results. Massive infusions of support have delivered anemic growth in rice productivity over the past four decades. Around 1980, rice yields in the Philippines were close to the average in other Southeast Asian countries. Since then, lower growth in rice yields has caused the Philippines to fall farther and farther behind, which is a

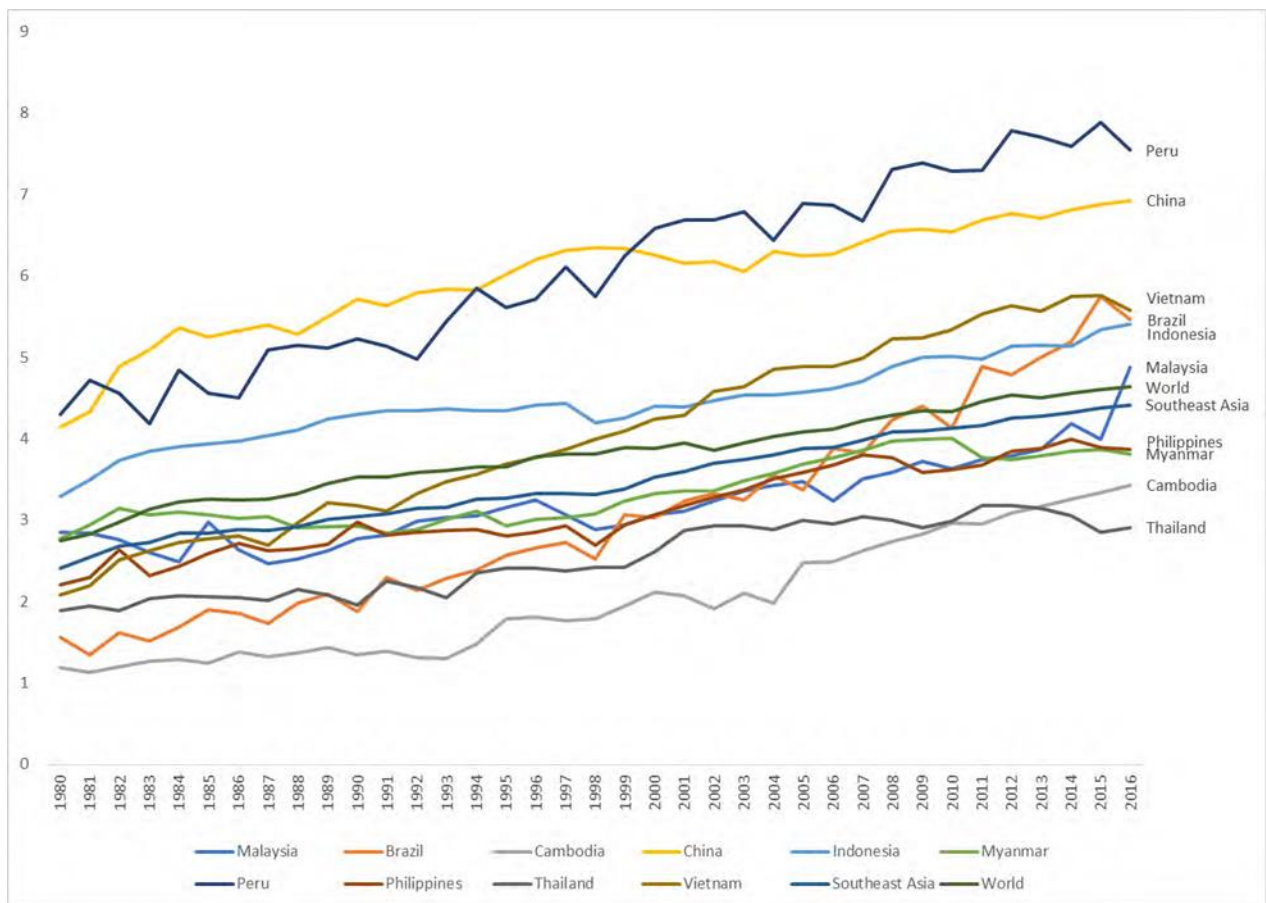
major reason why domestic rice production cannot compete with imports without significant support and protection (Figure 3).

Figure 2: Growth in GDP, in constant 2000 prices (%)



Source: Philippine Statistics Authority (PSA)

Figure 3: Rice yields around the world, 1980–2016



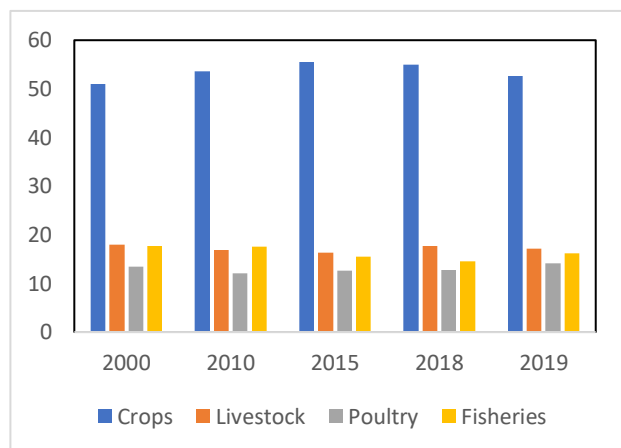
Source: FAOSTAT data for all countries other than Malaysia. Department of Agriculture data for Malaysia. Number for Malaysia 2016 is preliminary.

Diversification within agriculture

The diversification of agriculture is a long-standing policy goal in the Philippines, yet traditional crops still predominate. The share of traditional crops in agricultural output (by value) was 34.4% in 2018, even larger than the share in 2000 (31.4%) (Table 2). Even shares of non-crop agriculture—livestock, poultry, and fisheries—fell during that period, with the sharpest percentage point drop occurring for fisheries. Diversification to a broader mix of crops and livestock usually is a hallmark of transformation in agriculture. In the East Asia and Pacific region, economic development has been accompanied by a shift in the product mix from food staples to high-value crops, livestock, and poultry (Briones and Felipe 2013).

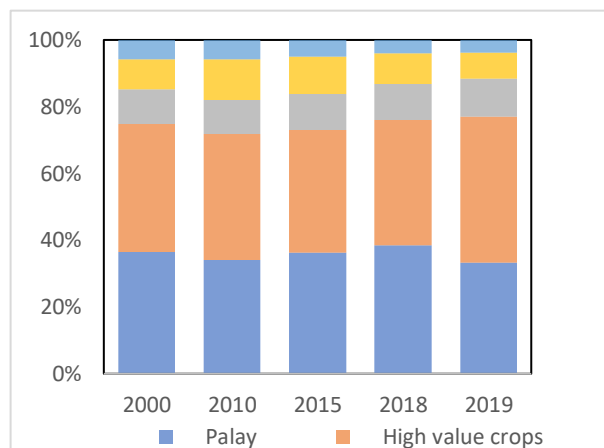
Legislative recognition of the need for diversification has not translated into a highly diversified agri-food sector. The High Value Crops Development Act of 1995 recognizes the pivotal role of high-value crops (HVCs) relative to traditional crops (*palay* or paddy, corn, coconut and sugarcane) in advancing major national socioeconomic goals. The objective of the act is the “development of agriculture in general to enhance productivity and incomes of farmers and the rural population, improve investment climate, competencies, and efficiency of agribusiness, and develop HVCs as export crops that will significantly augment the foreign exchange earnings of the country, through an all-out promotion of the production, processing, marketing, and distribution of high value crops in suitable areas of the country.” Despite this ambitious policy goal and the overall trend in developing Asia, the share of HVCs in agricultural output increased only slightly over the last two decades, from 19.6% in 2000 to 20.6% in 2018 and 22.9% in 2019 (Figure 4 and Figure 5).

Figure 4: Shares in value of total agricultural output, in constant 2000 prices (%)



Source: PSA

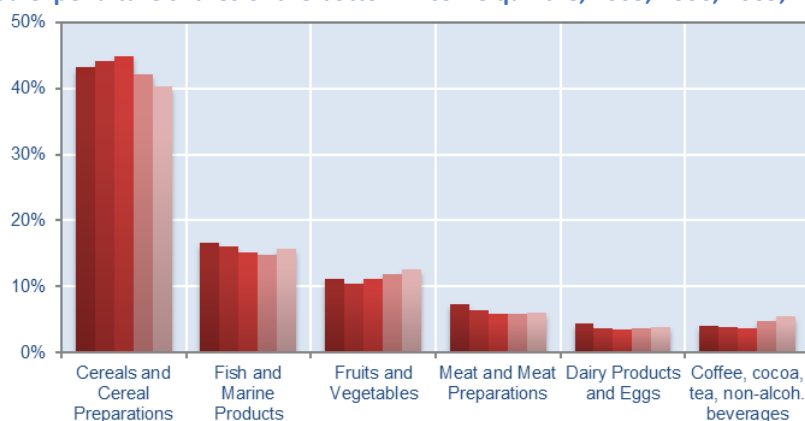
Figure 5: Shares in value of agricultural output (within crop), in constant 2000 prices (%)



Source: PSA

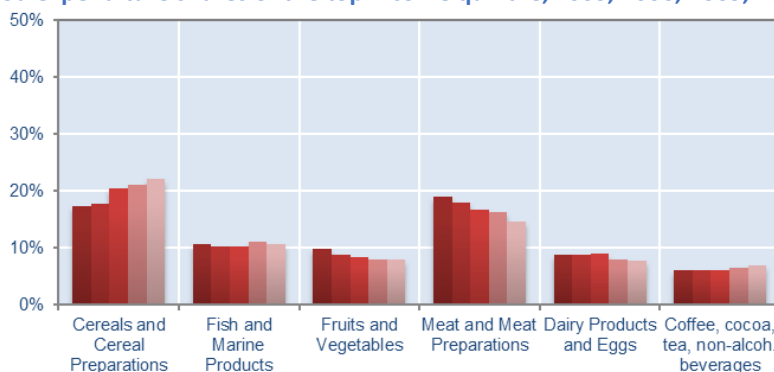
Consumption of cereals usually decreases with income growth in East Asia and the Pacific, yet this does not seem to be the case in the Philippines, even though the relatively high rice price should discourage rice consumption. Figure 6 and Figure 7 show food expenditure shares for the top and bottom income quintiles and their evolution over time. Higher-income households consume a more diverse array of foods—for instance, meat and dairy products feature more prominently in food purchases by the top income group.

Figure 6: Food expenditure shares of the bottom income quintile, 2003, 2006, 2009, 2012, and 2015



Source: OECD.

Figure 7: Food expenditure shares of the top income quintile, 2003, 2006, 2009, 2012, and 2015



Source: OECD.

No doubt social and cultural factors play a role in this consumption pattern, but economic factors are key: it is expensive for Filipinos to diversify their diets and include more nutritious foods. Most Filipino households could afford a calorically-adequate diet in 2015, but one-third could not afford a nutritionally-adequate diet (WFP 2015). Good nutrition is more expensive in urban areas; on average, urban consumers pay a premium of 10% for a nutritionally adequate diet compared to their rural counterparts. At the extreme, Metro Manila residents pay a 69% premium. Inadequate logistics (discussed later) is partly responsible for restricting the expansion of horticulture value chains, leading to subpar diets. The emerging trend of eating less food in the home and more food from restaurants and kiosks should offer opportunities to modernize food supply chains, develop agribusiness, and address requirements for safe and nutritious food.

Growth in agro-processing has been steady and strong. Unlike agriculture as a whole, food and beverage manufacturing has retained a fairly constant share of GDP since 2000, at about 10%. Despite weak links with primary production, the agri-food sector has maintained robust growth, keeping pace with overall income growth. Very recently, the dominance of traditional crops in agro-processing has begun to reverse.

Very recent signs have also emerged that HVCs are beginning to make a stronger contribution to diversification following rice market reforms. Between 2018 and 2019, the share of HVCs in agricultural output rose by 2.3 percentage points, and the shares of poultry and even fisheries made gains as well. The share of traditional crops experienced a small decline; the largest drop was for palay at 3.6 percentage

points. In 2019 passage of the Rice Liberalization Act (RA 11203) abolished the quota system for rice imports and opened the importation of rice to private traders, subject only to customs duties and sanitary and phytosanitary (SPS) regulations. Under the new act, the National Food Authority (NFA) is no longer responsible for regulating the rice sector and imports. Its role is now limited to domestic procurement of paddy from farmers and the maintenance of national rice buffer stocks as an emergency safeguard.

Rice is produced in irrigated and rainfed systems, but the bulk of production originates from irrigated systems (77% in 2019). Wet season production is higher than dry season production in both systems, and in 2018, 54% of the overall harvest was obtained during the wet season. The difference in wet season production and dry season production is vastly larger in rainfed systems (92% in 2018) than in irrigated systems (2% in 2018).

Compared to irrigated rice production systems, rainfed systems seem less resilient to economic shocks and at the same time are diversifying more rapidly into other crops. Following a steep drop in the palay price from 2018 to 2019, the annual rice harvest fell by 1.3% (Table 1). Output from irrigated systems rose slightly (0.8%) owing to a rapid recovery in the wet season of 2019, while output from rainfed systems

declined sharply, contracting by 11.3% in the dry season and another 6.1% in the wet season. Based on this evidence, it appears that in comparison to irrigated systems, rainfed systems are far less resilient to economic shocks, especially in the dry season. Furthermore, diversification out of rice into other crops has happened faster in rainfed systems.

Table 1: Palay harvest by type of production system and season, 2018–19 (000 tons)

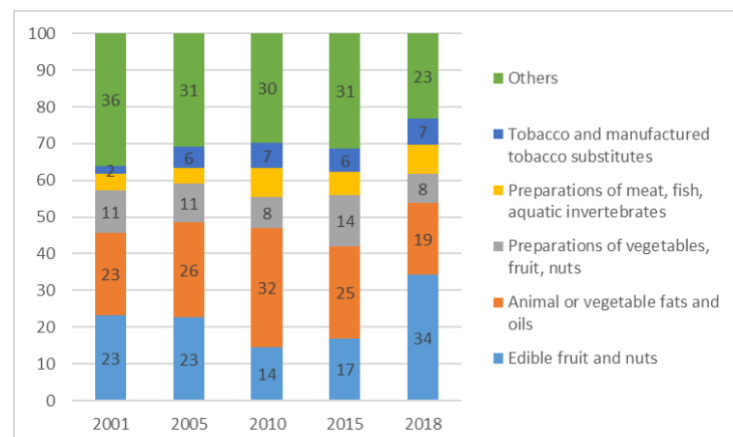
	Irrigated system	Rainfed system	All systems
2018			
Annual	14,348	4,718	19,066
Dry season	7,098	1,616	8,713
Wet season	7,250	3,103	10,353
2019			
Annual	14,469	4,346	18,815
Dry season	6,837	1,433	8,269
Wet season	7,632	2,913	10,545
Change (%)			
Annual	0.8	-7.9	-1.3
Dry season	-3.7	-11.3	-5.1
Wet season	5.3	-6.1	1.9

Source: PSA.

Agricultural exports in the Philippines are driven by HVCs, but the country lags its regional peers in overall export performance, with the exception of strong performance in exports of processed foods. Export demand is a key driver of agricultural growth. Exports are heavily concentrated in

HVCs (especially fruits) as well as meat and aquatic products (Figure 8). The composition of exports has changed somewhat among commodity groups. Edible fruits and nuts now exceed one-third of agricultural exports (up from a 14% share in 2010), and fats and oils (mostly coconut oil) are down to 19% from over one-fourth in 2005. Also striking is the expanding share of tobacco in agricultural exports. But in overall growth of agricultural exports, the Philippines lags neighboring

Figure 8: Shares in agricultural exports by commodity group, 2001–18 (%)



Source: Trademap.

countries such as Vietnam and Indonesia, which have posted 12% annual export growth compared to the Philippines at 7.6%. By 2017, total agri-food exports of the Philippines were just over US\$5B, whereas Indonesia had US\$34.5B. Thailand exports six times more than the Philippines, and Vietnam exports over five times more. One positive note is the country's exports of processed food (such as cereal). At 30.5%, the Philippines has one of the highest shares of processed food in agricultural exports across the region; only Thailand has a higher share (46%). Accelerating the shift of cropped area from traditional crops to HVCs will likely enable agricultural exports to grow faster.

Logistical constraints to competitiveness

Weak logistics systems place Philippine agriculture at a competitive disadvantage. Given that the country is an archipelago, logistics is more challenging for the Philippines than for many other countries. A major logistics study for rural Mindanao (World Bank 2019) provides an analysis that is applicable to the rest of the country. At the national level, the Philippines performs below regional neighbors on various measures of logistics effectiveness (Table 2). The country ranks lower than Thailand and Vietnam in terms of trading across borders and has the lowest liner shipping connectivity compared with these countries and Indonesia. Philippines has the lowest regional ranking in terms of overall logistics performance.

Table 2: Comparative statistics on logistics effectiveness, the Philippines and neighboring countries

Statistic	Thailand	Indonesia	Philippines	Vietnam
Logistics Performance Index Ranking (2018)	32/160	46/160	60/160	39/160
Liner Shipping Connectivity Index (2017)	41.0	40.9	25.0	65.61
Trading Across Borders Ranking (2020)	62/190	116/190	113/190	104/190

Source: World Bank and UNCTAD.

Note: Higher numbers imply worse performance.

Poor transport connectivity is especially problematic for producers of fruits, meats, and other HVCs. Because of high logistics costs, rice and maize farmers prefer that traders pick up their products and do not pursue higher prices by delivering their products directly to buyers. Transportation costs can rise by an additional 71% during the rainy season. The lack of internal connectivity (the need to load and unload between ships and trucks or rail) results in double handling, food wastage, and failure of product consolidation, leading to higher per unit transport and handling costs. Companies that manage to solve these problems through large-scale operations and vertical integration gain an advantage over unorganized smallholders, sometimes developing a globally successful agribusiness (examples include Dole and Del Monte, both based in Mindanao).

Food safety is a continuing challenge

Food safety problems reflect the growing strains on food systems throughout emerging Asia. Food systems are laboring to adapt to urbanization and other demographic changes, in addition to consumers' shifting dietary preferences (toward animal products, processed foods, and eating outside the home), the intensification of agricultural production, and longer supply chains. These megatrends interact with other factors such as intense competitive pressures, supplier and consumer knowledge gaps, and inadequate regulatory enforcement capacities. The region's diverse food safety problems stem from environmental hazards (contaminated soil and water); poor hygienic conditions and practices in farms, markets, and food

facilities; the improper use of fertilizers, pesticides, and antibiotics; and unsafe food-handling and preparation practices by vendors and consumers.

Countries throughout emerging Asia are experiencing rising levels of foodborne illness, with growing public health and economic costs, and rising levels of consumer distrust. The Foodborne Disease Burden Epidemiology Reference Group (FERG), which is affiliated with the World Health Organization, estimated that the countries of emerging Asia experienced 270 million cases of foodborne illness in 2010, resulting in short- or longer-term health complications and some 225,000 deaths.

In the Philippines, as elsewhere, recorded food illness outbreaks—associated with food canteens, restaurants, and so on—represent the very small tip of the iceberg of actual foodborne illness. Specific data on the Philippines are not available due to severe limitations in its food safety surveillance and foodborne illness reporting systems. The main information available comes from reported outbreaks of illness, either officially recorded or reported in the media. Azanza et al. (2019) summarize the information for 319 foodborne illness outbreaks, affecting just under 14,000 people, between 2005 and 2018. Remarkably, the microbiological or chemical cause of nearly 90% of these cases was found to be unknown. Most cases occur without people visiting a doctor or local clinic, and most of the time when individuals consult medical professionals, the illness is not attributed to contaminated food.

The costs of foodborne illness are high in the Philippines, and the risks appear to be highest for animal-sourced foods. Given the Philippine diet, population, environmental health conditions, and what is known about food hygiene in market places and among food service operators, and drawing upon estimates for countries with comparable conditions, it is estimated that the Philippines experiences some 8–9 million cases of foodborne illness each year, with 3,000–4,000 cases resulting in death. Taking into account the country's per capita income, foodborne illness translates into an annual “productivity loss” (due to lost work, disability, and premature death) of just over US\$1.5 billion. Azanza et al. (2019) found that different types of foods were responsible for the outbreaks of foodborne illness that they assessed. Meat and meat-based dishes appear to be an especially common source of illness, which Azanza et al. attribute to disruptions in the meat supply chain, the presence of many unofficial/illegal slaughterhouses, and the common phenomenon of unregistered establishments supplying “hot meat” of compromised quality. Fish and seafood dishes are also common sources of illness due to the presence of toxins and lack of proper storage or clean water and ice. Food safety risks can be especially high for meat and fish sold by street food vendors or very small restaurants, which commonly encounter problems maintaining hygienic conditions and adequate storage and temperature controls. Indeed, FERG estimates that animal-sourced foods are responsible for some 55% of foodborne illnesses in the Philippines.

Socioeconomic Trends

Non-farm income is now the biggest source of household income, although agriculture continues to be important in the more remote provinces. Table 3 presents average household income by source for 1991 and 2012. Households are categorized into residents of “near” provinces that are 110 kilometers or less from the nearest Metropolitan Center for Luzon and Mindanao (120 kilometers for Visayas) and residents of all other provinces, which are “Remote.” A Metropolitan Center is Metro Manila, Cebu City, or Davao City. Across all types of households, income from agriculture (both entrepreneurial income and wages) was already just 7% in 2012, down from 12% in 1991. Shares of agricultural income tend to be much larger

in remote provinces compared to near provinces, whether in 1991 or in 2012, although the share of agricultural income dropped more in remote provinces than in near provinces.

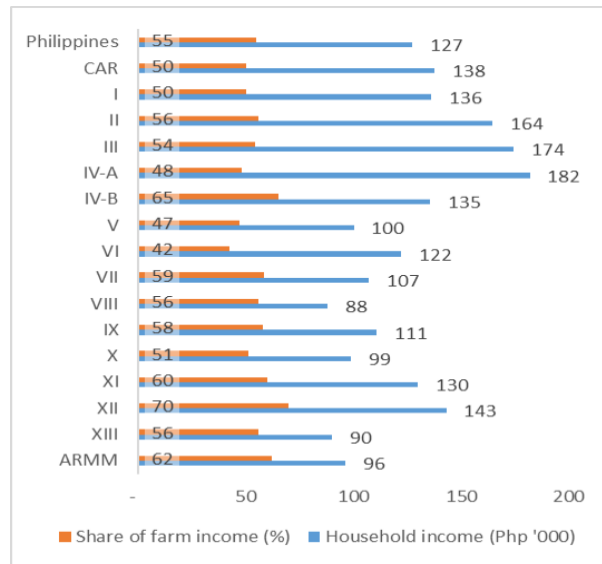
Among agricultural households, however, farming contributes the majority of household income—more so in lower-income areas. Figure 9 presents data from the Survey of Socioeconomic Characteristics of Farmers of 2012 (reference year 2011). The sample consists of 19,775 agricultural households, identified in the 2007 Census of Population as having at least one member of working age whose primary occupation is crop farming and/or livestock/poultry raising. Nationally, agriculture accounts for 55% of the income of agricultural households, which means that non-agricultural activity accounts for a sizable portion (45%) of their income. Agriculture provides 58–70% of agricultural household income in Mindanao. The average agricultural household income across regions is only PHP111,000, compared to the national average of PHP127,000. Meanwhile, in mainland Luzon, the share of agriculture in the incomes of agricultural households ranges from a low of 48% in IV-A (the region with the highest agricultural income) to a high of 56% in II, just above the national average. Agricultural households in mainland Luzon earn 17% more than the national average across regions.

Table 3: Average household income by income source and distance from a metropolitan center, 1991 and 2012

	Philippines		Near provinces		Remote provinces	
	1991	2012	1991	2012	1991	2012
Household income (US\$ 2005 PPP)	2,460	5,475	3,295	6,618	1,562	3,902
Sources of income (%):						
Agricultural wages	7	5	5	3	12	9
Crop and livestock income	5	2	3	1	11	5
Non-farm wages	65	66	70	71	54	56
Self-employment	4	3	4	3	4	4
Foreign remittances	15	17	15	17	13	17
Domestic remittances	4	7	3	5	5	10

Source: Quimba and Estudillo 2018.

Figure 9: Share of farm income in total income of agricultural households, 2011

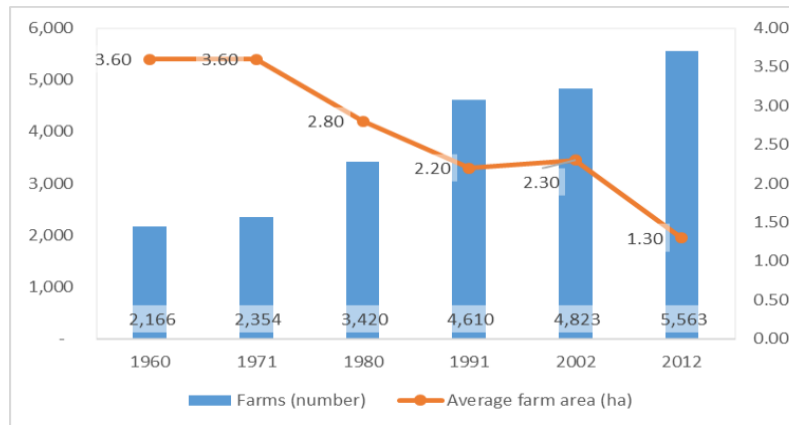


Source: BAS 2013.

Landholdings are now severely fragmented. Burgeoning population growth breaks up farms into small holdings, and many agricultural households have been compelled to rely heavily on income outside of agriculture because their farms are miniscule. Time-series data from various Censuses of Agriculture show the gradual evolution of the farm population and farm sizes over time (Figure 10). The blue bars (which correspond approximately to the number of agricultural operators) have been rising over time—in fact, they have risen more than two-and-a-half times over a span of five decades.³ Given the scarcity of land, farm size has diminished from an average of 3.6 hectares (ha) in 1960 to just 1.3 ha in 2012. As explained previously, their very small holdings place smallholders and small-scale fisherfolk at a disadvantage in linking to markets.

³ The blue bars correspond to the number of farms/holdings, where a “holding” is defined as “a piece or pieces of land used wholly or partly for any agricultural activity (i.e., growing of crops, tending of livestock and poultry, etc.) and operated as one technical unit by one person alone or with others regardless of title, legal form, size, and location.” A “holder” is “a civil or juridical person who exercises management control over the agricultural operation of a holding and takes major decisions regarding resource use.” However, holders are overwhelmingly natural persons or agricultural operators; in 2012, the number of agricultural operators was 5.56 million or 99.9% of all holders.

Figure 10: Number of farms/farmers and average farm size (ha), 1960–2012

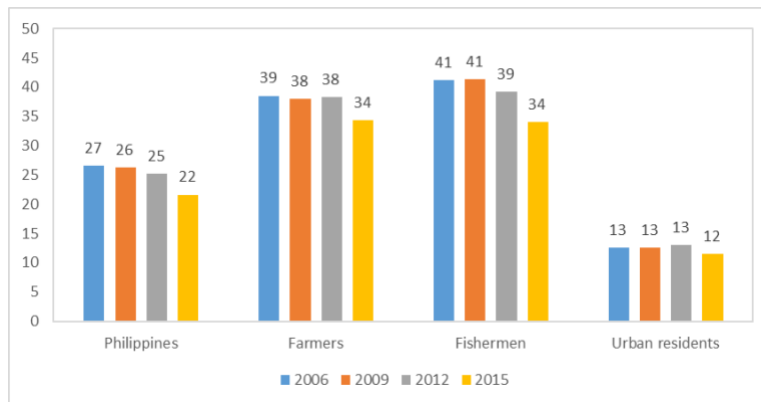


Source: PSA Openstat.

The fragmentation of landholdings would not have been so severe if land markets had been functioning properly, because markets would have naturally led to some consolidation. The land ownership ceiling (5 ha) imposed by the Comprehensive Agrarian Reform Program (CARP), together with the dysfunctional land administration system, hinder an active market for agricultural land from operating.

Even as poverty has fallen, farmers and fisherfolk remain among the poorest members of society. The increase in household income shown in Table 3 is consistent with reductions in the incidence of poverty over time nationally. Similarly, Figure 11 shows that poverty fell from 27% to 22% between 2006 and 2015.

Figure 11: Poverty incidence (%) by basic sector, 2006–15



Source: PSA

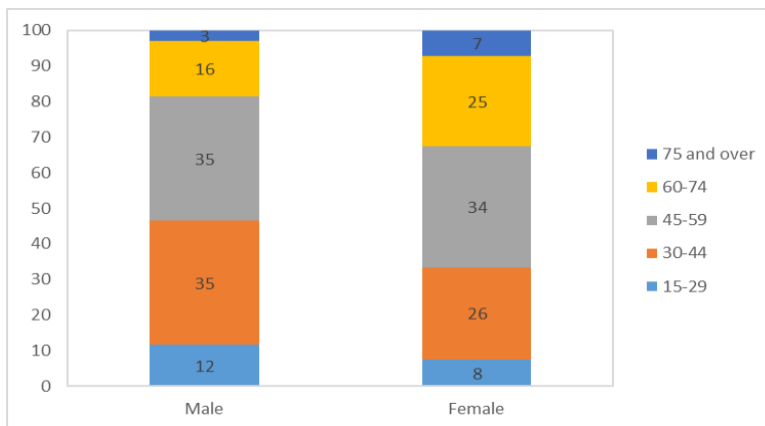
Poverty among farmers and fisherfolk declined at a similar or even faster rate—by 5 percentage points for farmers and 7 percentage points for fisherfolk. Yet as of 2015, the incidence of poverty among farmers and fisherfolk was still far higher than the national average, and nearly three times greater than poverty among urban households.

Filipino farmers are mostly male, in their late 40s. The Census of Agriculture and Fisheries 2012 (conducted in February–April, 2013)

classifies agricultural operators (in crop and livestock farming, aquaculture, and fisheries) by sex and age bracket (Figure 12). Male operators account for 89% of operators, and their median age is 46; the median age of female operators is 52, for a median age of 47 for all operators. Close to one-third of female operators are in the senior age group (60 and above), whereas only 19% of males fall within that group. Females often outlive their spouses, thereby acquiring control of the family farm upon the demise of the male head. Note that nearly half of male agricultural operators (47%) are 44 years old or younger. These

data contradict widespread estimates (circulating from 2013 onward) that the average age of Filipino farmers is 57 years.⁴

Figure 12: Distribution of agricultural operators by age bracket (%)



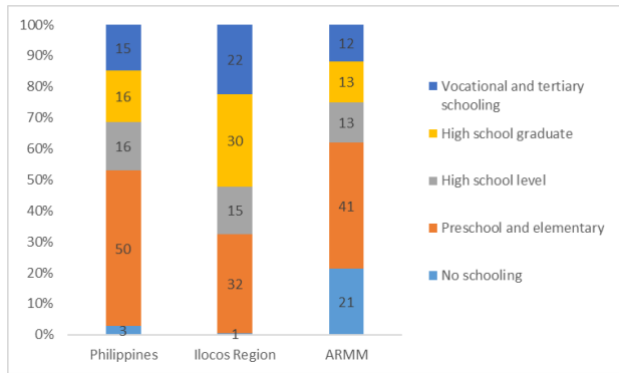
Source: PSA Openstat.

Most Filipino farmers have not completed high school, although 53% have completed primary school and 69% have had some secondary schooling. Figure 13 shows the large variation in farmers’ educational attainment across regions of the Philippines. The region with the largest proportion of unschooled farmers (21%) by far is the Autonomous Region in Muslim Mindanao, an area with a legacy of widespread conflict and disruption of daily life. In Region I (Ilocos Region), only 1% of farmers have never attended school, and 30% have completed high school, which is nearly double the national average.

Paddy farmers tend to be older than the average farmer and to have many years of experience. The Philippine Rice Research Institute (PhilRice) estimates that the average age of paddy farmers was 54 years in 2012 (Figure 14). Their farming experience is understandably high (28 years on average) and level of schooling (8 years on average) is low (culminating in the second year of high school under the previous K–10 system). These indicators are nearly identical across production systems. More irrigated rice farmers belong to a farmer organization (56%) than rainfed farmers (37%), probably because irrigation management normally involves formal membership in an irrigators’ association. Across systems, the share of rice farmers who are members of a farmer organization is 51%.

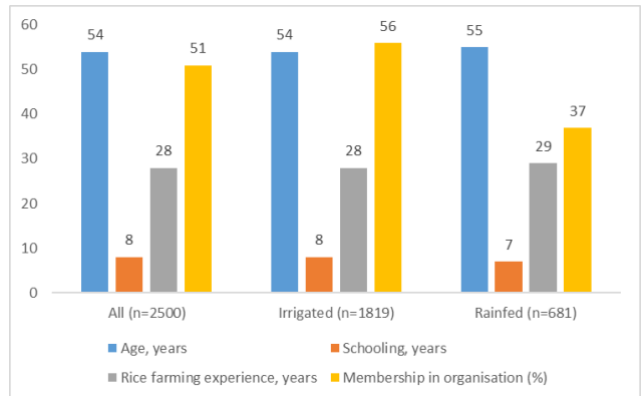
⁴ See for example, the explanatory text of House Bill 5336. http://congress.gov.ph/legisdocs/basic_17/HB05336.pdf.

Figure 13: Distribution of farmers by educational attainment, Philippines, selected regions



Source: BAS

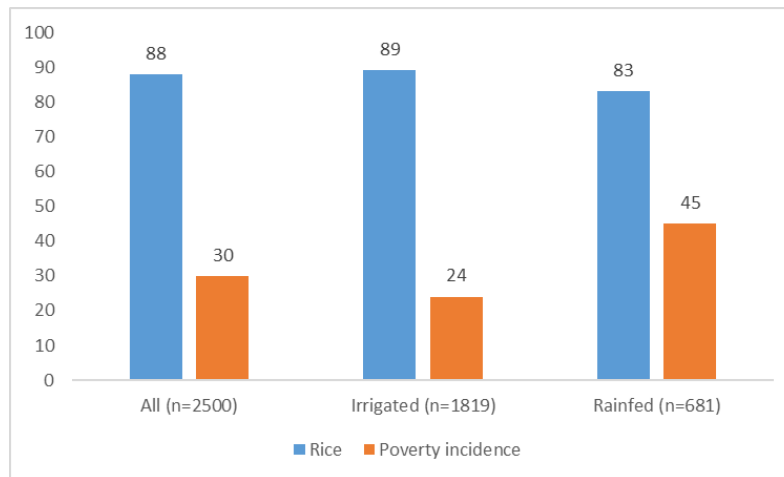
Figure 14: Indicators for palay farmers, by production system, 2012



Source: PhilRice

Paddy farmers in irrigated and rainfed systems derive most of their income from paddy, but paddy farmers in rainfed areas are much poorer (Figure 15). The dependence on income from paddy is in fact higher among irrigated farmers, who derive close to nine-tenths of their income from palay, than among rainfed farmers, who derive 83% of their income from palay. The overall incidence of poverty among paddy farmers in 2012 was 30%, lower than the average for all farmers (38%) (PSA data), but that is because poverty is low among paddy farmers in irrigated systems. Paddy farmers in rainfed systems have an extraordinarily high level of poverty (45%).

Figure 15: Income indicators of palay farmers, 2012 (%)



Source: PhilRice

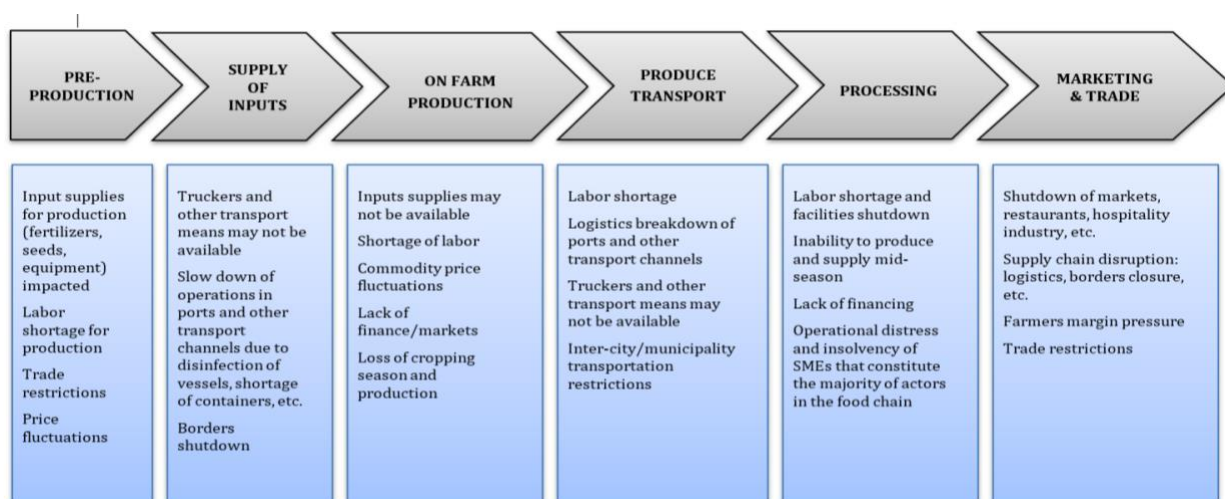
The COVID-19 Pandemic and Philippine Agriculture

The novel coronavirus disease, later known as COVID-19, was first reported in China in late 2019 and classified as a pandemic by the World Health Organization in March 2020. By April 25, about one-third of the world's population was living under government-imposed mass quarantine measures.⁵

In the Philippines, the government moved from declaring a community quarantine (CQ) in Metro Manila on March 12 to declaring an enhanced community quarantine (ECQ) on March 16 on the Luzon island group as the number of COVID-19 cases began to spiral. The Luzon island group is home to about 62 million people or 57% of the national population. The ECQ has entailed a suspension of economic activity, except for essential sectors; a skeletal work force and social distancing restriction in the permitted sectors; a prohibition on public transportation; and a stay-home order on all quarantined persons unless they are accessing basic necessities and health services, also subject to movement restrictions and social distancing. The ECQ has also been applied in some cities and provinces outside Luzon, and other jurisdictions have applied the general CQ.

Food production and food marketing are treated as essential sectors or activities. Dine-in food service may be temporarily prohibited, but food purchases and deliveries are typically allowed. The essential status of the agri-food system does not mean that the food supply chain has been free of disruptions, however. On the contrary, it has undergone severe disruption because of the movement restrictions associated with CQs (Figure 16). Many countries have experienced similar disruptions in their food supply chains as they restricted movements of people and goods to contain the spread of COVID-19.

Figure 16: Food supply chain disruptions related to COVID-19



Source: World Bank.

The Philippines has mostly succeeded in sustaining functional food supply chains. Food supply chains are only as strong as their weakest link, and the initial problems and uncertainties on the supply and demand side have largely been addressed. Among the most effective measures has been the “food lane

⁵ <https://www.businessinsider.com/countries-on-lockdown-coronavirus-italy-2020-3>.

pass,” which permits suppliers and truckers to pass freely through checkpoints (subject only to verification of documents and a quick health check). The pass is extended to food, whether fresh or processed, and inputs required to produce food, such as feed, seed, and fertilizer.

Beyond supply chain disruptions, the longer-lasting effects of COVID-19 are likely to be felt on the demand side. It is highly likely that the collapse in output and employment following the economic lockdown will have knock-on effects on demand, including demand for food. The widespread loss of income and employment threaten an already precarious food security and nutrition situation. A survey by the National Economic Development Authority (2020) shows that 60% of companies shut down completely during ECQ; one-quarter of the companies surveyed had to lay off workers. Even if quarantine measures are lifted, it is unclear how many businesses will resume and how many workers can resume their previous jobs.

The Philippines has started to distribute cash aid targeting 18 million households under the Bayanihan Heal as One Act, which was enacted at record speed during the ECQ. The local governments (LGUs) within Metro Manila and some other areas under ECQ have begun to distribute food packs to quarantined residents. Many other countries have also initiated or ramped up existing income support mechanisms for vulnerable households. Judging from experience, the most effective way to manage this support is through direct cash transfers where they are feasible. This measure has been adopted in almost all East Asia and Pacific countries. Judging by the extent and depth of the economic collapse, however, both domestically and worldwide, these transfers are far from sufficient.

Summary

This chapter set the stage for the analysis that follows by looking at important historical trends in the agri-food sector over time, as well as at key indicators of the current condition of the sector and rural population, pointing to areas of concern for policy makers. The chapter has also briefly discussed how the COVID-19 crisis is affecting the agri-food system, including food markets, because the effects of this rapidly evolving crisis will be an integral part of the context in which the strategy for Philippine agriculture plays out.

Legacy Programs and Their Limitations for Agricultural Transformation



Chapter 3. Legacy Programs and Their Limitations for Agricultural Transformation

Key Messages

The composition of the budget for agriculture, including the DA's banner programs, suggests an unswerving focus on primary food crops to meet basic food security. The continued emphasis on self-sufficiency has limited the choices available to producers.

Land consolidation, modernization, and industrialization—major policy goals reflected in the “New Thinking”—are only partially reflected in the Philippine portfolio for agriculture. Market support, research and development (R&D), and extension services for non-traditional value chains continue to be lesser investment priorities.

The delivery of extension services in the Philippines is not organized optimally. The current system inhibits the demand-driven provision of services to all farmers and fishers in an inclusive, adequate, integrated, coherent, sustainable, and timely way.

Well-targeted agricultural support programs, such as the Philippines Rural Development Project (PRDP), offer promising approaches to support sector transformation. The mainstreaming of such approaches throughout agriculture programming will be essential to the overarching success of agricultural transformation in the Philippines.

The Philippines has a number of “banner programs” designed to support specific agricultural commodities and activities regarded as priorities for development and the food supply. In their current incarnation, banner programs focus on providing support services for rice, corn, HVCs, livestock, organic agriculture, and halal food (Box 2; for more detail, see Annex 1). The services encompass production support, market development, extension support, R&D, irrigation network services, farm-to-market road network services, regulatory services, and agricultural machinery, equipment, and facility support services.

Box 2: Commodity-based banner programs of the Department of Agriculture

National Rice Program. This banner program aims to uplift the lives of Filipino rice farmers based on the four guiding principles of the government's Agri-Pinoy (Agrikulturang Pilipino) strategy: sustainable agriculture and resource management, food security and self-sufficiency, broad-based local partnerships, and support services from farm to table.

Corn Program. This banner program aims to support and hasten the expansion of hybrid corn, cassava, and other feed crops to make domestic livestock and poultry production more competitive with cheaper inputs, to generate rural jobs, and to achieve self-sufficiency in food and feed. The program promotes cost-reducing and productivity-enhancing technologies for corn and cassava, seeks to ease pressure and demand on rice by promoting white corn as a nutritional substitute, has targets for increasing corn and cassava yields, and also prioritizes increasing the incomes of corn and cassava farmers.

High-Value Crops Development Program (HVCDP): Pursuant to the High-Value Crops Development Act (1995), the HVCDP aims to advance food security and sustainable growth by achieving self-sufficiency in high value crop (HVC) production through promotion, production, processing, and marketing support.

Livestock Program: This program stimulates the rural economy to increase livestock production and ensure that livestock products are available, accessible, and affordable. The program supports those objectives by promoting the development of livestock enterprises and scaling up livestock and poultry production in compliance with environmental standards.

Organic Agriculture Program: This program is designed to increase national and international awareness and support for Philippine organic products and contribute to overall agricultural growth through improved competitiveness, sustainability, and food security based on farming practices with significantly reduced utilization of external inputs and chemical fertilizers, pesticides, and pharmaceuticals. The program envisions that organic farming will be practiced on at least 5% of Philippine agricultural land.

Halal Food Industry Development Program: This program aims to make the Philippines an active player in international markets for halal products.

The legacy policies and approaches of reflected in the banner programs present challenges for operationalizing the significant shifts in policy and institutional paradigms under the “New Thinking.” To understand the institutional context in which those challenges play out, this chapter reviews the recent evolution and performance of the main programs and policies of the DA, as well as reforms that have attempted to consolidate, modernize, and industrialize the agri-food sector. It uses a simple “strategy assessment” approach to understand the extent to which current budgetary support for DA programs is consistent with achieving the broad sectoral goals, objectives, and development outcomes articulated by the “New Thinking,” and taking the effects of the pandemic into consideration.

The Challenges of Legacy Agriculture and Shifts toward Reform

Since the 2000s, reviews of agricultural policy, programming, and public expenditure have consistently shown how legacy policies constrain the effectiveness of agriculture programming and expenditure. Two prime examples are the reliance on input subsidies to achieve the aims of banner programs, and the persistent bias toward rice self-sufficiency (Box 3).

Attempts to change the status quo by shifting support to targeted core functions of the DA, such as enhancing agricultural productivity, incomes, investment, and environmental services, made little progress. For example, during the Arroyo administration in 2004, the government entered into a loan agreement with the World Bank Group to undertake a Diversified Farm Income and Market Development Project, to be implemented by the DA. The project was designed to reform DA expenditure programming (with its heavy emphasis on banner programs) by strategically allocating budgetary resources toward core DA functions and supporting service delivery for market development. By 2010, the project was terminated, with many of its objectives unattained. Legacy policies and objectives remained embedded in programming for agriculture. As noted in the Project Completion Report:

- The rice price crisis of 2008 had strengthened the government’s resolve to achieve rice self-sufficiency through market price support for rice farmers, as well as generous production support.

- Rather than shift budgets toward core functions, the DA doubled down on the status quo. About 70% of the DA’s operational budget continued to be channeled to banner programs for production support based on input subsidies. Banner program coordinators determined how much budget to allocate to functional units of the DA to implement core activities, perpetuating a cycle of bargaining by implementing agencies to finance core functions.
- The Department of Budget and Management failed to impose various budget disciplines on the DA, such as adherence to committed major final outputs and tighter integration between planning and budgeting.

Box 3: Key findings on agriculture programming and expenditures

Reviews and assessments of broad agricultural policy and specific expenditure policies of the DA[†] have consistently identified the following issues that limit the effectiveness of agriculture programming and spending in the Philippines:

- **Reliance on input subsidies to support production under the banner programs.** Agricultural expenditures for these programs focus on subsidies that are economically distortionary and fiscally onerous. Meanwhile, key public goods, such as R&D and technology dissemination, are severely under-resourced.
- **Policy bias toward rice self-sufficiency.** The allocation of public expenditure reflects the considerable priority assigned to traditional crops under key banner programs. The overwhelming emphasis is on rice, in pursuit of self-sufficiency in this staple food.
- **Absence of meaningful performance indicators.** Expenditure programs tend to focus on the delivery of easily measured outputs and services, but a deeper assessment of the actual outcomes and impact of these expenditure programs is lacking.
- **Dysfunctional land markets.** The prolonged implementation of CARP and its attendant disincentive effects have constrained the participation of private capital in agricultural development.

[†] These studies are summarized in the two most recent agricultural public expenditure reviews: World Bank (2007), “Philippines: Agricultural Public Expenditure Review,” Washington, DC; and OECD (2017), “Agricultural Policies in the Philippines,” Paris.

The next administration (2010–16) made key changes in expenditure policy, but spending support to rice continued to predominate. Some types of input subsidies were eliminated, such as the program that provided subsidized seed and fertilizer for hybrid rice. Input subsidies remained in place, with subsidies for farm mechanization becoming increasingly prominent (OECD 2016). The self-sufficiency program expanded under the Food Staples Sufficiency Program (FSSP), further intensifying the programmatic bias toward rice. To understand the extent of the emphasis on rice, note that the expenditure on rice was about 60–73% as large as the allocation for the DA and its attached corporations from 1995 to 2015. Some of the expenditure on rice has been explicit—the National Rice Program has consistently enjoyed the largest allocation among the banner programs—and some is implicit (the heavy support for irrigation). Some improvement was observed in 2015–17, when the share of expenditure on rice fell to 50%, although this share is still vastly disproportionate to the contribution made by rice to agricultural gross value added (18%) (Ponce and Inocencio 2017).

Despite expenditure reform and eventual adoption of the major final output format of the Department of Budget and Management, many features of DA expenditure policy remain unchanged. Funds

continue to be concentrated in the DA Office of the Secretary (OSec) and channeled to the banner programs to support production and pursue output targets. Results-based management remains tied to easily quantified output indicators, rather than more meaningful outcomes and impacts. Not surprisingly, service delivery remains ineffective, plagued by weak internal controls that encourage leakage (Briones 2013; Oliveros 2015). This finding seems empirically borne out by the lack of a statistical relationship between DA expenditures (apportioned to the regions) and regional agricultural output. In contrast, there is a significant and positive relationship between DAR expenditures and regional agricultural output (Limlengco 2018).

Under the current administration (2017 onward), a brief overview of the budget shows that resources remain overwhelmingly concentrated within OSec and banner programs. The administration enacted a landmark reform—the Rice Liberalization Act (RA 11203)—and seeks to develop a competitive rice sector within a diversified agri-food system rather than focusing on rice self-sufficiency alone. Yet 82% of the PHP62.3B budget of the DA remains concentrated with the OSec as of 2020 to support its banner programs and special projects.⁶ The OSec allocates resources to various programs as shown in Table 4. Under programs 1 and 2, subprogram resources flow through the banner programs, except for the Farm-to-market road subprogram, which is distributed to “Key Production Areas.” Figure 17 is a snapshot of

Table 4: Resource allocations to agriculture programs by OSec, 2020

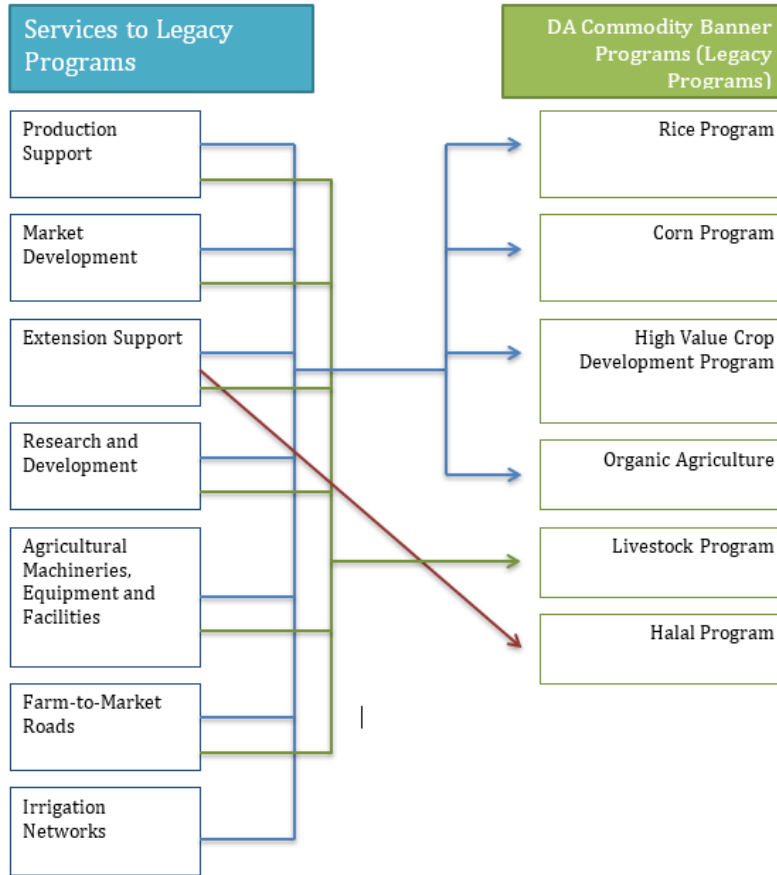
Program	Allocation (% share in the OSec operations budget)
(1) Technical and Support Services Program (24%)	24.0
Production support subprogram	
Extension support, education, and training subprogram	
R&D subprogram	
(2) Agricultural Machinery, Equipment, Facilities, and Infrastructure Program	29.0
Provision of agricultural equipment and facilities	
Irrigation network services subprogram	
Farm-to-market road subprogram (22%)	22.0
(3) Agriculture and Fishery Policy Program (0.1%)	0.1
(4) Agriculture and Fishery Regulatory Support Program (3%)	3.0
(5) Locally-funded and Foreign-Assisted Program	44.0

DA’s programmatic approach, through which a substantive part of legacy policy is implemented. The right-hand side shows DA-supported commodity banner programs, which absorb close to 50% of budgetary support (see Annex 1 for details). The services supporting commodity banner programs are presented on the left-hand side. A simple matrix (Annex 2) of programs supported by the DA—the banner programs, locally funded and foreign-assisted programs, and programs under DA-attached agencies and bureaus—suggests that although the banner

programs are less dominant than before, their influence will remain significant in terms of the resources available to support the shift to agricultural transformation envisioned under the “New Thinking.” The next section reviews recent trends in public financing and investment for agriculture, including resources to support the pandemic response, to provide a more comprehensive view of the investment context for agricultural transformation.

⁶ The remaining 18% is apportioned among the attached agencies, together with the Bureau of Fisheries and Aquatic Resources (BFAR) and the National Fisheries Research and Development Institute.

Figure 17: Structure of the DA's legacy programmatic approach



Source: Author's representation using DA framework.

Recent Financing and Investment Trends for Agriculture

A review of the budget for agriculture over the past five years shows that the most recent budget is by far the highest over that period (Table 5). The total program/operational budget assigned to the DA under the General Appropriations Act (GAA)⁷ for FY2020 is PHP55B (plus additional PHP8 million supplemental budget), mostly lodged with OSec, as noted earlier plus supplemental budget. Growth in the 2020 budget was driven by increased allocations to OSec (46%) followed by Philippine Center For Postharvest Development And Mechanization (PhilMech) (18%), Fertilizer and Pesticide Authority (FPA) (15%), the Agricultural Credit Policy Council (12%), and Bureau of Fisheries and Aquatic Resources (BFAR) (8%) while the budget for other attached agencies has declined compared to previous years. The supplemental budget is PHP8.1B.

⁷ By statutory mandate, Philippine agriculture has been on course to modernize the sector since 1997, through the adoption of the Agriculture and Fisheries Modernization Act, which was aimed at transforming Philippine agriculture from being resource-based to technology- and market-driven, and financed through the GAA.

Table 5: GAA operations budget of the DA and its attached agencies (PHP 000s)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Office of The Secretary	37,895,290	33,086,630	39,171,841	31,074,066	45,384,881
Agricultural Credit Policy Council	32,809	797,454	1,102,154	2,505,175	2,812,505
Bureau of Fisheries and Aquatic Resources (BFAR)	5,527,330	5,691,995	4,590,520	4,530,397	4,904,300
Fertilizer and Pesticide Authority (FPA)	-	-	-	91,104	104,517
National Fisheries Research And Development Institute (NFRDI)	-	-	-	-	232,438
National Meat Inspection Service (NMIS)	221,788	279,531	530,994	363,772	350,336
Philippine Carabao Center (PCC)	437,024	382,553	456,023	617,689	549,151
Philippine Center For Postharvest Development And Mechanization (PhilMech)	186,090	244,349	270,627	223,364	264,063
Philippine Council for Agriculture And Fisheries (PCAF)	134,353	152,906	152,507	164,711	127,106
Philippine Fiber Industry Development Authority (PhilFIDA)	151,297	264,806	436,150	311,218	295,166
Supplemental Budget					8,064,666

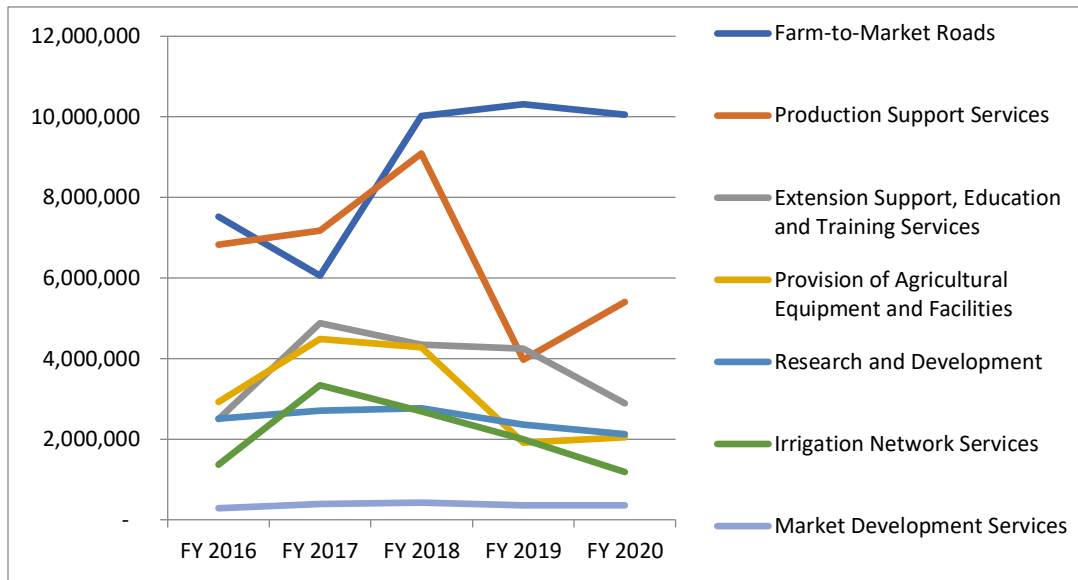
Source: Department of Agriculture.

Recent trends in the funding of DA service programs indicate that investment priorities are far from accommodating a shift toward agricultural transformation. Figure 18 and Figure 19 depict investments over FY2016–20 in DA service programs, which contribute to the objectives of the banner programs. As part of the government’s “Build, Build, Build” initiative, the DA has invested heavily over the past three years in roads to broaden farm-to-market accessibility and trigger economic activity in remote agricultural areas (Figure 18). Farmer-to-market road projects received almost half of all resources allocated to service programs in FY2020 (Figure 19). The budget for production support services,⁸ after dropping by about PHP5B in 2019, recovered to some extent in 2020. Meanwhile, investments in public goods that are essential to agricultural transformation—such as R&D, market development (other than roads), and extension—have fared badly. Public investment in R&D and especially in market development services has been staggeringly low. Over the five-year period, market support services have never received more than PHP0.5B in annual funding (the allocation for FY2020 is PHP357M). The consistently paltry resources for market development and R&D are spread over several bureaus and institutions, where they fail to generate sufficient market-driven research outputs or to link research effectively to extension services that provide profitable technologies to farmers (OECD 2018). The modernization of Philippine agriculture depends on increasing the opportunities and capacities of smallholder farmers and fisherfolk to participate in the postharvest, processing, and marketing segments of value chains. These levels of funding make it more challenging to approach that level of modernization.

⁸ These services mainly include support for supplying inputs such as seed, planting materials, fingerlings, animals, fertilizers, and other soil ameliorants.

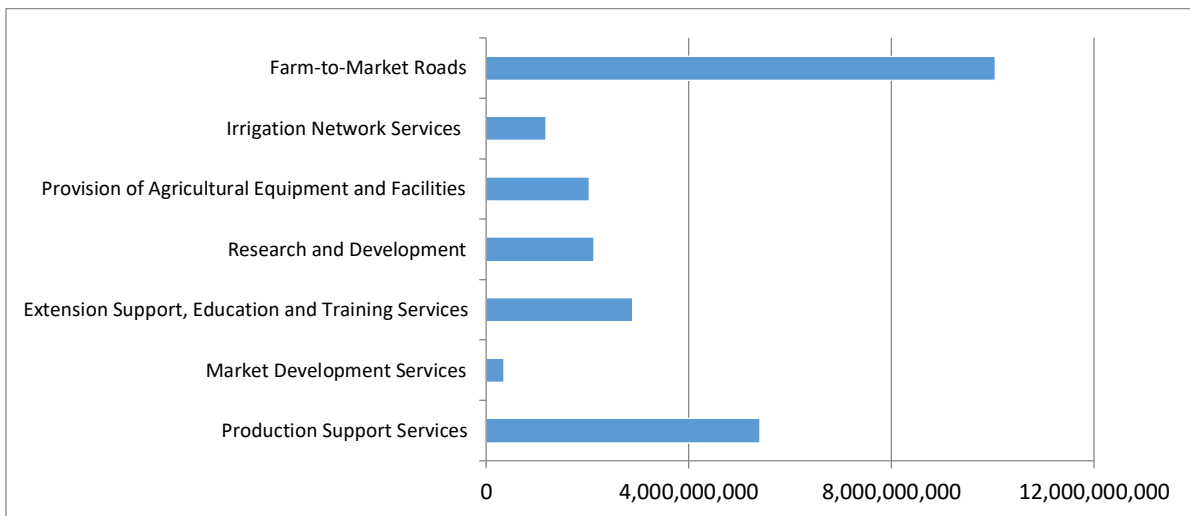
A focus on rice still pervades government policy and spending decisions. A scan of DA budgetary allocations for commodity-based banner programs shows that most of this support is channeled to the Rice Program (Figure 20). Under the DA budget for FY2020, the Rice Program received 61% of the budget appropriated for production support services, 34% of the budget appropriated for extension support, education, and training services, 44% for agricultural equipment and facilities, 36% for R&D, and 84% for irrigation.

Figure 18: Trends in allocations to programs funded under the operations budget of the Office of the Secretary of the DA (PHP 000s)



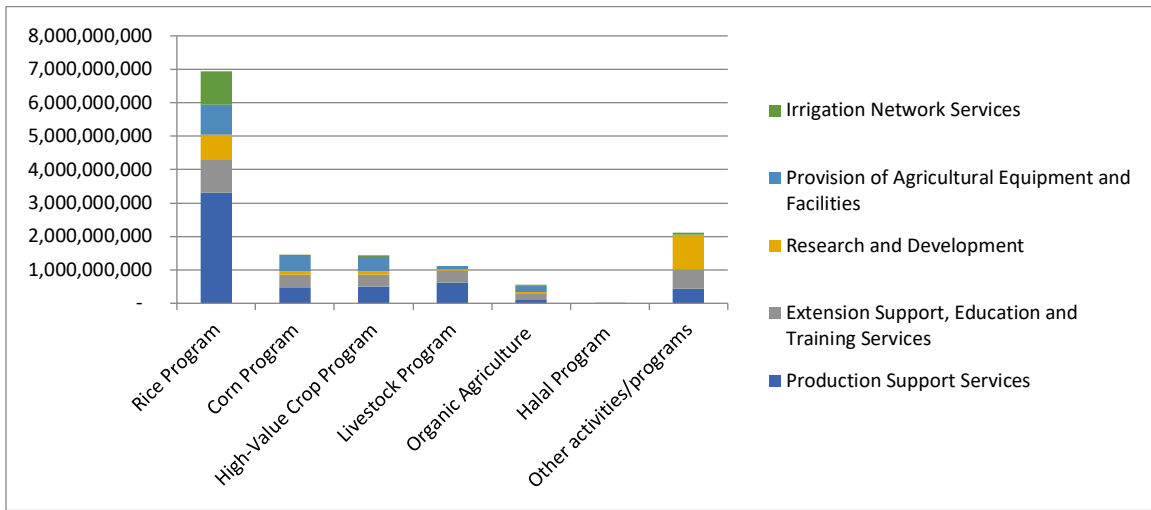
Source: Department of Agriculture.

Figure 19: FY2020 appropriations for DA operations, by service program (in PHP)



Source: Department of Agriculture

Figure 20: Appropriations (in PHP) for DA operations by program, FY 2020



Source: Department of Agriculture.

Agriculture Programming and the Pandemic Response

The pandemic response for agriculture is encompassed within the DA’s programmatic approach. The DA introduced a broad set of measures under its ALPAS-COVID-19 (“Plant, Plant, Plant”) program to help farmers and agribusiness respond to the pandemic and ensure a food-secure Philippines. The program entails a massive expenditure outlay (PHP32B supplementary budget) (Table 6).

Table 6: ALPAS-COVID-19 (Plant, Plant, Plant) program

Increasing NFA’s Fund for 30-Day Bufferstock	8.24 B	Upscaling of Kadiwa ni Ani at Kita Program	1.0 B
Rice Resiliency Program	8.5 B*	Expanded Small Ruminants and Poultry Project	1.0 B
Corn-Livestock Integration and Corporate Farming	1.75 B	Enhanced White Corn Production for Food Resiliency	300 M
Expanded Coconut based Diversification Project	1.0 B	Urban Agriculture Project	500 M
Fisheries Resiliency Project	1.2 B	Revitalized Gulayan Project	1.0 B
Expanded SURE Aid and Recovery Project	3.0 B	Sustained Information, Education and Communication Project	50 M
Expanded Agriculture Insurance Program	3.0 B	Logistical Support to Frontline Essential Services	502 M

* Already Funded

Source: DA, May 2020.

The DA’s emergency response to facilitate the movement, transport, and marketing of food from producers and provinces through Kadiwa ni Ani at Kita in partnership with the LGUs and private sector has had a visible impact. It has reportedly benefitted 12,000 farmers, market porters, packagers, and truckers in Metro Manila and major urban centers. At the same time, the DA injected a financial boost for rice farmers to meet their needs during the ECQ through the Financial Subsidy to Rice Farmers (FSRF) program, which will provide a PHP5,000 cash subsidy to 600,000 rice farmers through the Land Bank of the Philippines.

With Ani at Kita, a new set of performance indicators related to farmers' income security will be institutionalized. A results-based, bottom-up planning and operations approach may finally transition the DA away from heavy reliance on production support in the form of input subsidies and toward public goods and market development to ensure sustainable livelihoods for farmers and fisherfolk.

At this juncture, the pandemic has affected HVC farmers more than traditional crop farmers. An evaluation by the National Economic Development Authority⁹ estimated an income loss of PHP36.82M in HVC farming. The Calabarzon Region reported the highest income loss (PHP12.39M), followed by Cordillera Administrative Region (PHP5.64M) and Central Luzon (PHP2.67M). The income loss for rice farmers is high at PHP18.23M, and corn farmers have accrued a loss of PHP5.6M.

The administration's flagship economic recovery plan ("We Recover as One"), which outlines priority programs and projects for 2020/21, reinforces the implementation of ALPAS-COVID-19. It realigns the DA budget for non-food banner programs (for example, tobacco) into the following: subsidy or distribution of farm machinery; piloting or expanding other e-commerce and marketing platforms (online palengke); research, development, and extension; and commercialization of safe, nutritious, medicinal or therapeutic, and well-packaged agri-food products. Priorities for 2020 also include mobile marketplaces, rolling stores, and foodbanks. For 2021, priorities include support services through credit and insurance with concessional terms; supports for cooperatives; fast-tracked implementation of the Rice Competitiveness Enhancement Fund Mechanization component; social amelioration programs for displaced fisherfolk, farmworkers, and laborers; digital advancement; and other capacity-building activities.

A Conceptual Framework for Understanding and Implementing the "New Thinking" in Agriculture Programming

The "New Thinking" vision and paradigms

The DA envisions a food-secure Philippines with farmers and fisherfolk who prosper through stakeholder empowerment, increased productivity, profitability, and the use of sustainable practices for improved resilience. The conceptual framework of the "New Thinking" that the DA has articulated to realize this vision consists of eight paradigms: agricultural modernization, industrialization, export promotion, farm consolidation, infrastructure development, roadmap development, securing budget and investments, and legislative support. Underpinning these eight paradigms are the four pillars of the DA agro-industrial strategy: inclusive sector, utilization of science-based tools, market-oriented interventions, and resilience to climate risks. This policy reorientation holds promise for transformational change that will produce a more resilient, inclusive, competitive, and environmentally-sensitive sector. More specifically:

- The plan for **modernization** involves the adoption of modern science-based farming and good agricultural practices to boost production of staples, HVCs, fish, and poultry and livestock products in a sustainable way. Modernization entails crop diversification and agricultural entrepreneurship

⁹ Technical Working Group on Anticipatory and Forward Planning (TWG-AFP), "Economic Recovery Plan (2020): We Recover as One."

in farming and fisheries, in addition to improved access to production, processing, and handling technologies.

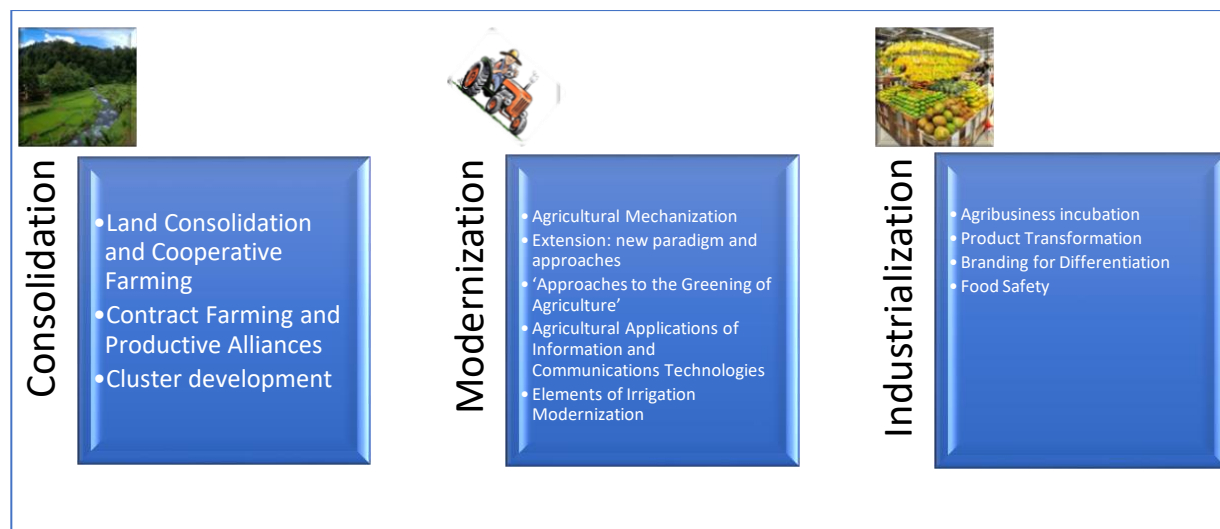
- **Industrialization** of the agri-food system requires improvements in value chains, increased engagement of the private sector in strengthening agri-based industries, the development of domestic and export markets, and the use of digital technology in farming, fisheries, and agribusiness.
- **Export promotion** entails the aggressive, systematic promotion of agricultural and fisheries products in overseas markets. The DA will need to foster stronger convergence with the Department of Trade and Industry (DTI) and related agencies.
- **Consolidation of small and medium farms** will enable producers to achieve economies of scale, reduce production costs, and realize higher farm productivity and profitability through more efficient farming. Consolidation will rely on arrangements such as block farming, trust farming, contract farming, and cooperative farming, often involving partnerships between producer groups and agribusiness.
- **Infrastructure development**, aligned with the government’s “Build, Build, Build” program, is a crucial part of the “New Thinking” in agriculture. Vital infrastructure—farm-to-market roads and postharvest, processing, and marketing facilities—will be put into place to strengthen linkages from farms to domestic and global markets. Strategic involvement of the private sector will accelerate the development of modern national irrigation systems.
- **Roadmap development** involves producing industry and commodity five-year rolling plans that map out strategies to achieve sectoral and subsectoral productivity, competitiveness, sustainability, and resilience goals. A value chain approach will underpin these plans to ensure that stakeholders operating in all value chain segments see their fair share of benefits.
- The DA will seek to secure a higher **budget**, beyond the general appropriation, and improve the generation of resources and **investments** to facilitate growth in the sector. The DA understands that **legislative support** is instrumental to modernizing agriculture, and it will pursue conducive policies and structural reforms for legislation and institutionalization.

Evidence of the “New Thinking” in the agriculture portfolio

This section examines the implementation of the “New Thinking” in the agriculture portfolio of the DA and allied institutions. A simple framework or matrix of quality at design is used for the analysis. For greater clarity, the analysis condenses the eight “New Thinking” paradigms into three paradigms for agricultural transformation: consolidation, modernization, and industrialization, depicted in Figure 21.¹⁰ The analysis examines (i) the extent to which the composition and trajectory of the DA’s current investments and policy priorities match its vision (the “New Thinking”) and (ii) the policies and changes that are being introduced, financed, and/or promoted in the agriculture portfolio, based on a sample of DA-supported programs (including programs financed through foreign funding).

¹⁰ The three paradigms broadly encompass all eight paradigms of the “New Thinking” in the sense that *export promotion* relies on value addition, which can involve either transforming commodities, raising their quality, or otherwise differentiating them; *infrastructure*; *legislative support* and regulatory reform; and financial resources (*budgets*, *investments*) as elements of moving forward with *roadmaps* for consolidation, modernization, and industrialization.

Figure 21: A framework for transformational change in agriculture: Three paradigms and their corresponding interventions



It is worth noting that the analytical framework depicted in Figure 21 posits a much wider set of policy objectives for the sector than the “New Thinking,” because it includes objectives contained within the DA’s legacy programming. The legacy objectives are included because the analysis is intended to be a holistic examination of the extent to which current programming contributes to or deters the “New Thinking” transformation of Philippine agriculture.

The sections that follow describe results of the analysis for each of the three framework paradigms (consolidation, mechanization, and industrialization). The discussion also highlights specific constraints and other elements in the context of the Philippines (including the pandemic crisis) that may influence progress in the “New Thinking” agenda. The in-depth analysis of extension requested by the DA is included in the section on modernization.

Consolidation

Land consolidation and joint farming are not widely practiced in the Philippines because farming communities are not well informed about options for consolidation and their advantages (PhilRice 2015). With respect to the DA’s main investment priorities (the banner programs), land consolidation is part of the regular activities of the Rice Program, together with production support services, mechanization services, and extension services. A multi-institutional Rice Program¹¹ has been designed and will be piloted across three target regions; as part of that pilot, farms will be consolidated and established as demonstration farms (techno demo farms).

Some innovative approaches to land consolidation have been implemented by other DA-attached agencies and through donor-funded programs supported by the DA. These approaches have included block farming, trust farming, contract farming, and cooperative farming. Block farms in the Philippines generally produce sugarcane, although a small number produce other crops (Box 4). In the first year of

¹¹ Involving government agencies—NIA (irrigation); PhilRice (provision of inbred rice lines to develop hybrids; DA provides the hybrid seed); PhilMech (mechanization); DA RFO and LGUs (on-the-ground implementation), as well as the private sector (hybrid seed companies and seed growers, and companies producing inbred lines and seed).

block farming, 90% of the land is planted to sugarcane and 10% to bananas, which are used for sustainable charcoal production. Under the existing plan, small farmers gain experience in managing bigger farms. Production capital for 55 ha is provided to each farmer organization, along with incentives for farmers who produce the highest tonnage of sugarcane. Technical assistance is provided for business development services. The greatest constraint to land consolidation is not the lack of options, however; it is the lack of a clear legal and regulatory framework, targeted technical assistance, and operational support.

Box 4: Models for block farming in the Philippines: Advantages and constraints

The Block Farming System is a form of land consolidation and joint farming that promotes aggregation in agricultural production and intensification of farming to achieve economies of scale. In the Philippines, block farming has been implemented in the sugarcane industry under the National Convergence Initiative of the DA, DAR, and the Sugar Regulatory Authority. The formal title of this initiative is Improving Productivity of Sugarcane Farmer by Agrarian Reform Beneficiaries Organizations (ARBOs) through Block Farming, a DAR Agrarian Reform Community Connectivity and Economic Support Service (ARCESS) Project. The project aimed to consolidate small farms into aggregations of 30–50 ha to achieve plantation-scale levels of production through cost-efficient sugarcane farming practices. Agrarian reform beneficiaries are often hired as workers, while retaining ownership of the land. Farmers also receive guidance in managing production for at least two cropping seasons. Profit-sharing arrangements vary depending on arrangements among farm enrollees, ARBO officers, and any financiers involved. Financing schemes may take the form of partnerships, joint ventures, contract growing, foreign funding, or loans and similar arrangements.

A block farming model implemented by DAR under the Comprehensive Agrarian Reform Program (CARP) is Agribusiness Venture Arrangements (AVAs), in which ARBOs use the land awarded under CARP. The AVA establishes contracts (leases and growership contracts) between agrarian reform beneficiaries and agricultural companies to produce high-value crops. In 2016, three-fourths of AVAs operated through leases and the remainder through growership contracts; most produced bananas, pineapples, cacao, and oil palm. An assessment by FAO has found that AVAs are not without problems. For example, ARBOs often fare poorly under leasing arrangements, and leases are inconsistent with the goals of CARP. Additionally, leases cover very long terms (more than 10 years) that discourage ARBOs from taking responsibility for their land. Rental rates are low, and increases are both infrequent and small. Findings on growership contracts show that AVAs must allocate risks more equitably between parties and that ARBOs need to be more empowered in negotiating contract provisions such as price. Recommendations for strengthening ARBOs and improving the implementation of AVAs have been provided to DAR.

Modernization

Mechanization

The DA has consistently considered mechanization—production and postharvest machinery, equipment, and facilities—as one of its top three priority services for improving agricultural productivity and competitiveness. In 2018, the DA distributed about 13,000 production and postharvest units of machinery and equipment across its banner programs. At the same time, the banner programs built or rehabilitated around 6,600 facilities that, together with the machinery, reached about 11,600 beneficiary groups. That year, under the National Rice Program, 2,500 farmer groups received 1,200 units of production-related machinery and equipment and 800 units of postharvest machinery and equipment, including hand tractors, precision seeders, four-wheel drives, transplanters, seed spreaders, collapsible dryer cases, multi-purpose drying pavements, and recirculating dryers with biomass furnaces. The Corn Program provided almost 1,200 farmer groups with 200 units of production-related machinery and equipment, and about 1,000 units of postharvest machinery and equipment, including tractors, corn planters and pickers, cassava diggers, grain dryers, cassava granulators, generator sets, and seed storage

facilities. The Philippine Center for Postharvest Development and Mechanization's (PhilMech) focuses on developing agri-entrepreneurship through the delivery of postharvest and processing equipment that adds value to produce. Technologies developed in 2018 mostly targeted non-rice commodities. PhilMech has introduced innovations such as multi-commodity solar tunnel dryers for crops, fruits, and fish; coffee processing systems; a soybean postharvest and processing system; multi-row onion seeder; and cassava digger.

Research and development

About half of DA funding for R&D is allocated to the attached agencies to support agricultural and technological research for modernization and industrialization. A significant share of the budget is still directed to rice research.

Recent R&D for rice has included:

- **Collaboration of DA-PhilRice with the International Rice Research Institute (IRRI) on innovative tools.** The Rice Crop Manager (RCM), for example, delivers on-site personalized advice to rice farmers on crop and location-specific nutrient management. Recommendations are usually provided through printouts facilitated by agriculture extension workers, although an SMS function is also available. As of 2018, RCM had provided recommendations to about 313,000 farmers growing rice on 270,000 ha. The number of farmers registered in the RCM Farmer & Farm Lot Register is about 42,000, spanning 61,600 ha of rice.
- **Pest and Disease Risk Identification and Management (PRIME) technology.** Using field-based pest surveillance derived from satellite and drone images and risk modeling, PRIME identifies the risk factors for pest outbreaks, maps potential outbreak risks, and formulates integrated pest management strategies.
- **The NextGen project.**¹² The third major project piloted in 2018, NextGen is a collaborative effort of the DA, IRRI, PhilRice, Bureau of Agricultural Research (BAR), Bureau of Plant Industry (BPI), and the University of the Philippines Los Baños. NextGen seeks to increase the competitiveness of rice production by fast-tracking the development of next-generation high-yielding and climate resilient rice varieties and accelerating their adoption through a multi-environment testing (MET) strategy.

In the Corn Program, the Cagayan Valley Research Center, under DA-RFO II, led development of two National Seed Industry Council (NSIC) registered varieties in 2018. CVRC Cn 15 (NSIC 2018 Cn 314) – OPV Yellow is an average-yielding variety with high shelling recovery, moderate resistance to lodging, and drought tolerance. CVRC Glut No. 12 (NSIC 2018 Cn 316) – OPV White is an average-yielding white variety with good eating quality, high shelling recovery, and moderate resistance to lodging.

In the Livestock Program, R&D in 2018 focused on genetic improvement, coordinated by the Bureau of Animal Industry (BAI). The Unified Artificial Insemination Program provided strategic direction for artificial insemination (AI) of cattle, carabao, and goats, and the “AI sa Barangay” initiative was launched, which aims to provide training, capital inputs, breeder boards, and AI equipment to technicians in every area with 5,000 cows.

¹² Formally known as Accelerating the Development and Adoption of Next- Generation (NextGen) Rice Varieties for the Major Ecosystems in The Philippines.

The weak and relatively undiversified R&D system is a significant barrier to widespread adoption of improved agricultural technology—a barrier that becomes higher for producers with little education. Low productivity can be traced directly to the failure to adopt new technologies. As far back as Stier (1974), it has been well established that education favors technology adoption and growth in productivity. Farmers with limited education may struggle to absorb information about innovations developed through research. Extension is one way to address this deficit (Digal et al. 2020), but producers with very low levels of education may still find it difficult to understand extension information.

Climate change

Climate change adaptation and mitigation have been key policy priorities for the Philippines since 2007.

The National Climate Change Action Plan (NCCAP, 2011–2028) and Philippine Development Plan outline climate change priorities related to food security, water efficiency, environmental and ecological stability, human security, climate-friendly industries and services, sustainable energy, and knowledge and capacity development (NCCAP 2011). The NCCAP does not identify pathways for each economic sector to mainstream these priorities, however.

The DA launched its Adaptation and Mitigation Initiative in Agriculture in 2013 to ensure that agricultural policies and programs contribute to reducing climate risks and vulnerabilities, but no overarching response to climate imperatives has emerged. The linkage between DA-wide departmental policies and system-wide climate change programs is weak. Except for the Rice Program, all other programs make no reference to NCCAP priorities, and the implementation of climate-responsive actions suffers from a lack of coordination between national, sectoral, and local authorities (OECD 2017).

The rice sector has benefited the most from the DA’s increased policy focus and investment support to mitigate climate risk. As mentioned, the DA has fast-tracked the development of high-yielding, climate-resilient rice varieties, tested their performance through a new multi-environment strategy, and produced high-quality seed. PhilRice has developed a large number of climate-resilient rice varieties through 57 public R&D agencies (OECD 2017) to support improvements in rice productivity and yield potential, especially in rice-growing areas where drought stress is higher. Similar climate-adaptive activities do not seem to form part of the work on non-rice crops.

Extension

In the Philippines, extension advice is delivered through a decentralized system by a range of government agencies, NGOs, and the private sector. Extension has been devolved to local authorities under the Local Government Code since 1991. The DA sets overall policies, provides guidance and resources, and the LGUs implement programs and provide extension services through provinces and municipalities. Specialized agencies have their own extension agents; for example, the DAR (once part of the DA) provides extension support to agrarian reform beneficiaries in specific agrarian reform communities down to the municipal level. Many NGOs offering extension advice operate in specific projects and areas; the private sector largely provides information in combination with selling inputs. Virtually all key stakeholders interviewed for this report supported a decentralized extension system and do not want to return to a national system, although they are aware of the need for improvement. They highlighted the need for better coordination among extension actors, with technical leadership and a clear arrangement of roles and responsibilities.

Extension approaches are often poorly designed and targeted. Programming and budgeting of extension from the areas of the DA that connect with LGUs are closely tied to overall crop programming. Many

commodity-specific extension programs aim to support wealthier farmers to produce more. Programs also tend to use a “one-size-fits-all” approach that cannot be adapted to the wide range of local priorities of an archipelago nation and its farmers. For example, in Cordillera Administrative Region (CAR), many small non-commercial commodities are not well covered.

Training for extension workers suffers from a lack of coordination and planning. The DA funds training for extension workers at the municipal level through its programs (rice, corn, HVCs, and so on), all of which offer many training events for extension and technical services, particularly for rice. Plans are not synchronized for extension training, nor coordinated sufficiently with ATI.

Extension coverage in the LGUs is variable. Based on information from the National Extension Agenda and Programs (NEAP) 2017–22, the Philippines has an estimated 10,000 agriculture extensionists. A majority of these extension service providers are with LGUs, but they are employed by different government agencies. The overall number of extensionists may appear quite good in terms of the number of farmers per service provider (about 600–900 farmers per extension agent), but in actuality concerns remain with the quality of service delivery and coordination, the spread of support according to need, and ultimately the effectiveness of delivery.

Since 2018, pilot initiatives have focused on coordinating extension at the provincial level, which has several advantages compared to the national and more local level. Under the Province-led Agriculture and Fisheries Extension Systems (PAFES), the province serves as an extension hub that synchronizes agricultural plans and programs and orchestrates the various stakeholders (DA, municipalities, city government units, state universities and agencies, the private sector, NGOs, and community-based organizations). Extension at the provincial level can provide economies of scale and reflect more strategic priorities, while remaining relatively close to the local context. Two PAFES pilots have started in Ilocos Norte and Apayao, and three more are expected (Quezon, Bohol, and Davao del Norte).

In Ilocos Norte, PAFES is piloting an innovative model for strengthening research-extension-farmer linkages in which various institutions share science-based knowledge and technology. This pilot, which builds upon the Provincial Commodity Investment Plan (PCIP) created under the PRDP, is implemented through a co-financing arrangement between the provincial government unit (80%) and the DA (20% counterpart). The pilot has a clear agri-enterprise focus, aiming to catalyze the establishment of small and medium businesses and their links to markets through the development of managerial, marketing, financial, and entrepreneurial skills.

The choice of the province as a focal point for extension has spurred great interest among stakeholders and seems to be gaining support across regions. A period of two to three years is needed to prove that the PAFES model is successful and ready to scale up. Potential challenges to scaling up include the wide economic inequalities among provinces, the co-financing mechanism, and the lack of long-term support and commitment from the provincial governors. In addition, it is important to keep in mind that it is still better to handle agricultural research and market assistance at the national level. The DA will need to lead research on new crop varieties or pest management technology, national and international markets, export information, and food safety.

Many pathways can lead to a more pluralistic extension system; one is to encourage greater private sector involvement. Indeed, the private sector can become involved without state support, but it will be much more synergistic when the national government plays a coordinating role to ensure quality and the use of unbiased information. The private sector can contribute directly to extension provision, especially

in areas where the public system is ill equipped. In the Philippines, the Agriculture Training Institute (ATI) has played a role in increasing private sector participation in extension provision through the accreditation of service providers. The goal is to ensure quality and at the same time provide a route for accredited providers to obtain state funding for extension and rural services grants. Although the accredited providers have mostly tended to be non-state players rather than for-profit companies, the ATI initiative represents an important step toward more a pluralistic extension delivery system. ATI has recently completed an evaluation of this initiative.

The major challenges facing the extension services include:

- **LGU extension workers often lack the right mix of technical capacities to meet producers' needs.** The NEAP recognizes that the specific capacities of extension workers and modes of delivering information are problematic. The frontline extension staff of municipal LGUs have mixed educational backgrounds and sometimes lack expertise in agriculture, especially if they are hired through short-term contracts or political connections. The Philippines has no shortage of well-qualified agriculture graduates, but they are not always recruited to frontline positions. The educational background and professional experience of LGU service providers may not be aligned well with the current needs of farmers, and simple production-oriented extension messages may no longer be sufficient to support the kind of agricultural transformation envisioned in the “New Thinking.” These days, Filipino producers require advice not only on technical aspects of production such as prescribed volumes and frequency of fertilizer applications; they also need information on topics such as funding available to scale up production, commodity price trends, possible markets for their produce, quality requirements, climate-smart solutions, and organic agriculture. Producers tend to require more of a “package approach” that helps them to sustainably produce and profitably market their commodities.
- **Poorer producers and producers in more remote locations have little access to extension advice.** Not all farmers have the same access to extension services and information suitable to their circumstances. More productive and organized farmers (members of associations or cooperatives) get access to core extension services, whereas the most disadvantaged producers have less land, live in remote locations, practice subsistence agriculture, are female, and operate mixed integrated farming systems that are not focused on the main staples. Some accessibility issues are related to the costs that LGUs need to cover for extension agents to reach remote areas and provide a wider range of services than they can handle. For example, a monthly travel allowance may cover only one day’s work in one remote village. Different contexts call for different extension services and more digital approaches. The largest and most difficult group for agricultural extension and advisory systems to reach is small-scale, subsistence farmers. The delivery of public goods-related extension, supported by public funds, could specialize in meeting their needs.
- **Public sector coordination of extension remains weak.** The government agencies that remain at the top of the extension system (DA, DAR) tend to have different internal policies and targets. Inter-agency communication, coordination, and alignment of agricultural extension goals tend to be weak. These circumstances encourage inter-agency encroachment, which increases confusion for farmers as well as extension service providers. Consequently, many of the current extension programs suffer from poor execution, insufficient funding, or poor management. Because of the decentralized nature of the system, the national agencies responsible for extension services (DA, DAR) have little influence at the LGU level, which means that the management, supervision, and

monitoring and evaluation of the entire agricultural extension system is disconnected at the governance level (a “broken link” in the hierarchy). This status quo hampers the complementarity of extension services and players and results in suboptimal delivery of services.

- **Linkages between research and extension also remain weak, fragmented, and inefficient.** Even though the Philippines hosts world-renowned national and international agricultural research institutions, the linkages and information flows between the various players in Filipino agriculture and extension are suboptimal. Partnerships must either be established or strengthened. Coordination with agricultural R&D to inform extension and provide farmers with up-to-date and appropriate research outputs remains fragmented, and mechanisms to get feedback from farmers are equally unsystematic. Some regions have research and extension consortiums with overlapping agency participation. Under these circumstances, the process for setting priorities and getting the best science to farmers cannot be efficient. Coherent, efficient linking mechanisms to drive appropriate research and the adoption of technology by producers are a key requirement for an agricultural innovation system to be effective.
- **A number of other circumstances make it challenging for Filipino producers to obtain the extension information they need.** Some lack access to technology such as the internet or cellphone networks because they live in remote locations. Others are older and lack digital skills. Some producers are exposed to contradictory extension advice from numerous programs run by different actors (government agencies, private sector, NGOs). A major complication for service providers is that farmers are often poorly organized. One solution could be to organize farmers into bigger groups, such as producer associations, at the municipal level. This level of organization could allow more comprehensive delivery of “extension service packages” that include regular extension services plus support for agribusiness, entrepreneurship, and marketing. Some examples of this approach already exist, such as the Pakisama Farmers Association and other agri-food cooperatives. Although plenty of cooperatives have been formed throughout the Philippines, most are small, and few federations of cooperatives are operating at higher levels. Extension could be more easily channeled to bigger cooperatives, and if they are sufficiently profitable, they can even arrange for members to receive professional extension services tailored to the particular needs of the cooperative.

Irrigation modernization

Irrigation infrastructure, technology, and services are primarily dedicated to rice production but have contributed little to diversification or higher rice productivity. An area of about 1.8 million ha, or around 60% of the potential irrigable area of 3 million ha in the Philippines, is currently irrigated. Most of the national and communal irrigation systems have been designed to support rice production; they deliver water through gravity flow and irrigation canals.

The modernization of irrigation systems could not only improve the productivity of rice but also open opportunities for farmers to diversify and commercialize production. Past efforts to introduce productivity-enhancing practices, including use of the System of Rice Intensification (SRI) and Alternate Wetting and Drying (AWD), have not been very successful, as farmers were not inclined to change farming practices when they were not assured of reliable water delivery to their plots. Many households produce rice only for subsistence and not for sale, but there are opportunities for traditional rice farming to adopt a more commercial orientation, in which irrigation will play a key role. With the introduction of HVCs for

import substitution and export (rubber, mangoes, coffee, cacao, bananas, palm oil, and vegetables), irrigation serves as an important impetus for diversification and commercial agriculture. Convincing farmers to change may be challenging in areas where decades of support for rice production seem inconsistent with the push for diversification.

Developing the capacity to design and manage modern irrigation systems for a wider range of crops and cropping patterns will require significant changes on the part of national agencies and more effective participation of the private sector. The National Irrigation Authority (NIA) has primarily focused on irrigation for rice, so the NIA and also the DA will have to gain knowledge and experience to meet the requirements of diversification. For example, expertise is required in new design principles and the use of modern technologies for proper irrigation management, such as soil moisture monitors (probes) and remote sensing technology for water accounting and data collection. This expertise is not available within the DA's legacy programming. Equipping modern irrigation systems is an added challenge. The private market for field irrigation equipment such as drip and sprinkler systems and solar pumps is not very developed in the Philippines.

Industrialization

An expanding agro-industrial sector can increase rural prosperity by providing options to add value to farm and fishery products, and budgetary support for industrialization has increased. Agro-industrialization in the Philippines has been promoted mainly through the provision of agribusiness and marketing support services (in the form of postharvest facilities) for value-chain development. Almost all banner programs have supported some form of agribusiness incubation through "agricultural trading centers," business development services, and other types of technical assistance. Overall budgetary support for various channels of industrialization,¹³ such as marketing and promotion, has increased consistently since 2010.

Growth in the number of successful young entrepreneurs in agriculture has potential to increase the pace of industrialization, although access to credit will be a concern. The significant share of younger agricultural operators (ages 20–40) suggests the potential to expand entrepreneurship among this group, many of whom may be better educated and more open to innovation than their older peers. The DA is already promoting youth agri-entrepreneurship (for example, under the Youth Agricultural Development Program). A major constraint to entrepreneurship among younger producers is their lack of capital¹⁴. They tend to have fewer assets to use as collateral and less savings to use as working capital.

Improvements in value chain linkages and a more vibrant export sector will build on these efforts to support industrialization. Agro-industrialization will fare better in a setting where there are stronger, more inclusive linkages between primary producers on the one hand and processors and marketers on the other, in addition to supporting infrastructure and a wider range of services (including business

¹³ Measured by General Services Support Estimate (GSSE), which is the equivalent of the annual monetary value of gross transfers to general services provided to agricultural producers collectively (such as research, development, training, inspection, marketing and promotion), arising from policy measures that support agriculture regardless of their nature, objectives, and impacts on farm production, income, or consumption (OECD 2017).

¹⁴ According to Llanto (2015), micro-entrepreneurs and small enterprises suffer from limited access to a range of financial services despite the mandatory credit allocation imposed by law, i.e. the Magna Carta for Micro, Small and Medium Enterprises. As of December 31, 2019, percentage of compliance for micro and small enterprises is at 2.8%, way below the mandated 8% minimum requirement. The limited presence of banks in rural areas is also a hindrance to credit accessibility and expansion of credit (Source: Agriculture Credit Policy Council)

development and financial services). In keeping with the “New Thinking,” wider promotion of exports could accelerate industrialization, but the Philippines has a way to go in this regard. It lags neighboring countries in total agricultural exports and exports per hectare of agricultural land, and only two of its agricultural exports—bananas and coconut products—bring in more than US\$1B per year. Neighboring countries have many more. Land consolidation and the development of producer organizations, as discussed previously, would facilitate collective action, the delivery of business development services, and mutually beneficial partnerships with agro-industry.

The development of a competitive agro-industrial sector will also require attention to food safety. Managing food safety risks, especially those linked to animal-borne diseases, remains an integral part of the DA’s trade and competitiveness agenda. The Food Safety Act of 2013 (RA 10611) invests the DA food safety regulatory agencies—BAI, the National Meat Inspection Service (NMIS), the Bureau of Fisheries and Aquatic Resources (BFAR), and the National Dairy Authority (NDA)—with responsibility for the health of animals raised for food and the safety of feeds and other inputs for livestock production. The DA manages advisories and alerts related to food safety, and its core responsibilities include product tracing, and collaborating on food safety research and the development of food safety standards. The DA and allied agencies also have mandates related to various SPS functions (Table 7) in the absence of a national biosecurity authority (Box 5).

Table 7: Mandated sanitary and phytosanitary (SPS) functions of the DA and allied agencies, and penalties for non-compliance

	BAI	BPI	BFAR	NMIS	Other
Quarantine (general)	√	√	√	√	
Domestic quarantine	√	√			
Inspection	√	√	√	√	
Enter establishments	√	√		√	
Market surveillance				√	BAFPS
Protection of inspectors	√ *		√	√	* feeds only
Confiscation/destruction	√ *	√	√	√	* feeds only
Limited liability		√			
Fee collection	20c/mt	Subject to rules and regulations	Subject to rules and regulations	Subject to rules and regulations	
Monetary penalties (maximum)	PHP1,000	PHP20,000	PHP12M	PHP1M	
Imprisonment (maximum)	1 year, 1 day	12 years	12 years	12 years	

Source: Author’s calculation (IFC).

Box 5: The risks of a fragmented biosecurity system

The effectiveness of the biosecurity system in the Philippines is marred by fragmented mandates arising from an outdated legal framework. Quarantine functions are split across four agencies, which limits the scope for coordination and resource sharing. The differing mandates and limits on the power of each of these agencies are embedded in separate laws, and in the case of the Bureau of Animal Industry and Bureau of Plant Industry, those enabling laws are decades old. Currently, authority over biosecurity is specific to agricultural products (animal, plant, fisheries, and meats), although biosecurity risks can enter the country through non-agricultural products, such as sea containers, machinery, vessels, and used vehicles, among others. Under the current structure, some functions are duplicated across DA agencies, and some DA agencies are missing essential functions that are present in others, such as market surveillance, protection of inspectors, power to enter establishments where agricultural products are stored, and limited liability in cases of delay or damages. The legally mandated fees

should be updated, because some are too small (for example, 20 centavos per metric ton in the case of BAI); the same is true of the monetary penalties for non-compliance (the penalty of PHP1,000 is hardly a deterrent).

A mechanism for holistically implementing the “New Thinking”

A good example of a holistic approach that incorporates the “New Thinking” paradigms is the DA’s flagship program for agriculture and rural development, the Philippine Rural Development Project (PRDP). The PRDP has reformed the way the DA does business by working in partnership with LGUs. There has been progress and increased convergence at the local level, with LGUs now collaborating with the private sector and national government agencies. The project’s science-based planning approach and value chain framework, along with its well-known digital tools, have increased the quality of spending and improved accountability and transparency at the national, provincial, and municipal level (Box 4). Thanks to its well-established national platform, the PRDP has proven capacity to reach farmers and their organizations quickly in the event of a crisis, and it is well positioned to respond quickly to the challenges posed by COVID-19.

Box 6: Philippine Rural Development Project

The Philippine Rural Development Project (PRDP) is national in scope, covering all 81 provinces. The project relies on a science-based planning framework and synergies among national government agencies, provincial and municipal local governments, and the private sector, to support investments that promote sustainable and equitable growth in productivity and income for farmers and fisherfolk. The design of the PRDP is based on the Mindanao Rural Development Program (MRDP), which started in 2000 and successfully operationalized the decentralization reform agenda for the agricultural and fisheries sector in active partnership with the LGUs of Mindanao.

More specifically, the PRDP works to develop the rural agricultural sector by providing key support services that strengthen market access and farm-to-market linkages (such as infrastructure and facilities), improving the entrepreneurial capacities of producer groups, and opening up opportunities in production, postharvest processing, product value addition, and marketing. In this regard, the project has been one of pioneers in developing productive alliances to unlock rural production and marketing potential. The pillars of its agribusiness model are farm consolidation, farmer aggregation, and agricultural modernization. The Enterprise Development Component (I-REAP) of the project invests in strategic segments of the value chain to create marketable surplus in the sector. This component funds micro, small, and medium-scale enterprises of farmer and fisher producer groups, especially working with Proponent Groups who are willing to assist smaller groups in joint business planning, vertical clustering, and in entering into formal marketing arrangements. The vertical clustering and joint business planning of Proponent Groups are supported by the PRDP through upgrading and expanding their existing enterprises. The Rural Infrastructure Development Component (I-BUILD) complements agribusiness development by improving market access and enhancing agricultural product transportation through establishment of farm-to-market roads. Improved productivity and increased cropping intensity are also supported through the installation of communal irrigation systems.

The PRDP has been extremely innovative in incorporating and mainstreaming information and communication technology (ICT) in all its components and activities. The role of ICT through the utilization of digital tools has significantly aided in the efficient financing of investments for both rural infrastructure and agricultural enterprises and has strengthened transparency and accountability in the overall delivery of project investments. To date, the use of digital technology has saved an estimated US\$55M by detecting irregularities in subproject implementation without requiring field visits.

4 International Experiences with Agricultural Transformation: Lessons for the Post-COVID Context



Chapter 4. International Experiences with Agricultural Transformation: Lessons for the Post-COVID Context

The Philippines responded immediately to the onset of the COVID-19 pandemic with measures to mitigate adverse social and economic impacts, but looking ahead, policy makers need to plan beyond the crisis. While it is challenging to strategize for the post-COVID-19 rebuilding of agriculture, the crisis presents a unique opportunity to ensure that policies are in place to promote the reconstruction of an agri-food system that is more resilient, inclusive, competitive, and environmentally sustainable than before. In this regard, much can be learned from international experience. Transformational change in agricultural policy has often taken place in the context of crises, which tend to undermine the coalitions that oppose changes to the status quo.

This chapter takes a longer-term perspective, looking at lessons for the Philippines from experiences in other countries with two types of policies: broad, transformative reforms, and reforms that operate more like precision instruments to achieve specific results. The first type of experience is a radical shift in overall policy orientation, which enables transformational change. The initial part of this chapter looks at reform programs that demonstrated transformative results over a long period (Chile, New Zealand, Turkey). The second part of the chapter takes a much more granular look at many less sweeping but very important reforms and innovations in other countries that will be useful to consider in operationalizing the “New Thinking” through consolidation, modernization, and industrialization.

These two kinds of reforms are highly complementary. The “big bang” reform program, which changes the overall incentive structure and in turn conditions the behavior of farmers and other sectoral players, is a necessary but insufficient ingredient for catalyzing major transformation. Reform needs to be accompanied and followed up by lower-level policies and investments to promote the transformation. But, looked at from the other angle, experience has shown that these policies and investments will not by themselves achieve the desired result unless the broader policy environment is appropriate. The overarching reforms must go hand-in-hand with these changes at the more micro level.

Transformational Reforms in Historical Perspective:

Chile, Turkey, and New Zealand

Chile: From policies of protection and self-sufficiency to outward orientation

Chilean agricultural policy in the 1950s and 1960s more or less fit the general paradigm of policies in many developing countries. Exchange rate policy, import restrictions and tariffs, export controls, and various subsidies were employed to encourage industrial development while increasing agricultural production. As documented in various studies (Krueger, Schiff, and Valdes 1988; Anderson 2009), the net effect of such a constellation of policies was generally to tax agriculture as a whole, but with very different treatment for import substitutes versus exports. Import substitutes were on average treated much more favorably, particularly food staples, based on a policy objective of increasing the degree of self-sufficiency in these products. In the mid-1960s, the policy was even more explicitly oriented toward goals of food

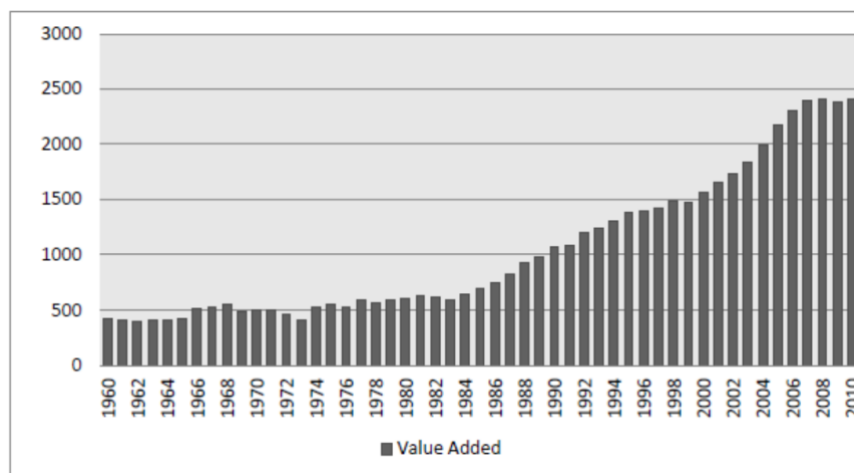
self-sufficiency (Valdes and Jara 2009). The policies included more trade interventions and price controls and supports, some operated through marketing boards, as well as government maintenance of stockpiles of staples. The import substitutes of wheat, milk, and beef were a particular focus of policy support.

All of that changed in the 1970s, when Chile adopted a very export-oriented strategy that included reducing the protection and special support for import substitute products. For most imported products (agricultural and others), the government established a uniform tariff starting at 90% in 1975, then 20% in 1977, and 10% in 1979. Export restrictions were eliminated. Some reforms in the service sector, such as privatization and deregulation of airlines and telecommunications, were also very important for the agricultural sector’s development.

Given the political and practical difficulties in dismantling a complex system of interventions in agriculture, there were some adjustments along the way. These adjustments included the introduction in the mid-1980s of: (i) a “price band” system using variable tariffs for wheat, oilseeds, and sugar, which was intended to buffer domestic prices from large swings in international prices; and (ii) a minimum customs valuation for dairy products. Protection and interventions were overall drastically reduced from previous levels, and protection for import substitutes was further reduced by Chile’s entrance into a “common market” with other countries in the Southern Cone of South America (MERCOSUR) in 1996, and later many other free trade agreements in the 2000s. These agreements eventually eliminated the price band system. In addition, the dispersion of protection and assistance to different products fell over several decades from 87.9% (1960–64) to 37.2% (1970–74), 17.0% (1980–84), and 12.1% (2000–05), reflecting the shift from picking specific products for special assistance to a much more uniform treatment that allowed normal market forces to pick winners and losers.

Chile’s reforms produced a well-known and remarkable export boom based on high-value fruits and vegetables and agro-industrial products. Prior to the reforms in 1960–73, agricultural exports grew by only 2% per annum, but exports jumped to 42.5% per annum in 1974–83, and by another 13.9% in 1983–90. Growth in agricultural value added overall rose from 0.2% per annum in the pre-reform period (1960–73) to 4.8% in 1974–83 and 4.5% in 1983–90 (Valdes 1993; Valdes and Foster 2014). Value added continued to rise rapidly until plateauing in the mid-2000s (Figure 22).

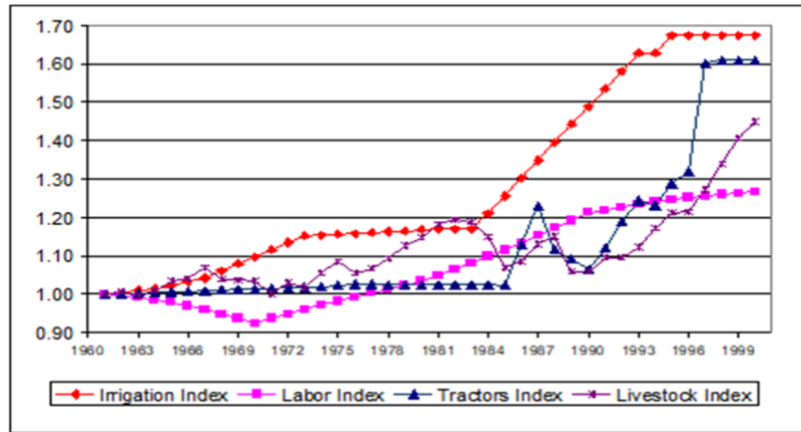
Figure 22: Chilean agriculture: forestry value added (billions of 2003 pesos), 1960–2010



Source: Valdes and Foster, 2014, from data from Instituto Nacional de Estadísticas de Chile, based on Echenique, 2011.

Reforms created a burst of modernization in production. Mechanization (proxied by an index of tractorization), after being virtually stagnant since the 1960s, began to increase rapidly in the mid-1980s. Irrigation use also increased dramatically at about the same time (Figure 26).

Figure 23: Input use in Chilean agriculture, 1960–2000

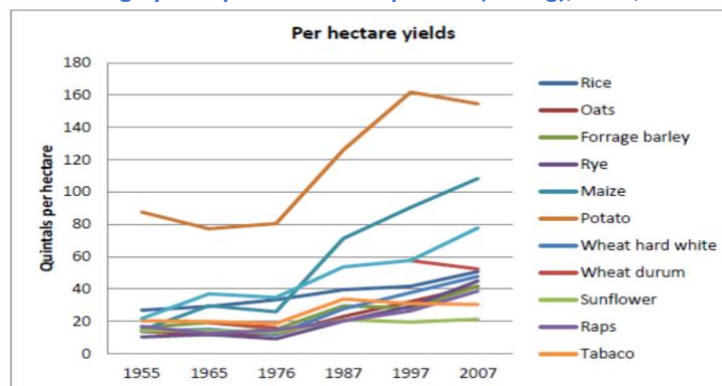


Source: Valdes and Foster 2004.

There is legitimate concern that smallholders were less able to take full advantage of the opportunities presented by the reforms than the larger operators. However, even the small farmers and relatively poor rural residents benefited from new opportunities as wage earners, especially in postharvest activities, as rural employment expanded. Jobs were created both because primary production of fruits and vegetables is more labor-intensive than growing cereals and because of the development of labor-intensive value chains both upstream (inputs and agricultural service providers) and downstream (packing, processing, and shipping). Nonetheless, the incorporation of smallholders into the economic boom has remained perhaps the most significant agricultural policy challenge.

What is not as well known is that import substitute sectors were also somewhat of a success story. After remaining virtually stagnant from the mid-1950s to the mid-1970s, yields per hectare increased rapidly for virtually all crops (Figure 24). As a result, while the area planted to cereal crops declined, their overall production increased. The dairy industry, which had previously been one of the protected import substitute sectors, took advantage of the overall liberalization and new technologies to increase its efficiency and re-invent itself as an export-oriented sector (FAO 2003).

Figure 24: Average yields per hectare in quintals (100 kg), Chile, selected years



Source: Valdes and Foster, 2014, from Instituto Nacional de Estadísticas de Chile Agricultural Census

New Zealand: Life after subsidies? Not so bad!

New Zealand faced several external shocks in the 1970s, which contributed to protectionist policies and an economic crisis. Those shocks included surging global oil prices and the United Kingdom's entry into the European Union (EU) in 1973, which eroded New Zealand's advantage in that market (Lambie 2005). Partly to insulate New Zealand producers and consumers from the effects of the shocks and preserve the pre-existing level of prosperity, the government became increasingly interventionist during the 1970s (Sandrey and Reynolds 1990). In agriculture, the emphasis was on supporting incomes and increasing production through heavy subsidies. Government subsidies to the sector increased from 15% of the value of output in 1979/80 to 33% in 1982/83 (Frontier Center for Policy Reform 2002). Assistance to agriculture consumed around 10% of total public expenditure (Valdes 1993). In combination with other policies, this level of expenditure created an economic crisis and underscored the need for significant reforms. The new government elected in 1984 undertook a wide-ranging reform program including (among others) trade liberalization, deregulation, devaluation and flotation of the exchange rate, privatization, and severe reductions in subsidies in agriculture and other sectors.

In agriculture, about 30 production subsidies and export incentives of various kinds were removed, including fertilizer subsidies, price supports, subsidized loans, disaster relief, and tax breaks to increase livestock herds. Total assistance fell from 30% of output value to around 3% and eventually to around 1% by 2001 (Sayre 2003).

The government provided some limited assistance to help farmers make the transition. Since the subsidies had inflated land prices, when they were removed, the value of farmland collapsed, leaving farmers with a heavy debt load. Government provided some assistance through a program to help restructure farm debt for qualified farmers. Those with no prospects for viability were not eligible (Valdes 1993). If they chose to leave farming, farmers were also offered an one time "exit grant" of around two-thirds of their previous annual income.

What were the impacts of this broad and deep reform program? Agricultural productivity growth overall increased from about 1% per annum before the reforms to 4% from 1986 to 2005 (Lambie 2005). Over the 15 years following the reforms, the value added in agriculture grew over 40% in constant dollars. The agricultural sector grew as a share of the overall economy from 14% in 1986–87 to 16.6% in 1999–2000, an almost unique experience among high-income countries (Lambie 2005). Land use diversified, and innovative products were developed. Sheep production—the most heavily subsidized activity—suffered the biggest cuts, so not surprisingly sheep numbers declined by about 29%. But lamb production increased slightly as productive efficiency was enhanced, and cattle numbers increased by 35%. Environmental management improved. Pesticide use declined by 50%. Soil erosion, land clearing, and overstocking declined as well. Livestock farming for the most part relocated away from erodible hillsides to more sustainable pastures (Yale Environmental Performance Index 2014, citing Macleod and Moller 2006). In general, the farm and agribusiness sector became more professional, innovative, efficient, and better managed (Frontier Centre for Public Policy 2002).

The rapid removal of subsidies did create serious pressure on farm profitability, particularly since it coincided with other impacts of the government's stabilization program. Those impacts included higher interest rates (meaning higher debt service costs for farmers) and an appreciated real exchange rate, which reduced prices of the exportable products on which many farm incomes depended. This situation was exacerbated by a decline in prices of wool and dairy products in international markets in the late

1980s. Some farmers had to exit farming, but exits were not nearly as common as had been feared. The official prediction was that the sector would lose around 10% of its farms. In reality, the number was only about 1%. Land prices, which had been greatly inflated by the huge subsidies, initially fell and bottomed out in 1989, but they began to rise after 1991 and, by 1995, had nearly reached their 1985 levels. The difference was that by 1995 land prices were based on real market profitability of production, not artificially inflated by subsidies. Real farm income declined sharply from 1984 to 1985, but by 1989 had recovered to its level of 1984 and continued to rise thereafter (Sayre 2003; Valdes 1993, citing OECD data). The restructuring and eventual recovery of the farm sector might not have been possible in the absence of a reasonably well-functioning financial system, along with the government's proactive efforts to facilitate the necessary restructuring of debt.

The “cold turkey” removal of subsidies was not the policy choice of New Zealand farmers at the time, but they came to recognize the necessity of this path and to enjoy its benefits. The Federated Farmers of New Zealand has become an eloquent advocate for the elimination of subsidies (Federated Farmer of New Zealand 2002; Lambie 2005; Sayre 2003).

Turkey: From a crisis to long-term agricultural growth and transformation

Turkey suffered from a series of economic crises in 1999–2001, with hyperinflation and total GDP contraction of 4.7% in 1999 and 7.5% in 2001, and agricultural policy had contributed significantly to the economic mess. All major products had price supports of some kind, through purchases by state-owned enterprises (SOEs), agricultural sales cooperative unions (heavily political and grossly inefficient), and/or tariffs on imports. All important inputs were subsidized, with the highest subsidies for credit and fertilizer. Fiscal transfers to agriculture amounted to around 3% of overall GDP, making agriculture a huge fiscal burden, while the high prices of basic foods taxed poor consumers. Despite this enormous volume of support, agricultural growth was very low and declining in the 1990s because the mechanisms of support were so inefficient.

Starting in 2000, the government implemented an economy-wide reform program, including big changes in the agricultural support programs. The reforms:

- Drastically reduced transfers to SOEs and the agricultural service cooperative unions (ASCUs). The ASCUs were not genuine farmer cooperatives, but rather agents of the government, run in a top-down manner. The reforms reduced the inefficient interventions of SOEs and forced restructuring of ASCUs to make them real member-operated coops. The program provided technical assistance and a revolving fund to help ASCUs restructure and to pay severance for the estimated 12,000 employees that were redundant, out of 16,500 total staff.
- Provided grants to farmers transitioning away from crops that had been heavily supported (hazelnuts and tobacco).
- Provided all farmers with an area-based (decoupled) support payment (Direct Income Support, DIS) to cushion the shock of the removal of other supports. All farmers were eligible, and the amount of a farmer's payment was based only on the area farmed, not on production nor input use. The objective was to support farmers and partially compensate them for the income they lost through other elements of the reform program.

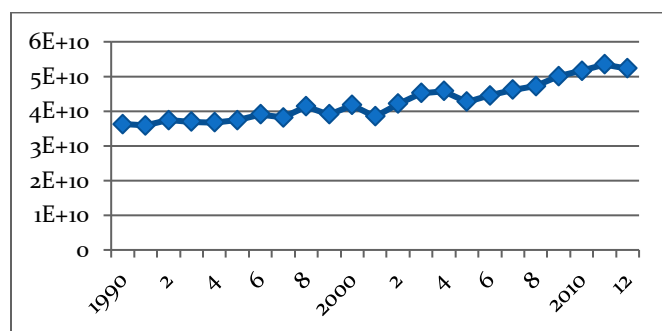
These policy measures benefited the national budget and consumers. The Producer Support Estimate—a measure of support used by the Organisation for Economic Co-operation and Development (OECD) to indicate how much support is given to agricultural producers—fell from 24% of total agricultural production value in 1999 to 10% in 2002. The Nominal Protection Coefficient, which measures trade policy support, fell from 1.24 to 1.10. Consumers benefited greatly, as the Consumer Subsidy Estimate (how the OECD measures the benefit or tax on consumers from measures supporting agriculture) fell from –22% (that is, an implicit tax on consumers of 22%) to –8%. The overall savings to the government budget amounted to about US\$4.28B per year. However, because the inefficiencies and leakages in the previous system had been so large, the loss in actual transfers to farmers was estimated at only around US\$2.78B. Of this, the new DIS payments compensated for US\$1.25B.

The DIS system was begun in 2001/02, following a pilot land registration program in 2000/01. All agricultural land was eligible for DIS payments and the program covered about 2.75 million farms. Payments were denominated in Turkish lira and were originally set at the equivalent of around US\$90 per hectare. This amount had to be adjusted periodically to remain close to that level in real terms. In the short term, the DIS replaced about 40% of the income that farmers lost from other aspects of the reform program.

The DIS program was successful in its objectives. The DIS program made it politically feasible for the government to implement the reforms. Econometric estimates showed that each US\$1 in DIS generated around US\$2.5 in agricultural value added. As a side benefit, land registration for the DIS system created a National Registry of Farmers and completed the land cadaster, setting the stage for potential EU accession (which has not occurred for other reasons) as well as for modern banking and real estate systems. Land registration facilitated a program to consolidate isolated parcels of land, which eventually consolidated 106,935 dispersed parcels covering 65,700 ha into 50,625 parcels, all with road access.

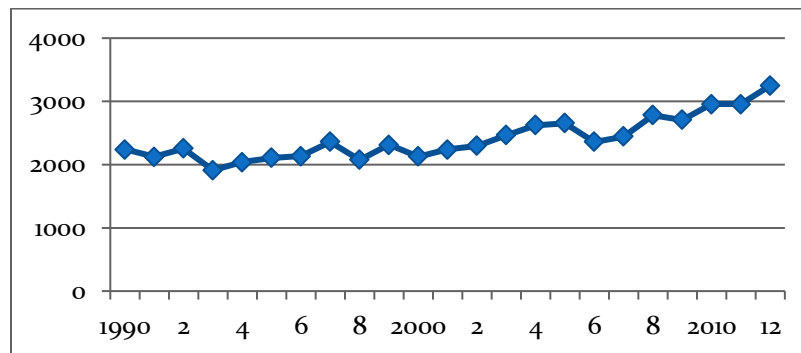
The reform program accelerated agricultural growth. The immediate impact of the removal of subsidies and protection was a decline in product prices of 13% on average, and a similar percentage increase in input prices. Not surprisingly, crop production and value added fell (Figure 25), but not by much (only about 2%), and a rapid recovery and acceleration of productivity and growth ensued. Value added per agricultural worker (a good measure of the incomes of workers) increased from a bit over US\$4,000 before the program to just under US\$7,000 about 12 years later. Cereal yields per hectare, which had been stagnant all through the 1990s, increased rapidly—about 50% in this period (Figure 26). Food production increased by close to 45%.

Figure 25: Agriculture value added, Turkey, 1990–2012 (constant 2005 US\$)



Source: World Bank staff estimates from government statistical data.

Figure 26: Cereal yields (kg/ha), 1990–2012



Source: World Bank staff estimates from government statistical data.

Micro-level Policies, Investments, and Innovations to Support Transformation

As the eight paradigms underpinning the government’s “New Thinking” imply, the strategy for agricultural transformation will have several elements. One element in almost all successful agricultural strategies is export orientation, which is established through the kinds of overarching reforms described in the previous section. Other elements of the strategy must be brought into being through interventions at a more micro level. This section focuses on the elements of consolidation, modernization, and industrialization. For each one, there is a rich global experience from which to draw lessons. Clearly not all of these experiences will be equally relevant for the Philippines, and it is beyond the purview of this report to carry out the kind of in-depth analysis that would be required to make hard recommendations or to design detailed implementation strategies. Rather, the examples here are intended to serve as a menu of options to be considered to tackle specific challenges.

Consolidation

The agrarian structure and physical geography of the Philippines create significant challenges for transforming the country’s agriculture. Very small landholdings and an overall fragmented agrarian structure make it difficult for Philippine farm households to earn adequate incomes. These features also add to the logistical challenges and high transaction costs of aggregating output and prevent economies of scale in production and postharvest activities. The logistical burden is made heavier by the country’s physical geography and underdeveloped rural infrastructure.

This section highlights several strategies and institutional arrangements for overcoming such constraints. It draws attention to how they have been applied in middle-income Asia and Latin America and underscores suitable roles for government to play in facilitating them. There are many potential approaches, and this discussion is not meant to be comprehensive. Relevant international experience is clustered here under three headings: (i) land consolidation and cooperative farming (aggregating at the farm level); (ii) contract farming and productive alliances (aggregating vertically from farmers to agro-enterprises), and (iii) agricultural cluster development (spatially aggregating producers, processor/packers, and service providers).

CO 1: Land consolidation and cooperative farming¹⁵

While the government cannot create new arable land, it can pursue policies to support, consolidate, and intensify farming operations on the land that is still available. Drawing upon regional examples, three basic approaches are discussed here: (i) consolidation to increase the average size of farms into viable commercial units, through sale or lease; (ii) consolidation to reduce fragmentation of smallholder plots; and (iii) cooperative farming, in which individual farmers retain ownership of their land but farm it jointly.

Several Asian countries have been actively promoting consolidation through sale or lease. Although leasing can be done on an informal basis, formal sale and leasing require that the title must be recognized. Many countries struggle to provide appropriate registration systems. Despite continued emphasis on smallholders by governments and international agencies, there is a growing view that farmers should be assisted to “move up or move out” of farming. China has been particularly active in promoting consolidation, and evidence suggests that it has led to increased investment for agricultural production and facilitated temporary or permanent migration to urban areas by people who no longer wish to remain on the land. Prior to reforms under which certificates were issued to confirm a person’s title to land, farmers were reluctant to migrate for fear of losing their land to expropriation. The new system permits sale and lease of land rights. Around 25% of rural households have rented out their cultivated land. Compared with past practices of only renting to friends and relatives, recent transfers have included leases to farmers’ professional cooperatives, as well as private companies (Box 7).

Box 7: Recent land consolidation trends in China

From the 1980s to the mid-2000s, China experienced a decline in the average size of farm holdings as a result of rural population growth and the conversion of a considerable amount of farmland to urban and industrial uses. Since then, land consolidation has occurred in several parts of the country. This process has been driven by rising labor costs and out-migration and been facilitated by: (i) the emergence of local government land transfer services (providing information, contract design, and dispute settlement services); (ii) policy support in the form of loan guarantees and subsidies for larger farm investments; and (iii) the emergence of an active market in mechanization services.

Huang and Ding (2015) report that in 2013, some 53 million rural households (23% of the total) had rented out some agricultural land. Their survey in northeastern and northern China points to a remarkable increase in the average size of farm holdings from 1.03 ha in 2008 to 1.73 ha in 2013. In parallel with this expansion in the size of household farms, a growing number of land cooperatives and company-run farms have emerged. Land cooperatives occupy around 200 ha on average, and company-run farms occupy 100 ha; together they accounted for an estimated 20% of all agricultural land in these regions in 2013, up from a negligible share only six years earlier.

To facilitate land transfer and consolidation in China, local governments set up land transfer service centers. Most of these service centers or platforms have been established at the township level, and in some cases a larger networking platform has been developed to pool rental information across townships. The main responsibilities of land service centers are to: (i) collect information on who is looking to lease out; (ii) provide potential clients with information on location, area, major land characteristics, and

¹⁵ This discussion is derived primarily from Shepherd (2019).

suggested price of land to be leased out; (iii) prepare a formal land contract; and (iv) be responsible for contract dispute mediation.

In Vietnam, a model called “big tenant, small landlord” has been developed to consolidate small pieces of land into large fields. Farmers with small amounts of land lease their land use rights to other farmers, cooperatives, or commercial enterprises, who then manage larger land areas. Lease arrangements can be anywhere from one to twenty years, and the consolidated fields typically range in size from 5 to 20 ha. One advantage of this model is that elderly farmers can earn a reliable rental income if younger family members have migrated to urban areas, which is common. If younger people do stay, they often receive priority for employment on the consolidated farm.

Consolidating land through leasing arrangements has some problems that remain to be resolved. First, there is often a lack of trust between farmers and commercial enterprises leasing the land, and there is no clear arrangement for arbitration of disputes. The short-term leases resulting from this lack of trust mean that the party leasing the land will be reluctant to make improvements. Second, land that has been leased and improved (for example, through the construction of a farm building) cannot be used as collateral for bank loans. Third, there are official limits on the amount of land that can be accumulated in this way. Finally, the land is often fragmented into many small plots, increasing the costs of consolidation. Investors have to negotiate with a large number of households to accumulate a significant area of land. If a few farmers decline to collaborate, the whole venture is jeopardized, as tractors and combines must work around individual holdings in the middle of a larger farm.

Another approach is to restructure land holdings while ensuring that farmers retain the same amount of land. In Uttar Pradesh in India, a government program straightened field boundaries to reshape holdings into rectangular form as much as possible. This work improved the ease of cultivation, particularly plowing, and lessened disputes due to unclear border demarcations and encroachments. Unnecessary field boundaries were eliminated, increasing the total area available for farming and saving farmers time in moving from one farm to another. In the Dinh Hoa Commune of Vietnam, land consolidation has similarly reduced the number of plots owned by individual farm households, thereby increasing the average size of a plot without changing the total area of farmland belonging to each household. This effort to restructure holdings, in which the local government works with smallholders, has reduced labor costs, increased mechanization, and permitted some restructuring of irrigation systems.

In cases farmers collaborate to carry out farming activities on a cooperative basis. Rice seems to be particularly suitable for this kind of collaboration between farmers. It normally grows in standing water, and because farmers in a village traditionally share the same water reserves, they already need to cooperate in managing this common resource and maintaining the irrigation system. In addition, paddy farming requires a large amount of labor. To address labor shortages during planting and harvesting, farmers in rice-producing villages in Indonesia sometimes form cooperative labor exchanges, working on one farm one day and another the next.

Joint farming can be done informally, by producer organizations, or through government initiatives. An example of informal coordination by smallholders comes from southern Cambodia, where the use of combine harvesters for paddy increased rapidly a decade ago. In some areas farmers planted different varieties at different times, and combines had trouble accessing fields, because to harvest one farmer’s field, a combine would have had to drive over the growing crop of another. To overcome this problem, farmers agreed to plant the same variety at the same time. This practice not only facilitated harvesting

but led to greater aggregation and the possibility selling in bulk to buyers. This approach may have been inspired by the Small Farmers, Large Field (SFLF) program in neighboring Vietnam, which buys significant quantities of Cambodian paddy.

Under the SFLF program, Vietnamese farmers integrate their small rice areas into one large field, operated under a variety of arrangements. This system gives farmers greater bargaining power with buyers and input suppliers, increases the use of on-farm and postharvest mechanization, yields an aggregated supply of just one rice variety, and has improved storage. In some areas, membership in the SFLF program is essential for farmers wishing to become involved in contract farming. Under the SFLF, participating farmers organize themselves into groups, often with assistance from local authorities. They synchronize their operations by adopting a single rice variety to plant. Instead of operating their own nurseries, they establish a group nursery, transplanting and harvesting around the same time, thereby converting their small plots into a large field. This creates favorable conditions for the application of improved technologies such as combine harvesters, and for improvements to irrigation. The SFLF programs range from formal arrangements, in which farmers set up a company structure and become shareholders, to the informal coordination of activities. They invariably involve aggregation of the paddy, with sale to one buyer, with or without a contractual arrangement, as well as group purchase of fertilizer and pesticides. Occasionally, the enterprise purchasing the paddy also supplies seed. Studies indicate that SFLF farms have been more efficient than individual small farms and that farmers have higher levels of productivity.

Several countries have launched joint-farming initiatives, whereby farmers pool their resources, including land, under a central management unit. Through an initiative of the Nepal Agricultural Cooperative Central Federation (NACCFL), which groups over 800 agricultural cooperatives, neighboring farmers lease their land to NACCFL for 15 years and keep working on the joint plot (about 70 ha). They are paid according to their work and receive income from leasing the land. As discussed in Chapter 3, parcels allocated to smallholders after land reform in the Philippines were too small to farm efficiently. Block farming was introduced among sugarcane producers in 2011 to encourage farmers with contiguous areas to join together as cooperatives or producer organizations to achieve economies of scale in their farm operations (land preparation, planting, fertilizer and chemical application, weeding, and harvesting). A related development is the “one village, one product movement,” which began in Ōita Prefecture in Japan in 1980. Under this program, communities agreed to produce goods with high added value. The program has been copied by India, Nepal, Thailand, and other countries, but it seems mainly to have been limited to products that, although of high value, have limited demand.

CO 2: Contract farming and productive alliances¹⁶

Contract farming is a transaction-based approach to coordination in agri-food value chains. Though contract farming is centuries old and its track record is mixed, there is rising interest in its potential to address traditional as well as emerging challenges related to food production and marketing. These challenges include increasing demand for quality, sustainability, traceability, and certification, and growing competition for agricultural land and labor. On the most basic level, contract farming is one way of potentially reducing the transaction costs involved in sourcing agricultural products and getting them to market. Though there is no single contract farming model, it generally involves a formal agreement—

¹⁶ This discussion draws primarily from Will/GIZ (2013), World Bank (2016), World Bank (2017), and Shepherd (2019).

often between a multiplicity of producers and at least one buyer such as a processor or trader—to buy/sell agricultural products on terms established in advance. In addition, it is common for contract farming agreements to address market failures surrounding the provision of agricultural inputs, technology, and services such as finance, extension, training, transportation, and logistics—by involving buyers or third parties in delivering these to farmers.

Contract farming has also become a growth strategy for processing and trading firms under pressure to comply with standards and resolve tightening land, labor, or other resource constraints. To remain competitive, firms increasingly must meet more rigorous or restrictive environmental, labor, social, land-use, food safety, quality, and traceability standards. In some contexts, smallholders can become a source of competitive advantage by providing access to ever scarcer land and labor resources, and local farming knowledge. Comprehensive, forward-looking arrangements with such producers can help lower the costs and increase the feasibility of meeting higher standards. Buyer involvement ranges from providing or dictating the use of certain inputs (specific varieties) to controlling or investing in most aspects of production from land preparation to harvesting (land, machines, staff, management). The latter is often true when large volumes of a commodity need to be of a uniform quality for processing (sugarcane, cotton, coffee, tea, dairy, poultry, and so forth) and when buyers source from their own estates as well as contracted farmers (for example, outgrower schemes involving perennials).¹⁷

While contract farming is primarily led by the private sector, government support for such arrangements is not uncommon on the grounds that they contribute to broader policy objectives, such as inclusive growth, food security, or the protection of natural resources. Besides improving the enabling environment (the rule of law, the quality of infrastructure, health, and education, political stability, financial markets, and so forth), government can encourage contract farming by facilitating interactions and brokering transactions among potential counterparts, establishing a legal framework for farming contracts, putting economic incentives in place, building technical and institutional capacity, and educating counterparts about potential benefits and risks. India, Morocco, Thailand, Vietnam, and other countries have developed formal policies aimed promoting contract farming.

Not all farmers are suitable for contracting, whether working directly with companies or through producer organizations. In choosing farmers, companies are first likely to consider factors such as agronomic suitability of the land; climate, pests, and diseases; the location of the farm; and suitability of infrastructure such as roads, electricity, and communications.¹⁸ Companies should also meet certain criteria, and smallholder representatives or governments should carry out “due diligence” to minimize risks of signing contracts with unsuitable buyers. While it is unrealistic to require all companies to have had previous contract farming experience, it is desirable that some of their employees have had such

¹⁷ When it goes well, contract farming can offer buyers greater consistency in terms of quality and volumes, a better alignment of supplies and customer requirements, and lower operating risks and costs. For smallholders, central benefits of successful contract farming include enhanced access to markets along with higher and more stable incomes. Under some arrangements, producers negotiate an equity stake (in other words, they become joint owners of productive assets such as land and processing facilities).

¹⁸ Having selected the locations where they want to work, they will then carry out a further search for suitable smallholders, using criteria such as farmers’ assets and access to finance (to pay laborers, for instance); their capacity to meet market requirements (their ability to follow cultivation instructions), and the amount of land they have available. As the best land is usually densely populated, however, companies will inevitably end up working with farmers with small land areas, even if that is not their preference. There appears to be much fluidity in smallholder involvement in contracts, at least for seasonal crops, with farmers working for one company in one year and another the next.

experience, as poor managers can jeopardize success. Research suggests that the main factors leading to successful operations were the prior strength and capabilities of lead firms. Where these operations were well managed, had ample finance, and had a competitive position within domestic or international markets, it was possible to have reasonable success with upgrading smallholder production.

Contract farming works better under some circumstances than others. It is generally more common for crops that are of high value, difficult to grow, perishable, require prompt processing (oil palm, tea, sugarcane, tobacco), or are subject to strict standards. It also seems to work better when there are few alternative markets for the smallholders, thus limiting the chances of side selling. In the case of vegetables, contract farming is usually less risky for a company when it is working with farmers on crops for which there is little local demand or on specialized products, such as organic crops, for which the company can pay a premium. Experience to date suggests that rice and other staples are not really suitable for contract farming. Because companies can obtain supplies of staples from multiple sources, they have limited incentives to introduce contracts for standard varieties for which there are no quality specifications and multiple buyers. The main examples of contract farming in rice production involve varieties that command a premium on national or international markets, such as aromatic varieties and organic rice. Several contract farming operations are in place for these purposes, including in Cambodia, Laos, and Vietnam.

Another approach to consolidating some critical mass of small primary producers and at the same time linking them with distributors or processors is an anchor-company approach. This is the strategy of the productive alliance projects financed by the World Bank. Productive alliances involve three core actors: a group of organized smallholder producers, one or more agro-enterprise buyers, and the public sector. The approach aims to promote horizontal alliances among the producers as well as a vertical alliance between the producers and the buyer(s). Typically, a business agreement is signed between the agency in charge of the program or project (for example, a government ministry), the commercial partner, a service provider, and a producer organization. The agreement specifies product characteristics (such as varieties to be grown), the quantity to be purchased, production methods, and logistical arrangements (such as how and when the product will be delivered). It also defines how the price is set and payment made and indicates any contributions of the buyer, such as input provision and technical assistance. Most programs include some provision of grant resources, usually for technical assistance to address technical issues, build relationships between the farmer groups and company, and sometimes also to help co-finance infrastructure and equipment (for example, related to irrigation or commodity storage).

A typical productive alliance program in a country might involve support to 100–300 such partnerships, either focused on a few commodities or offered to a wide set of value chains, and the participating farmer groups tend to have 50–100 members. As with contract farming, the productive alliance approach is not suitable for the poorest smallholders. Projects generally work with “transitional smallholder producers” who lack well-established linkages to buyers and markets but have the willingness and capacity to engage in modern markets. To be considered, smallholders must already be engaged in market-oriented production and have the potential to generate income and jobs. The participating companies are generally small and medium food/agricultural processors, produce packers, seed companies, and commodity exporters, although sometimes larger companies are involved.

Usually, an information campaign is conducted to raise awareness of the productive alliance program among producer organizations and companies. This campaign is followed by the issuance of a call for proposals, which is often made by the agriculture ministry. Producer organizations start the process by preparing basic business plans, which are evaluated against strict predefined eligibility criteria, thereby

minimizing the risk of political interference. If chosen to be taken further, a proposal is developed into a more detailed plan, usually with the help of a business development service. From the beginning, the plan should indicate the commercial partner. Following the final funding agreement, program funds are transferred to the producer organization in installments, which are paid on receipt of evidence that the previous installment was used as intended. The grant is expected to be matched by contributions from the producer organization and the buyer (in the form of technical assistance and inputs) and, possibly, funding from public institutions and bank loans.

Even when there is effective screening of proposals and timely assistance to the partners, upwards of one-third of the alliances have tended to break down during or after program support. In some cases, farmers have been unable to maintain the stringent quality requirements of the buyers. There have been weaknesses among the producer organizations, including failure to communicate with members, poor management, inability to manage conflicts, and a lack of social cohesion within the organization. Lack of management skills is perhaps inevitable when the groups are relatively small. Only much larger producer organizations can afford to employ full-time managers. Alliances also sometimes break up owing to adverse developments in the overall commodity market or other commercial or financial problems experienced by the partner company. Program success involves more than disbursing money. Detailed assessments need to be made of the capacities of the prospective producer organizations and company partners. The quality of available business development services also needs to be checked and, ideally, strengthened, and any emerging problems need to be managed.

Considering contract farming and productive alliances together, governments and donors can be of considerable assistance in facilitating linkages between companies and farmers. Government usually assumes an active facilitation role in coordinating farmers and matching buyers and producers when a contracting or broader partnership operation is in the planning stages. Government can also play a conflict resolution role. However, several points of caution are necessary. External support may provide the chosen companies with an unfair competitive advantage over others. Thus, the support provided should be relatively limited and should concentrate on aspects such as group organization and trust development, and avoid direct subsidies to operations of the companies. Careful consideration is needed for the sustainability of interventions and outcomes. Collaboration with government and development agencies makes sense for the private sector when it has modest costs to bear, but subsequently taking on those costs may not represent a sustainable business model. The long-term sustainability of many contract farming or productive alliances often depends upon how well programs link the involved players with financial institutions, as grant resources are short-lived.

CO 3: Cluster development

Agro-based clusters involve the co-location of all or many actors involved in the production and transformation of a commodity. This co-location helps to spur innovation, reduce transaction costs, and enable the sharing of infrastructure, skilled labor, and services. The concept is an agri-food model that resembles what is sometimes referred to as the “economics of agglomeration” in the case of cities.

Public sector promotion of agro-based clusters has emerged as one response to the productivity and market pressures on agro-industry arising from globalization, standardization, high-value production, massive growth in demand, retail and packaging innovations, and a ramp up in efficiency. These clusters have been particularly helpful to export agriculture by improving productivity, value addition, and access to high-value markets. They have also benefited small producers by allowing them to participate in

economies of scale and share costs related to training, quality management, market information, and capital-intensive assets. Another benefit of clusters, in some cases, has been their contribution to creating a regional or brand identity, often with links to other clusters such as tourism (Galvez-Nogales/FAO 2010).

The public sector can support clusters in multiple ways. Examples include the creation of special economic zones, investments in human capital through education and training, the promotion of cooperation among firms, efforts to strengthen applied research institutions, and the adoption of other industry-friendly policies. Box 8 provides examples of public sector support for agro-based clusters in Latin America.

Box 8: Public sector support for clusters: Examples from Latin America

Clusters do not usually emerge spontaneously, but take shape through the efforts of agents such as government, large local firms, foreign direct investors, and universities, often working in concert. In most cases, clusters are shaped by public-private collaboration. The flower cluster in Ecuador and apple cluster in Santa Catarina, Brazil, for example, were the product of public collaboration with lead firms. In some cases, the private sector has played a driving role and government has only become involved at a later stage, as in the case of the Rio Grande do Norte melon cluster in Brazil (Galvez-Nogales/FAO 2010).

Chile's salmon cluster is an example of government playing a significant, supporting role. That cluster is known for having turned Chile, previously a minor player in the salmon industry, into the world's second-largest producer. The stage was set for this remarkable achievement by the reforms of the 1970s and 1980s, discussed earlier, which reversed policies favoring production of import substitutes and discouraging exports. In this case, government helped by building trust and facilitating joint action among different industry players. It also funded and collaborated in research and program design to overcome a wide variety of challenges related to upgrading (fish health and genetics, supplier management and certification, vaccine registration, coastal zoning, fisher registration, regulatory enforcement, and clean production). Much of this was done through or in collaboration with Fundación Chile, a nonprofit private sector organization established in 1976 by an agreement between the government and private sector with the objective of improving the competitiveness of Chilean products. The government's export promotion organization, ProChile, also played a role by actively promoting the products abroad. As in Chile's multiple fruit clusters, an integrated territorial program that sits within a key industry association helped to align regional government efforts with business needs.

In some cases, as in the Chilean and Argentine wine clusters, government support has been decisive. In both cases, the government played a pivotal role in liberalizing grape and wine production and exports, as well as in enabling collective marketing and export promotion efforts. The public sector in Chile also supported technology absorption, especially by small producers, while in Argentina, the government promoted public-private partnerships and participatory governance which engaged industry in mutual monitoring.

Examples of government single-handedly creating clusters from scratch are extremely rare. The Brazilian Petrolina-Juazeiro mango and grape clusters are exceptional in this respect. Government-created clusters tend to be rare because the vast majority of clusters build upon the co-location of their actors and the formal and informal linkages between them—elements that develop organically, over time, even if they are later encouraged.

Modernization

No country has succeeded in transforming its agriculture from a low-productivity, low-income, resource-intensive sector to a dynamic engine of sustainable growth and prosperity without taking advantage of the many recent innovations in production technologies and policies—the process of modernization. As highlighted in Chapters 2 and 3, the Philippines has experienced only modest improvements in agricultural productivity in recent decades, despite the considerable public resources

invested in irrigation, agricultural advisory services, and input subsidies. The clearest indications of a productivity problem are the weak advance in average rice yields and the very slow growth in TFP for the sector. Agricultural labor productivity has been increasing, although largely because of rural out-migration of underemployed workers, rather than to efficient farm mechanization and diversification. The slow intensification of Philippine agriculture means that its environmental footprint is somewhat lower than the footprint of agriculture in several other middle-income Asian countries, yet Philippine agriculture is still a growing contributor to pollution and greenhouse gas emissions. Overall, the Philippine agricultural sector has not been on the cutting edge of innovation, and the lack of innovation is reflected in its performance. This section examines international experience in a variety of technical and thematic areas associated with innovation and the modernization of agriculture. It focuses on (i) agricultural mechanization, (ii) approaches to the greening of agriculture, (iii) agricultural applications of ICT, (iv) paradigm shifts in agricultural extension, and (v) elements of irrigation modernization.

MO 1: Agricultural mechanization

Mechanization is a central component of agricultural modernization, not least because of its power to increase land, input, and labor productivity on and off the farm and to reduce the drudgery of farming. Going forward, mechanization could play a central role in enhancing the agricultural sustainability. Historically, mechanization has often been detrimental to the environment and farming resources by contributing to soil compaction and erosion, increasing tillage, and spreading chemical pollution. More recent choices and uses of labor-saving technology (such as no-till agriculture or precision farming, which both reduce water and chemical use) have demonstrated potential to facilitate sustainable farming practices and improved labor conditions in parts of the world.

Throughout East Asia, agricultural mechanization has been a joint product of structural transformation and direct public sector support. Mechanization has generally accelerated where the pull of industrial and urban employment has led farm labor to dwindle. Rising labor costs make farm machinery more financially attractive. And out-migration can aid mechanization by increasing rural incomes and the size of farming operations, and thus farmers' ability to invest in and recoup the costs of machinery—though empirical evidence of this outcome is mixed (Luo and Escalante 2015). In the Republic of Korea, mechanization took off in the 1970s, even as rapid industrialization drew labor away from farms. In China, the use of tractors and other machinery rose rapidly in the 1980s and 1990s, possibly in response to farm-labor constraints thought to have preceded the rural population's outright decline, starting in the mid-1990s (Yang et al. 2013). In Japan, mechanical cultivators became prevalent in the late 1950s, when post-war industrialization drove agricultural wages up (Pingali 2007).

Governments have directly intervened to promote mechanization, often in the name of agricultural modernization and competitiveness, but also food security. Notwithstanding national differences, a recurrent motive has been the perceived need to compensate for labor shortages to prevent food production from declining. Furthermore, mechanization has meant confronting a range of challenges classically associated with technology diffusion—related to risk aversion, information asymmetries, and coordination failures. In East Asia, governments have used a combination of supply- and demand-side interventions to address these challenges (see Box 9 on Korea's mechanization plan). The supply side has sought to stimulate the domestic production, absorption, distribution, and servicing of agricultural machinery, while the demand side has been geared to stimulating the adoption and use of machinery by agricultural producers.

On the supply side, even if a country can rely primarily on imported equipment, mechanization cannot progress without investing in national capacity to adapt machinery to local needs and conditions, as well as to operate and service equipment over its useful life. Accordingly, East Asian governments have resorted to a range of measures to develop a domestic machinery industry. Examples include training a class of specialized engineers and technicians; shielding national firms from competition (restricted market entry, fiscal advantages, subsidized debt, guaranteed sales); and courting foreign technology transfer through various arrangements. In China, notably, the government has pursued a policy known as “exchange of market for technology,” which consists of facilitating the entry of foreign firms (relaxing restriction on foreign investment, offering fiscal advantages) to participate in domestically-beneficial joint ventures (for example, John Deere-Jalian) (Wang 2013). China now sports a healthy machinery industry that caters both to home and export markets (Gao 2006).

Box 9: Korea’s Agricultural Mechanization Plan: Combining supply- and demand-side components

Korea’s first Five-year Agricultural Mechanization Plan, dating to 1970, can be used to illustrate this combination of supply and demand components. Focused on promoting the uptake of small-scale machinery (such as power tillers) in rice farming, the plan supported research and development to adapt equipment to Korean conditions, favored Korean-made machines, and strengthened machinery inspection and quality control services. It also required manufacturers to develop far-reaching sales networks and after-sale services, and to collaborate with public extension services that were put in place to train farmers in the use of machines.

The National Agricultural Cooperative Federation, present across the country, also took part in promotional efforts. Meanwhile, farmers were given access to concessional credit to purchase machinery or lease equipment purchased by a joint-use organization put in place for this purpose. By the 1990s, and several plans later, the mechanization of Korea’s rice sector could be considered complete, and Korea had become an exporter of agricultural machinery to developed countries. Subsequently the government’s focus shifted to the uptake of machinery to support value addition (for example, in horticulture) (Yun Jin Ha and Kim Kyeong Uk 2013; Kang jung-il 2006).

On the demand side, one impediment that is specific and central to the adoption of agricultural machinery—everywhere but particularly in East Asia—lies in its high fixed costs. Although machines come in different sizes and levels of sophistication, their indivisibility can represent a barrier to the adoption of costly equipment. This problem is particularly apparent in regions such as East Asia, where landholdings or farming operations have remained small, limiting individual farmers’ ability to recoup a large investment. To address this issue, one approach has been to support direct equipment purchases by farmers, using such instruments as price subsidies, concessional credit, and extension services (while simultaneously fostering the development of machinery adapted to small farms and their environment). In China, for example, short-listed machinery has been eligible for subsidies since 2004. By one account, however, only 2–3% of (larger) farmers have taken advantage of the subsidy (sources cited in Gale 2013). The opening of land rental markets in China has given rise to larger farming operations that can take advantage of machine services (Wang et al. 2014.)

A complementary and potentially more effective approach has been to promote equipment sharing arrangements, such as joint ownership, leasing, and farming services. The Chinese government, for example, aided the development of now widely used combine service enterprise clusters by subsidizing the price of machines and warehouse space; exonerating them from road tolls while improving roads; and offering them market intelligence (such as harvest calendars) that helped them to develop viable service areas spanning multiple provinces, across which they can spread high fixed costs. The government also

helped these entrepreneurs develop cooperative relationships that have enabled them to share the costs of maintenance and coordinate their service areas—for instance, by paying for their cell phone communications for a time (Yang et al. 2013).

MO 2: Approaches to the greening of agriculture¹⁹

While contributing to economic and income growth, market-oriented agriculture has sometimes contributed to the degradation of ecosystem services, including deforestation and greenhouse gas emissions, biodiversity loss and wetland destruction, soil erosion and degradation, and surface water pollution and depletion of aquifers. This situation not only creates problems for domestic society and the planet, but also calls into question whether a production model that draws so heavily on environmental services can be sustained over time. A recent regional study drew attention to some of these issues in the Philippines, including major problems of water pollution due to agricultural chemical run-off and substandard livestock and aquaculture waste management, air pollution from aerial chemical spraying, and soil erosion and biodiversity loss in the areas near banana plantations.

These impacts are not inevitable, and a wide range of instruments can and are being used world-wide to reduce agriculture’s environmental footprint (and benefit from perceptions of eco-friendliness in consumer markets). These instruments include various regulatory, financial, and advocacy mechanisms employed by governments and/or non-state actors to induce or facilitate more eco-friendly agricultural practices. Recent global and regional assessments of international experience have characterized the different roles that government is playing in this space and have drawn lessons from the application of different policy instruments.

This field is large and developing rapidly, making it difficult to provide widely applicable lessons or recommendations. That being said, a few generalizable insights may include:

- **Progress in the “greening” of agriculture typically occurs through incremental steps and by programs that are gradually rolled out, rather than through grand solutions initiated at scale.** There are many reasons for this, including: (i) the preference of most farmers to be “second movers” who observe and draw lessons from early adopters, (ii) the common situation where some new practices are relatively easy and inexpensive, while others are more challenging to implement (or the business case for adoption is less evident), and (iii) the need to build up trust and close coordination among multiple stakeholders and agencies.
- **Different levels of government often play distinctive roles in successful initiatives.** While national government entities normally serve as regulators, funders, and providers of scientific information, local government entities need to apply “soft skills” in helping to promote green agriculture initiatives, in mobilizing and supporting people for collective action, and in finding ways to adapt or interpret broader regulations to fit local circumstances.
- **Agricultural sustainability initiatives often struggle to mobilize sustainable financing.** Market premiums for (certified) sustainable produce rarely provide sufficient margins to fund complex technical and institutional programs. Public resources are generally important, even in programs where the private sector plays a major if not leading role.

¹⁹ The discussions of Korea and Vietnam draw heavily on Cassou (2018).

- **The scalability of agricultural sustainability programs requires:** (i) the development of accurate and timely land use and environmental monitoring data, (ii) a strong convergence if not full alignment between agricultural promotion and environmental protection policies, (iii) the development of local, regional, and national multi-stakeholder coalitions, and (iv) approaches which combine value-chain and spatially focused initiatives.

The examples in Box 10 illustrate how investments and policy tools can be deployed in the interest of improving the environmental performance of agriculture.

Box 10: Public-private water services and water quality protection in Latin America

In several countries, including Bolivia, Brazil, Colombia, and Ecuador, companies have partnered with municipal authorities and environmental non-profits (notably The Nature Conservancy) to put in place water funds that aim to offer participants a cost-effective means of securing the clean water resource on which they depend. These funds are used in large part to incentivize landowners, farmers, households, or communities to adopt better land management practices, often in connection with farming, which reduce erosion and pollution and improve water quality downstream. In Latin America, at least 23 local water funds invested US\$3.8M in watersheds in 2011, affecting an estimated 125,000 ha (Benett et al. 2013). Contributions to these funds are mostly voluntary, although some (Ecuador) benefit from earmarked water-user fees and municipal contributions. Several receive contributions from agribusiness, including sugar mills and breweries (Colombia). Though some offer cash payments, several offer in-kind incentives such as training and agro-inputs, finding that these can be better perceived by and more motivating to stewards of the land. It is also common for these programs to work with and build the capacity of community-based organizations. In fact, these programs often prefer to refer to themselves as reciprocal watershed agreements or cost-sharing programs rather than as payment for ecosystem services programs (PES), with their more market-oriented overtone.

In Colombia, a global beverage company has used PES to help protect the water resources on which its operations depend. The impetus came partly from rising water fees. With operations on the outskirts of Bogota, the company depends on the public water supply, but water quality was being compromised by upstream agriculture and related land clearing and degradation. Water users were bearing the burden of escalating water treatment costs. The company has partnered with the water utility company, the national parks agency, and an international conservation organization to address the problem at the root. It now pays into a water fund that is used to support stewardship activities designed to keep sediment out of the waterways that supply Bogota. Under one of the company's initiatives, farmers are paid to adopt modified farming practices, to restore degraded lands, or to relocate their activities—in particular, to graze livestock on less steeply sloping pastures.

Vietnam has taken a somewhat different approach to greening of support by leveraging credit subsidies for more sustainable agriculture. In the early 2000s, Vietnam began to phase out general direct credit subsidies that had been provided through the state-owned Vietnam Bank for Agricultural Development and established a non-profit Vietnam Bank for Social Policies in 2003. The mandate of the Vietnam Bank for Social Policies was to provide more targeted preferential (subsidized) agricultural credit to disadvantaged groups. Preferential credit was also provided for specific purposes, including as a special response to the food crisis (2009–10). One objective for which the government has been using credit subsidies is to encourage more environmentally-friendly production practices in the rice and coffee subsectors.

Rice production in the Mekong Delta is generally very intensive in the use of water, fertilizer, and other inputs. Over time, it has taken a heavy environmental toll. At the same time, there is a need for long-term finance to invest in land leveling, harvesting and drying equipment, and storage, among other

technologies. Farmers are also not well connected to wholesale and retail marketers seeking higher quality and more sustainably farmed rice.

To address all of these problems, the government (with World Bank support) began a program to provide finance at preferential terms (mostly in the form of matching grants to cooperatives), on the condition that farmers receive training to help them adopt alternative "greener" production techniques. For example, farmers receive training in crop rotation, which can reduce reliance on agrochemicals, and "VietGAP" ("good agricultural practices"), including techniques to cut down fertilizer use, reduce pesticide residues in food, and encourage the use of rice farming byproducts by recycling rice straw. Some farmers are trained in a Vietnamese rice farming protocol known as "1 Must and 5 Reductions" (1M5R) and a predecessor protocol known as "3 Reductions and 3 Gains" (3R3G). 1M5R calls for farmers to use certified seeds (the "1 must"), while reducing the use of four production inputs (seed, water, pesticides, and chemical fertilizers) and postharvest losses (the "5 reductions"). The program is also helping to link participating farmer organizations to agribusinesses.

In parallel with the rice sector, coffee production has been very input-intensive, which has resulted in very high yields (the highest in the world) but has also extracted a heavy environmental cost. Over-irrigation has depleted groundwater sources; fertilizer has been over-used, with consequent pollution problems; and coffee has encroached on forested land, some of which is not even very suitable for coffee production. Yields have fallen, and trees have become more vulnerable to disease over time. Well-managed coffee plantations can maintain high yields with trees aged 25 years or more, but in Vietnam's Central Highlands, yields were declining after just 15 years. They needed to be replanted. But since there is a 3–5 year lag from replanting until high levels of production are achieved, small farmers required long-term finance.

In response, the government instigated a program (World Bank supported) to provide subsidized credit to farmers (channeled through commercial banks), conditional on farmers' agreement to be trained in more ecologically-sound production methods and not to plant on unsuitable land. Through the program, farmers also received access to high-efficiency irrigation equipment and improved planting materials. An evaluation of the program indicated that participating farmers increased profits by 23% on average.

MO 3: ICT in agriculture

The list of ways in which applications of digital technologies can support transformational improvements in the agri-food sector is long and seemingly expanding daily. The Philippines is certainly taking advantage of some of these options—the e-commerce platform to connect buyers to sellers is one example—but the potential is far from being exhausted. Box 11 illustrates some of the ways that information technology is improving both government and private sector decision making. With an appropriate policy environment and public investments, much more could be accomplished. A good strategy to promote the promulgation of digital technologies will include measures to address the supply side (how to expand the opportunities available for agri-food agents) as well as the demand side (how to increase the appetite for use of these technologies).

To address supply side constraints, some of the main objectives would be to:

- **Craft regulations to reduce risks and costs for private sector investment in expansion of the digital infrastructure.** High-quality and stable regulations provide greater certainty for investment, serving as a necessary condition for the expansion of digital infrastructure in rural areas. Countries with

higher quality ICT regulations tend to also perform well on the GSMA Mobile Connectivity Index (World Bank 2016). Regulations that create high transaction costs are a particular problem in rural areas, which typically have lower population densities and therefore higher per customer costs of providing telecom service. They also often have higher costs of installation and maintenance. In such an environment of inherently high costs, it is especially important to use the available policy and regulatory levers to keep transaction costs as low as possible. Otherwise, if regulatory costs are also high, there is a danger that even if operators find it profitable to expand in urban areas, they may bypass the countryside. Given these unique features and requirements of rural areas, ministries of agriculture need to be closely engaged in crafting regulations, even though the regulations will for the most part need to apply country-wide. It is beyond the purview of this report to describe specific policies to facilitate investments in rural digital technology by operators, but GSMA (2018) includes such a discussion.

- **Use tax and subsidy policies to reduce costs without creating inappropriate incentives.** The most obvious policy advice in this regard is to refrain from imposing any taxes specific to digital activities or infrastructure, including import duties on necessary capital equipment. Evidence shows a strong negative correlation between sector-specific tax rates and connectivity in sub-Saharan African countries (GSMA 2018). What is perhaps not quite so obvious is that the incentive to expand coverage is affected by how the tax base is defined. Taxes levied on profits, rather than on revenue, will encourage companies to re-invest. Other kinds of explicit and indirect instruments—including Single Wholesale Networks, Universal Service Funds, and coverage obligations—have a mixed record and should be used with caution.

Box 11: Data-driven planning: Uruguay's agricultural information and decision-support system

Already well-known for its national livestock traceability system, Uruguay has been making intensive use of data and traceability systems to support the sustainable intensification and resilience of agriculture across the country. One notable initiative that relies heavily on ICT has involved the establishment of an agricultural information and decision support system, known as the SNIA (its Spanish acronym). Conceived in the wake of extreme weather in 2008–09, SNIA was originally envisioned as part of an early warning system as well as a planning tool for farmers. The data system was publicly launched in 2014 and collects data on climate, soil, and crop production.

The system rests on, but also enables, two-way information flows between the system and farmers. On the one hand, much of SNIA's data flows up from farmers; for example, since 2013, those with more than 100 ha have been legally required to submit annual soil-use and -management plans. On the other hand, its database—which compiles data from multiple other sources, including remote sensing—forms a substrate for a range of public information and advisory services, as well as decision-support tools, geared to supporting the land-use and production choices of farmers and expanding their access to markets. For example, a recently developed indicator will use SNIA data to capture the impact of weather events on production variability, using bottom-up data from the soil plans in combination with real-time weather and other nationally available data. The indicator is meant to serve both policy-level and farm-level decisions. The entire system—from data collection to use—is heavily reliant on ICT. Farmers, for example, submit all of their data electronically, via an online interface. Farmer soil plans, which need to be certified by accredited experts, are verified against the results of an erosion simulation model, and the execution of these plans is overseen using satellite imagery. The extension agents who help farmers draw up and execute these plans are being trained online as well as in person. While institutional factors are likely to be the biggest determinant of the system's success over time, its use of ICT is fundamental to the system's architecture and scalability.

Policies and investments aimed at increasing the demand for digital technologies are also important, including:

- **Investing in the skills for digital entrepreneurship.** The number of digital applications developed per person is highly correlated with basic skills (cross-country correlation coefficient of 0.89 in 2017). Incorporating more entrepreneurial and digital technology content in the curriculum of agricultural universities and training institutes could help develop useful skill sets. Mentoring and ongoing business advisory programs for enterprise development tend to be more effective than one-off training. One example is Twiga Foods in Kenya, a company launched in 2014 that uses a technology platform to improve the supply chain from farmers to markets, which has effectively benefited from mentorship programs (Google Launchpad and GSMA Ecosystem). Companies in the Africa Agriculture Incubators Network help agricultural start-ups through technical support and mentorship, including help in preparing business proposals to pitch to investors. Entrepreneurship programs that combine interventions (mentoring or coaching, finance, and access to markets) addressing the multiple constraints that entrepreneurs face tend to be more effective than single intervention programs (FAO 2014). Experience also shows that involving the private sector in program delivery is associated with improved impacts.
- **Eschewing sector-specific policies that directly undercut the benefits of digital technologies.** Precision agriculture and digital technologies for disseminating information and advice to farmers offer huge benefits in terms of both efficiency and environmental sustainability by allowing farmers to cut back on wasteful use of energy, fertilizer, other chemicals, and water. Yet where policies greatly underprice or subsidize these resources, farmers see little benefit from using precision agriculture to optimize the quantities used. Furthermore, since most subsidy schemes prescribe what fertilizer formula to use and when to apply it, farmers will be unable to rely on digital technologies to make decisions about these variables. There are of course many other benefits from reforming these policies, but clearly reform is a prerequisite for widespread adoption of precision agriculture.
- **Employing capacity building and skill development programs to stimulate demand for digital technologies at the farm level.** At the farm level, a limited understanding of how to benefit from digital technologies can undermine their adoption. Investments to increase digital literacy and knowledge can close this gap (World Bank 2016 (WDR). Support to farmers can be delivered through extension and advisory services. Government can also facilitate farmers' education in the use of these technologies by organizing farmers into groups to promote digital literacy (FAO and ITU 2016: 143-5). In addition, public-private partnerships can help farmers to understand and gain a presence in e-commerce platforms. For example, technical support was provided to melon farmers in the Xinjiang Region in China to improve the quality of melons, support online promotion, and manage logistics shipments to clients.
- **Adopting laws and regulations to address the risk of loss of privacy and the closely related questions of data security and ownership rights.** With the collection, aggregation, and transmission of large amounts of data, there is a risk that rights to privacy may be compromised, or rights to ownership of data may be appropriated without adequate compensation. Without a legal framework in place to address questions of privacy and security, trust issues will be a major impediment to widespread adoption. These risks can in principle be mitigated by appropriate legal standards for collection and use of data. Several international organizations—including OECD, the

UN, and the African Union—have developed principles or guidelines for governance of data collection, use, and flows (FAO 2019 Briefing paper). Even in developed countries, the legal and regulatory frameworks around agricultural data ownership remain piecemeal and ad hoc, but countries have been experimenting with different approaches to address data ownership issues. As an example, the US and New Zealand agricultural sectors have been using voluntary industry standards to establish an understanding on data ownership between farmers and service providers who use farm data. In 2018, a coalition of agri-food associations in the EU introduced a joint EU Code of Conduct on agricultural data sharing. The EU has also issued a Science and Technology Options Assessment dealing with precision agriculture, which includes a comprehensive discussion of many legal and ethical issues raised by data collection and use in e- agriculture, and options for dealing with them.

MO 4: Paradigm shifts in agricultural extension

Extension services across the world have been affected by and have responded to emerging trends in agriculture and technological development. This response has involved several important paradigm shifts. A notable shift is from single, state-run extension systems toward pluralistic models where different levels of government, different government ministries, NGOs, universities, producer organizations, and the private sector may all offer extension provision. While each organization may follow its own models and approaches, in general, extension is more participatory, more demand driven, more market oriented, and has greater levels of accountability, both vertically and horizontally, than in the past. Peru is one country where extension has shifted from a publicly funded, centralized approach to a more pluralistic system. A second trend has involved a more careful distinction between the provision and the financing of services. Public funds can be used for the provision of services by producer organizations, NGOs, or private service providers. Some successful examples of countries that outsourced their extension services (either partially or fully) include Chile, France, Mexico, Peru, and Uganda. This approach would strengthen coordination between multiple players to avoid the duplication of services and ensure the efficient allocation of funds to competing needs. As a result, the delivery of extension services would be more targeted and probably more efficient, timely, and inclusive. Numerous combinations of financing sources and service providers are possible in a pluralistic system (Figure 27).

A third important trend relates to the modes of delivering information and advice. Traditional extension relied on person-to-person meetings with farmers and abundant in-person trainings. In the Philippines, these activities still take the vast majority of the DA's time and resources, and yet the number of farmers reached and the frequency of these interactions are still low compared to the overall number and needs of farmers and fisherfolk. This concern is particularly pertinent in remote mountainous areas where extension logistics are challenging and time-consuming. Though personal conversations are always necessary to build trust and engage with farmers, new creative and innovative modalities of interaction should be explored and promoted, including ICTs, peer-to-peer learning, and participatory extension approaches.

Figure 27: Agricultural extension delivery mechanism and financing source

		FUNDING	
		Public	Private
DELIVERY	Public	<p>Government funds, and its extension agency provides services and training.</p> <p>*Public sector funding and delivery*</p>	<p>Producers/associations pay fee or tax (cess) to cover costs of extension services.</p> <p>*Public sector cost recovery*</p>
	Private	<p>Government funds, but shifts responsibility for service delivery to other providers:</p> <ul style="list-style-type: none"> - contracting out - subsidies to producers to hire services directly - funding NGOs for services <p>*Public sector funding of “external” extension providers*</p>	<p>Public withdrawal from funding and delivery</p> <p>Commercialization</p> <p>Privatization to private company</p> <p>Transfer to NGOs or farmer organizations</p>

International experience illustrates that ICTs offer a huge potential to save time, cut transportation costs, and be more strategic about in-person extension visits. Leveraging technology is a powerful means of spreading science-based and market-driven decision making. There is a clear and growing trend worldwide to use digital extension for diagnosing and resolving crop and livestock production problems, providing recommendations, supporting agronomic practices, and offering price and weather information, and to use digital tools to facilitate marketing. Experience suggests that ICT extension can provide easy-to-implement solutions such as phone calls, SMS, IVR (Interactive Voice Response), radio and TV broadcasts, online or shared video demonstrations, social media, or e-extension platforms. Recent studies in Southeast Asia show that an overwhelming majority of farmers now complement face-to-face interactions with phone calls, which help extension services to maintain the trust and relationships that they have built with an individual. Further steps include the use of peer group dialogues in social media platforms as word-of-mouth communication, the active discovery of information through the web and videos, and finally engagement through digitally integrated tools such as multi-purpose apps. Social media has huge potential to foster both extension–farmer communication and peer-to-peer learning, which ultimately increases extension’s outreach. Extension should target local technology champions—farmers or even their children—to act as intermediaries between extension and farmers. At the same time, lead farmers influence others and are major drivers of ICT adoption among their peers.

Countries that are reforming their approaches to extension have learned that no single model is appropriate across the broad range of farmers, types of commercial settings, and types of information. In other words, extension services need “many sizes to fit all.” For example, different producers need different kinds of advisory content, and require different modalities of delivering and funding it. Large, modern producers can rely on relatively high-tech solutions with limited or no public sector funding, while poor smallholders may not have access to the kinds of technologies that would enable them to take advantage of modern ICT and will need more basic methods of accessing extension services with more public funding.

Industrialization

While farming itself can certainly be a profitable business, much of the value addition in the agri-food sector takes place in the supply of necessary inputs and services, and after the primary products leave the farm. Development of a thriving agribusiness sector upstream and downstream of the farm itself is a key ingredient for transforming the sector and can be a big source of income and employment in rural areas. There are many approaches to raising the value added in the agricultural sector. This section highlights just a few that have shown success elsewhere and would be promising to explore in the context of the Philippines.

IND 1: Agribusiness Incubation

Agribusiness incubation has emerged over the past 15–20 years to stimulate commercial agriculture and transform comparative advantages in commodity markets into competitive advantages in differentiated product markets (Goletti/World Bank 2011). A defining characteristic of agribusiness incubators is that they directly engage with startups to help them grow, usually offering them a range of advisory and business development services geared to improving firms' competitiveness and access to markets. Box 12 describes and provides examples of agribusiness incubators.

Box 12: Types and roles of agribusiness incubators

Some incubators are dedicated to accelerating the commercialization of technology or technology transfer. Incubators focused on commercialization typically have strong ties with agricultural research institutions; oftentimes they are arms or spinoffs of such institutions. Examples include the ICRISAT-affiliated Agribusiness Incubator in India—now the country's largest agribusiness incubator; IAA-IPB, affiliated with the Bogor Agricultural University in Indonesia; and Brazil's CENTEV/Technology Based Business Incubator, affiliated with the Federal University of Vicosa. Though their ties to research are to some degree the strength of these incubators (they provide privileged access to, and understanding of, the latest research), these ties also carry certain risks.

Examples of incubators that focus on technology transfer—at the grassroots and high-tech levels respectively—are Villgro in India, and the Malaysian Life Sciences Capital Fund. Villgro accelerates the uptake of indigenous technology with activities involving knowledge creation and sharing, competitions and awards, brokerage between innovators and entrepreneurs, and retail, mostly at the village-level. These activities aim to build rural confidence and networks. The Malaysian Life Sciences Capital Fund, a public-private venture fund, focuses on importing technologies that can be adapted to the national oil palm industry. Incubators transfer technology across national and corporate borders in various ways, including through intellectual property markets, manufacturing contracts, and joint ventures.

Some incubators go beyond technology commercialization and provide a broader set of support services. Timbali Industrial Incubator in South Africa (high-end floriculture) and Fundación Jalisco in Mexico (packaged fresh berries) are examples of incubators that specialize in developing value chains as well as providing market access to small-scale farmers. Both have developed farm-level business models that large numbers of small-scale producers can adopt, along with a suite of supportive farm-level and supply chain services (for example, the identification of new inputs, cropping methods, and handling technologies; and marketing, packing, order fulfillment, logistics, and cash management). The incubators allow generally low-asset, low-capacity, risk-averse producers to access distant and high-value niche markets that they would not be able to reach on their own, or even through existing farmer organizations. Timbali specifically recruits and nurtures black female agro-entrepreneurs to launch franchises. Both organizations have cultivated internal competencies and relationships to undertake or outsource market research and the testing of products before launch.

Government involvement in agribusiness incubation varies significantly, and incubators enjoy different degrees of financial and political autonomy. Many are non-profits and start out with public sector and other external sources of funding from which they wean themselves to varying degrees. Incubators are generally able to cover some, if not all of their operating costs by charging firms for access to their services and facilities (by charging consulting, business development, marketing, franchising, rental, and other fees). Over time, certain incubators invest in the firms they incubate as well as in their intellectual property, allowing them to share in their profits and royalties.

IND 2: Branding for differentiation

Constructing a positive national or subnational brand can help attract foreign direct investment and tourism and also promote exports and domestic sales while raising their price point. The success in domestic and international markets of products such as Pu'er tea from Yunnan Province of China (Box 13) and single-origin coffees and teas from multiple countries (Box 14) illustrates how the national or regional branding of a product—combining elements of marketing, legal protection, and quality management—can have a transformative effect on both domestic and international markets.

Box 13: Pu'er Tea in China

Pu'er tea from China's Yunnan Province went from being a relatively unknown product in the 2000s to one that enjoys broad recognition and distribution in China and increasingly overseas. Long prized by connoisseurs as a refined and healthful elixir, the beverage is now mass-marketed both as a premium eco-product and as the symbol of an ancient regional tradition. Chinese consumers widely believe it to improve digestion and promote weight loss. In a context where the multiplication of labels bearing safety guarantees, together with health scares, has sown confusion and distrust among consumers, Pu'er has risen above the fray.

The brand owes its success to joint efforts of the national and local government, growers, and industry, and their investments not only in marketing but in legal protection and environmental and quality management. Though rooted in history, the distinctive shape and packaging and the vibrant images of ethnic minorities and traditional agricultural landscapes now associated with Pu'er tea-cakes have been crafted by leading brands such as Dayi with support from Yunnan Province and Pu'er City. Meanwhile, industry and government have taken measures to substantiate claims to authenticity and quality. The Chinese government, in 2008, codified Pu'er as a geographic indicator for tea. Though not immune to counterfeiting, Pu'er-labeled tea is now subject to stringent standards and quality testing performed in local facilities. In addition, subsidies and training to promote ecological farming practices have helped to keep tea off of unsuitable lands, protect biodiversity, and keep agro-chemical use in check.

Box 14: Geographic indicators for tea and coffee to encourage product differentiation

Legal recognition of a geographic indicator as a form of intellectual property—both domestically and overseas—is widely used to restrict the production of a commodity in a legally enforceable way. It can be part of an effective strategy to limit competition for the supply of products that possess distinctive (sensory) qualities attributable to a specific geography. However, it requires bona fide interest and capacity on the part of producers and public authorities to protect those distinctive qualities. Legal protection is typically sought for geographic indicators that have a long-standing tradition and wide reputation. Antigua coffee from Guatemala, Blue Mountain coffee from Jamaica, Kona coffee from Hawaii, Nariño coffee from Colombia, Assam tea from Sri Lanka, and Ceylon tea from India were all renowned products before their geographic origins were codified (Diaz-Rios 2015).

Not all protected geographic indicators have emerged on the basis of long-standing tradition. For example, coffee produced in Brazil's Cerrado region achieved protection in 2005, although it was introduced as recently as the 1970s and its production is highly mechanized. In some cases, cultural importance and recognition have been the

product of deliberate marketing campaigns. Mexican Veracruz coffee was not widely known prior to obtaining legal protection.

Some geographic indicators are widely recognized because of past efforts to market and distribute products from a region. Antigua coffee, for example, initially gained recognition early in the 20th century through the efforts of a single producer. It was not until the 2000s that multiple farmers formed the Antigua Coffee Producer Association to protect the authenticity, quality, and reputation of this specific coffee and trademark the label. More indispensable than tradition and prior renown, then, are a product's distinctiveness from a sensory perspective, combined with effective marketing strategies.

Giovannucci (2015) reviewed international experience with geographic indicators. He noted that successful applications depend upon: (i) having a consistent supply of the product with specified/desired qualities; (ii) having strong coordinating organizations for promotional and other efforts; and (iii) working closely with downstream market players to ensure commercial success. While geographic indicators are increasingly seen as a key tool for value creation at the farmer level, the use of this tool has pros and cons compared with alternative approaches.

IND 3: Product transformation

More than half of the Philippines' agri-food exports consist of primary commodities. This is not intrinsically bad—it can be profitable—and the country enjoys a strong competitive advantage in the sale of certain bulk commodities. Still, the country may be missing opportunities to add value domestically. The sale of intermediate or final consumer products can create jobs and may enable firms to experience less volatility in the prices of their exports.

This does not mean that the Philippines (or any other exporter of agricultural commodities) should restrict or tax its commodities trade to force the emergence of value-adding industries. If the nascent industry is inefficient or experiencing its own technical or commercial problems, the net effect of the policy interventions might simply be a tax on farmers in the form of lower prices than those they would have obtained if the commodities were exported in raw form. This outcome has occurred in some of the world's soybean, coffee, and cashew nut industries. More successful agro-industrial strategies have involved sustained government support for private investments in agri-food processing ventures and in the systems of R&D and human capital development needed for these industries to be globally competitive. For an example from India's spice industry, see Box 15.

Box 15: Knowledge-intensive value addition in the Indian spice industry

India, the leading producer and exporter of spices, responded to increasing price competition from other Asian countries by moving into high value-added products, including branded, packaged consumer products, as well as spice oils and oleoresins. Since the early 2000s, these knowledge- and technology-intensive products have dominated India's spice exports in value terms, but this shift would not have been imaginable without India's heavy investment in quality infrastructure, applied research, and higher education.

India began to face increasing competition in the world market for bulk spices in the 1990s. The rise of low-cost producers such as China, Indonesia, and Vietnam undermined India's ability to compete on price but also to a large extent its ability to compete on quality. Although Indian spices often met higher standards, international sourcing of bulk spices had become increasingly price driven. A growing number of Indian enterprises confronted this challenge by shifting to and promoting higher value-added spice products. This strategy has not prevented India from losing ground to more price-competitive exporters in certain segments, but it has allowed Indian exports to reach record value. The public sector has played an instrumental role in this achievement, through the Spices Board of India. This industry regulator doubles as a research, extension, and export promotion agency, supporting product and market development and coordinating privately-held trade bodies.

India's high value-added spice exports fall broadly into two categories: packaged consumer products and spice-derived products used in manufacturing. Over time, India's focus on branding, quality certification, and less demanding markets has improved its presence in foreign markets for packaged spices, particularly in the Middle East. More transformational has been its investments in highly specialized, technology-intensive export products, such as spice oils and oleoresins. India now holds a major or dominant position in the international markets for these products, the exported value of which, in 2000–01, overtook that of black pepper—the commodity that historically dominated India's spice trade. Exports of bulk black pepper have more generally given way to trade in higher value pepper products, including pepper powder, dehydrated green pepper, brined pepper, and pepper oil and oleoresin. India reached a symbolic crossroads in 2012 when it became a net importer of black pepper.

IND 4: Managing food safety risks

After the enormous gains in basic food availability and affordability in East and Southeast Asia, food policy in the region is now devoting increased attention and resources to improving dietary quality and nutritional outcomes. However, the countries of the region can only fully realize their aspirations for food and nutritional security when the essential elements of a healthy diet are safe to eat. The available evidence, both anecdotal and scientific, points to a rising exposure of the region's population to food safety hazards, a significant (and perhaps rising) incidence of foodborne illness, and deepening consumer concerns about the contamination of local foods and the adequacy of prevailing governance structures, both public and private, to manage emerging risks. This issue will become more significant going forward as a dominant share of consumers become fully reliant on purchased foods and ingredients, and as regional diets continue to evolve beyond rice and other staple grains. In the coming decade, food safety will become a central element of national food security and strategy in much of East and Southeast Asia, including the Philippines (as it already is in Vietnam and China).

A significant share of the region's food safety problems and associated public health and economic costs are avoidable if a concerted set of preventive measures are put in place. Yet there are no simple solutions or quick fixes to the myriad of food safety challenges in the Philippines and the wider region. To the contrary, the effort requires a comprehensive approach to improving food safety awareness, practices, and governance, including addressing fragmented and often weakly coordinated institutional responsibilities, building up capacities for risk analysis and risk communications, enhancing systems for surveillance and food product traceability and recall, and moving from a focus on an end-product testing to an emphasis on supporting "good agricultural practices" among farmers and upgrading private sector management systems. Increasing consumer awareness and improving consumer food storage, handling and preparation practices are also very important.

As emphasized by the World Health Organization, food safety is a shared responsibility—of food business operators, consumers, and government entities. Putting this concept into practice represents a significant challenge for the Philippines and other countries in the region. Governments need to play effective vision-setting and convening roles, provide reliable information to other stakeholders, and effectively deploy a wide set of policy instruments, both carrots and sticks, to involve, incentivize, and leverage the actions of others. While practitioners once emphasized effective "official food control" systems, the most critical role for government is now recognized to be in facilitating investments and behavior changes by actors who share the goal and responsibility of safer food with government.

This inclusive concept of food safety management may require a paradigm shift in how the countries of the region approach food safety regulation. The traditional model centers on enforcement through

inspections of food facilities and product testing, and systems of legal and financial penalties for infractions. This strict authoritative model appeals to the public, media, and therefore political decision makers. It is not altogether effective, however, particularly where smallholder farmers, micro and small enterprises, and informal food channels predominate, or where surveillance and inspectorate capacities are limited. A shared responsibility model implies a move from a regulator-regulated relationship toward efforts by governments to better incentivize and facilitate the delivery of safe food production, processing, and distribution. The role of regulation then becomes one in which the absolute minimum food safety standard is applied, leaving food business operators with some degree of flexibility in deciding how to attain that standard, while the government's role is to offer information and other resources and support to motivate and assist compliance. For an example of how Singapore improved hygiene practices among street food vendors, see Box 16.

Box 16: How Singapore formalized its street food businesses

Some 40,000 hawkers plied Singapore's streets and riversides selling food and other low-cost goods and services in the 1960s, raising serious food safety and environmental concerns. To tackle those concerns, Singapore introduced a licensing and inspection scheme, but the main strategy was to formalize Singapore's street food businesses by relocating the vendors to hawker centers. Fifty-four centers were built in the late 1970s, and another fifty-nine in the early 1980s.

During the 1980s and 1990s, with hawker centers being increasingly recognized as playing important social roles in communities, a "regulate and educate" policy was used to improve hygiene practices. In 2001, the government allocated \$420M for infrastructure improvements to the sector under the Hawker Centre Upgrading Programme. Some hawker centers were completely rebuilt, and most acquired central freezers and cleaning areas. By 2014, 109 centers had been upgraded, accommodating 6,000 vendors. In 2016, two hawker stalls were awarded a Michelin star. Hawker centers have loyal local customers and are a tourist attraction.

The National Environment Authority manages and oversees Singapore's hawker centers. Its mission for these centers is for them to be "vibrant, communal spaces, offering a wide variety of affordable food, in a clean and hygienic environment." Here, the authority's role is to oversee stakeholders, develop and implement policies for the hawker sector, maintain the infrastructure of centers, and develop new centers. The authority also manages the assignment and rents for tenancies, licenses, and public relations.

In addition to shifting the paradigm for food safety regulation, governments in East and Southeast Asia need to invest more, and more smartly, in food safety—and especially domestic food safety, as trade-related concerns have tended to dominate attention in the past. This approach means investing with clear purpose and tracking the impacts of interventions; investing in the foundational knowledge, human resources, and infrastructure for food safety systems; balancing attention to hardware and software; realizing synergies among investments and in the pursuit of goals (initiatives addressing both animal and human health, and both food safety and environmental health); and ensuring the sustainability of investments and outcomes. Not all investments that can reduce the burden of foodborne disease are typically regarded as falling within the scope of "food safety" interventions. Critical investments may address environmental health issues, such as investments to increase access to potable water and improve sanitation or lessen environmental contaminants in soil, water, and air. Such measures reduce the propensity for cross-contamination in food supply chains. Also important are investments in public health systems, including those that improve the quality of and access to medical treatment, which can reduce health consequences when people are exposed to contaminated food.

Food safety improvements will require fundamental improvements in scientific, statistical, and other technical capacities, and ministries of finance and other central economic agencies will also have important roles to play. Best international practice calls for such entities to: (i) evaluate the benefits of public expenditures for food safety in light of the economic costs of unsafe food; (ii) emphasize forward-looking preventive measures to minimize future costs (avoidable losses) for, among other things, public health and market development; (iii) balance public expenditure and investment between “hardware” (laboratories, market places) and “software” (management systems, human capital, awareness-raising for behavioral change); and (iv) ensure that proposals for significant public investments or programs are justified using cost-benefit or cost-effectiveness analysis, and that alternative approaches, including regulatory measures and facilitating private investment, have been considered.

Good international practice counsels lead food safety agencies and pertinent technical ministries to develop a unified food safety strategy that defines priorities and responsibilities, guides the coordination of measures by government and private entities, and establishes funding needs. Global experience points to the role of these agencies in: (i) adjusting key performance indicators to focus more on food safety outcomes (magnitude of food safety risks, incidence of foodborne disease, standards-compliant trade) and less on non-compliant outcomes (infringements, value of fines collected, number of businesses closed); (ii) taking measures to minimize hazard entry into the food supply from farms, especially measures that also have benefits for public health and environmental protection; (iii) directing attention to small and informal actors in the food system, with an emphasis on awareness-raising, adopting safer food handling practices, and improving physical operating conditions (that is, access to clean water and waste management facilities); (iv) removing policy, regulatory, or other barriers to private investments and services for food safety; (v) applying risk-based approaches to govern food trade, together with improved trade facilitation capabilities; (vi) providing consumers with the tools to become partners in food safety through their own actions and through incentivizing and motivating food suppliers; and (vii) incorporating the science of behavior change by redesigning training programs, information campaigns, and other interventions.

Conclusions: What about the Philippines?

What are the general implications of the analysis and examples in this chapter for agricultural transformation in the Philippines? They may be summarized in eight concluding points, as follows.

First, modernization, industrialization, export orientation, consolidation, and infrastructure investment (private and public) have all been key elements of successful agricultural transformation programs. These key elements are part of a holistic approach to supply chain development, which is a requirement of agricultural transformation. To the extent that all of these elements are areas of focus for the government’s new strategic thinking, there is great promise for catalyzing transformational change.

Second, food security will always be an important objective of agricultural policy, but how this term is defined is critically important. Food security should not be based on outdated concepts, such as self-sufficiency levels. Availability and affordability of food are key, not self-sufficiency. In Chile—as in almost all countries in Latin America—attaining some target level of food self-sufficiency is simply no longer a consideration in policy making (Valdes 2003). It is widely recognized that any gaps in domestic supply can be readily filled on the international market, as long as the population has sufficient purchasing power.

Raising incomes by ensuring that resources are put to their most efficient use is the best guarantee of food security. The export boom in Chile and increased productive efficiency in importables would never have been possible without the abandonment of the import-substitution/food self-sufficiency model, with its high levels of protection and subsidies. In Chile, the boom was based on temperate fruit and vegetable products; in the Philippines, a similar boom could be based on tropical products (fruits and vegetables and commodities). But experience argues that policy success is best measured by increasing efficiency, productivity, and competitiveness of the sector, rather than increasing production. Success in these alternative dimensions will in turn raise incomes and produce prosperous farmers and fisherfolk.

Third, high levels of protection and support for importable agricultural products—particularly rice, in the case of the Philippines—are not compatible with the development of a profitable, diversified, and export-oriented sector. Resources for agricultural production—land, labor, capital—are limited, so funds that support rice production are taken away from other products. Farmers, like all economic agents, respond to the incentive structure created by policies. If government policies create incentives to produce rice by artificially raising its price and targeting this crop for special treatment by choices in public spending, farmers will not choose to diversify. In the Philippines, there are many opportunities to diversify out of traditional paddy production, including production of specialty high-value rice varieties for domestic or export markets. This kind of diversification could sustainably raise farmers' incomes but will be discouraged by a policy focus on rice.

Fourth, to support the agricultural sector, there are much better instruments than input subsidies, price supports, and trade policy. While such policies have been commonly used in many countries as the main instruments of agricultural support, experience has shown that they are expensive to consumers (in the case of import restrictions and tariffs) and taxpayers (subsidies and price supports), and are not cost effective in meeting their underlying objectives. They are also resource intensive and crowd out public expenditure on provision of public goods and services. In both high-income and developing countries, there has been a trend to shift away from these instruments and increasingly rely on “decoupled payments” to support farmers. These are cash payments that go directly to farmers, usually on a per hectare basis, and are not dependent on production or input use. These payments have many advantages, including giving farmers more choices and encouraging private sector development in upstream (inputs and agricultural services) and downstream (processing, marketing) markets, thereby helping farmers connect to value chains. They also can be designed to help make agriculture more environmentally sustainable. The experience of New Zealand demonstrates that even farmers who have become reliant on high levels of subsidies, like rice farmers in the Philippines, can adjust to much lower levels by raising their efficiency. Lowering subsidies forces greater attention to the demands of the market, better productive practices, and improved farm management. There is likely to be an adjustment period, and the government can play a role in helping farmers make a smooth transition, including possibly partially compensating some of the lost subsidies with smarter payments, such as the decoupled payments used by other countries. But in the final analysis, the result can be a favorable outcome for farmers as well as taxpayers and consumers.

Fifth, support for farmers can be leveraged to achieve multiple objectives. As has been done in the EU, Korea, Vietnam, the US, and other countries, support can be made conditional on actions by the recipients that are in the public interest, or in other words, which generate positive externalities. For example, farmers can be paid to provide environmental services.

Sixth, the advantages of consolidation in farming can be realized by actual consolidation of small plots into larger plots. But there are other approaches as well, many of which can be complementary. These approaches include various models of collaborative production, contract farming, productive alliances between primary producers and processors or marketers, and cluster development.

Seventh, adoption of modern production technologies embodied in improved factors of production (fertilizers, seeds, machinery, irrigation) may be required for the modernization of agriculture, but this is not the only aspect to be considered. Agricultural policy also needs to be modernized to recognize that the contribution of the sector is much broader than its traditional role of production; it also includes income and job generation, and environmental conservation services. Institutional modernization, including making the extension system more demand driven and pluralistic, is also important.

Eighth, a successful transformation will include development of an agro-industrial sector that adds value to local primary production. This transformation can occur through many channels, including incubation of “agripreneurial” activity and product differentiation and upscaling. But one prerequisite for enhancement of high-value food products on local or export markets is a strategy for ensuring the safety of the food supply.

Summary

Many other countries have pursued policy reforms, institutional changes, and investments that successfully produced transformational change in the agri-food sector, and lessons from these experiences can be used in the Philippines. This chapter has presented examples of “big bang” reform episodes that represent large-scale strategic paradigm shifts, as well as more thematic micro-level reforms, both of which are necessary to catalyze transformational improvements in sectoral performance.

The Way Forward



Chapter 5: The Way Forward

This report has looked at the agri-food sector’s recent performance and current situation through the lens of the “New Thinking” in sectoral policy. It has also explored global experience in fostering the transformation of agriculture along the lines that the “New Thinking” aims to achieve. This chapter provides policy options, strategic guidance, and recommendations to assist Philippine stakeholders in operationalizing this “New Thinking.” It is selective rather than comprehensive and is primarily geared toward provoking further dialogue among key stakeholders. It also tries to identify areas where further work is needed in relation to policy and regulatory reform, strategic planning, and the piloting or scaling up of newer institutional arrangements.

Agricultural transformation is a long-term endeavor involving changes in what is produced and how, how produce is aggregated and marketed, how services are by provided and by whom, and how performance is measured. Fostering an efficient transformation process and catering for the inevitable transitional problems requires clarity of purpose, strong leadership and coordination, and considerable investment, by farmers, enterprises, and government. It requires a roadmap that is not indelibly drawn but that is revisited and revised frequently to reflect new evidence about the sector’s performance, new learning about the effectiveness or otherwise of policies and programs, and new circumstances, perhaps even unforeseen problems and opportunities.

As recognized in the “New Thinking” documentation, the process of agricultural transformation requires policies and other interventions that extend beyond the scope and mandate of the DA and its affiliated agencies. Changes in the structure and foci of agriculture are intertwined with parallel developments in the management of water and other natural resources (Department of Environment and Natural Resources), agri-food logistics (Department of Transport), small and larger industry development (DTI), and in relation to nutrition and food safety (Department of Health). While much of the guidance provided in this chapter is oriented to the DA, there are several themes on which responsibilities are shared with (or even led by) other departments.

The guidance provided here begins with sector-wide reforms or orientations. These reforms are critical for inducing or generating momentum in the process of agricultural transformation. They are important for realigning incentives and stimulating new and better investments in the sector. Next, the discussion addresses several subsectoral or thematic areas for policy and investment. To maintain continuity with other sections of this report, these topics are clustered under the three headings of consolidation, modernization, and industrialization. It is important to emphasize that many of these topics are interconnected. There are strong synergies among interventions for these different themes, as a number of cases will illustrate. Just as agricultural transformation requires close coordination between the DA and other government agencies, initiatives in specific areas should not be done through isolated siloes.

The policy options are summarized in a table at the end of the chapter.

Sector-wide Orientation and Reforms

Shift from protecting a specific product and type of farmer to improving the overall resilience, competitiveness, and sustainability of the sector as a whole

At the broadest level, the transformation of Philippine agriculture must start with the new vision and goals for the sector. Over an extended period, the predominant focus of policy and public spending has been on a single commodity—rice—the country’s food staple. The bulk of attention and resources have been directed at raising rice productivity, assuring rice availability and affordability for consumers, and achieving national self-sufficiency. Agricultural, trade, and other policies have tilted the playing field to realize these aims. Considerable spending has gone toward single-crop subsidies and single-purpose irrigation schemes. While bringing some notable benefits, this agenda has not been the most efficient approach to agricultural public expenditure. The narrowly focused agenda has also caused other segments of the agricultural sector to fall well short of their potential. What the “old thinking” did not recognize is that it is not possible to create an environment that is both export-oriented and highly protective of import substitutes. With a limited stock of factors of production, resources that are used in producing import substitutes are not available for exportable production.

In developing overall strategies for the agri-food sector, the goal should be to create a level playing field, with no bias toward specific crops, but with the goal of lowering production costs so both import substitute crops and exports can be competitive in their respective markets. At the same time, a modern conception of food security recognizes that security does not depend on self-sufficiency, but rather is much more a function of incomes and general availability of nutritious foods. Government policy should focus on improving efficiency and competitiveness in primary production and throughout value chains. The limitations inherent in previous strategic approaches are recognized by the “New Thinking,” which posits a much wider set of objectives for the sector, even as efforts continue to modernize the country’s rice production and value chain.

There is a need to shift from a rice-centered agri-food policy to one that anticipates greater balance in sectoral priority-setting and resource allocation. In aspirational terms, it means moving toward an agri-food system that is: (i) resilient in the face of risks, (ii) inclusive in the opportunities it provides and the consumers it services, (iii) competitive in domestic and international markets, and (iv) environmentally sustainable from farm to fork.

Pursuing this agenda requires shifting from protecting a specific product and type of farmer to improving the overall resilience, competitiveness, and sustainability of the sector as a whole—while ensuring that it meets the needs of a wide set of stakeholders. An implicit, yet very important, aspect of this approach is an overall shift from a supply-oriented to a demand-driven agriculture. This path is appropriate and, in fact, essential for a rapidly growing and urbanizing middle-income country such as the Philippines. Rice will remain a vital food staple for the country, yet the bulk of the income-earning and job creation opportunities for the sector going forward will relate to something else. This path is meeting the demand and expectations of the rapidly growing middle, both in the Philippines and in the rest of emerging Asia. According to a recent study by McKinsey, the Asian middle class is expected to expand by some two billion people between 2015 and 2030 and account for nearly 90% of the global growth in this consumer segment. This growth will provide massive opportunities for those farmers, food companies, and service providers able to service this demand, especially for higher value foods, processed foods, and

out-of-home eating. Competing for this regional market (and for stomach share domestically) will require gains in supply reliability, reductions in logistical cost, and the capacity to meet higher quality and food safety standards.

Adjust the modalities of government support

Focus on fewer and more outcome-based and holistic programs to achieve sector objectives. DA may move away from managing many smaller projects that are agency-based and work mainly in “silos,” toward fewer and larger programs that are outcome-based and adopt a more holistic but simpler mechanism to achieve higher impact. Given that agricultural support services are a local government mandate, the programs also need to drive the incentives for LGUs to spend effectively. The PRDP is a good example. The project has introduced a science-based and multi-stakeholder planning framework to develop high-potential agricultural value chains and incentives for LGUs to formulate and implement investment plans to achieve agreed agricultural targets. With two types of subprojects, rural infrastructure and enterprise development, the PRDP helped to strengthen food supply chains, working from inputs, production, aggregation, processing, and marketing to logistics and rural infrastructure, therefore giving smallholders the opportunity to access more lucrative markets and creating rural jobs. With this mechanism, the PRDP has also strengthened the planning and implementation capacities of LGUs and producer organizations, while increasing convergence at the local level.

Move toward more public goods. In the past, a significant proportion of public spending has gone toward commodity price supports and input subsidies, so-called “private goods,” intended to meet social goals. Global experience and evidence are quite clear that reorienting government expenditures toward investments in public goods—including R&D, infrastructure, innovation systems, market information systems, biosecurity systems—generate higher returns and are a far superior method for inducing productivity gains, poverty reduction, and overall modernization of agriculture.

If farmer support is needed, rely on some form of “decoupled payments.” In circumstances where farmers continue to struggle to earn a livelihood from production and market engagement, there may remain justifications for direct support. But commodity price supports, input subsidies, and high protection through trade policy are typically not effective and are never sustainable. As illustrated in Chapter 4, successful transformational reform programs have started with “big bang” reforms to remove the policy bias toward import substitutes (generally food staples) and moved away from reliance on these tools. In some cases (Chile, New Zealand), support was removed with minimal compensation. But in other instances, farmers did receive partial compensation, which facilitated political acceptance of the reforms. If farmer support is needed, a preferable option is to rely on some form of “decoupled payments.” As discussed, these cash payments go directly to farmers, usually on a per hectare basis, and the amount of the payment does not depend on production or input use. These payments have many advantages, including giving farmers more choices and encouraging private sector development in upstream (inputs and agricultural services) and downstream (processing, marketing) markets, thereby helping farmers connect to value chains. This kind of support mechanism for farmers has been recognized as relatively efficient by the OECD and World Trade Organization, and it is used in the EU, Mexico, and USA, among others. This mechanism can also be used to incorporate environmental sustainability into farm support. As has been done in the EU, Korea, the US, Vietnam, and elsewhere, support can be made conditional upon actions by the recipients that are in the public interest, or in other words, which generate positive externalities. For example, farmers can be paid to provide environmental services. While cash transfers

are the most efficient way of providing “decoupled” benefits, a system of e-vouchers would be a second-best alternative, and would be a great improvement over direct provision of inputs by the government (fertilizer, chemicals, seeds, mechanization services, credit), provided that the payments are decoupled from input use and production.

Address market failures with matching grants to producer organizations through productive alliances.

Often smallholders struggle to access input and output markets, while for buyers, such as agribusinesses and wholesalers, it is difficult to get the quantity and quality of the produce they need on a consistent and timely basis. Government support is therefore justified to facilitate overcoming this market failure by bringing together buyers and producer organizations and providing support for the preparation and implementation of profitable business plans. This response can include investments and technical assistance to strengthen the organizational and entrepreneurial capacity of producer organizations and their market-led production, access to input and output markets, and access to technical, social, and financial services. These are the arrangements used by programs that have successfully implemented the productive alliance model (Bolivia, Brazil, Colombia, Vietnam, and others), even (through the PRDP) the Philippines.

Strengthen evidence-based decision-making

An important sector-wide issue is the need to strengthen evidence-based decision-making. This is needed in relation to policy formulation, in the monitoring and evaluation of public programs, and in the conduct of the government’s regulatory functions, whether related to environmental management, biosecurity, consumer protection, or other matters. Improved data and analysis are critical for timely and appropriate policy decisions, for ensuring that programs are being implemented effectively and having the desired results, and, in the context of limited resources, enabling regulatory units to properly allocate their personnel and facilities to target the most significant risks. A robust and coherent system of monitoring, evaluating, and reporting in real time on government programs and policies would help improve policy performance. Current systems are somewhat capable of monitoring government agencies’ performance in producing targeted policy outputs, but by design they are not meant to provide information about the real impact of publicly funded programs. The absence of a consistent and accessible system for outcome and impact evaluations makes it difficult to have objective public policy debates and to change the current approaches to agricultural policy in the Philippines.

Enact commercial and legal reforms

To spark the process of agricultural transformation, there is often an important agenda of legal and regulatory reforms. Outdated laws and regulations may be inhibiting the development of competitive product and input markets, the efficient use of land and water, or new investments in facilities or technologies by farmers or agro-enterprises. Some of these laws/regulations fall within the domain of the DA and its technical affiliates, while other laws/regulations which are critical for facilitating agricultural markets may fall within the domain of other ministries (industry and transport, among others). The DA should seek assistance from development partners to undertake a critical review of current laws and regulations impacting agricultural investment and development and to prioritize needed reforms.

Subsectoral and Thematic Interventions to Support Transformational Change

A wide range of areas may require interventions to bring about an efficient and competitive response to emerging market opportunities and to manage on-going or emerging risks effectively. A subset of these areas is discussed here to cover at least some of the important themes addressed earlier in this report. As noted, the themes are clustered under the three headings of consolidation, modernization, and industrialization, although in many cases these topics are interrelated.

Consolidation

Land consolidation

As elsewhere in Asia, the agrarian structure in the Philippines is dominated by very small farms with a tendency toward further fragmentation over time. While the subdivision of land provides some form of equity, the outcome for most farmers is a low standard of living. This agrarian structure also inhibits the realization of economies of scale and the ability to compensate for labor out-migration by using productivity-enhancing machinery. Farm-to-market transaction costs also tend to be very high. The Philippine situation is not unique; other countries in the region have been testing different approaches to consolidate individual farm plots, facilitating an agricultural land leasing market, and experimenting with block or cooperative farming involving the smallholder owners. Philippine policy makers and other stakeholders would benefit from undertaking study tours or otherwise engaging with key individuals who are knowledgeable about the efficacy and wider advantages and disadvantages of these different approaches.

The Philippines has the opportunity to learn from the body of accumulated experience on land consolidation. The Philippines can learn from other countries about testing different approaches to consolidate individual farm plots, facilitating an agricultural land leasing market, and improving block or cooperative farming schemes involving the smallholder owners. Several models are discussed in the report: (i) Consolidation to increase the average size of farms into viable commercial units, through sale or lease. China has been particularly active in promoting consolidation, and evidence suggests that it has led to increased investment for agricultural production and facilitated temporary or permanent migration to urban areas by people who no longer wish to remain on the land. Prior to reforms under which certificates were issued to confirm a person's title to land, farmers were reluctant to migrate for fear of losing their land to expropriation. The new system permits sale and lease of land rights. Around 25% of rural households have rented out their cultivated land. (ii) Consolidation to reduce fragmentation of smallholder plots. In Vietnam, a model called "big tenant, small landlord" has been developed to consolidate small pieces of land into large fields. In Uttar Pradesh in India, a government program straightened field boundaries to reshape holdings into rectangular form as much as possible. and (iii) Cooperative farming, in which individual farmers retain ownership of their land but farm it jointly. Joint farming can be done informally, by producer organizations, or through government initiatives. An example of informal coordination by smallholders comes from southern Cambodia, where the use of combine harvesters for paddy increased rapidly a decade ago. Under the large field (SFLF) program in neighboring Vietnam, Vietnamese farmers integrate their small rice areas into one large field, operated under a variety

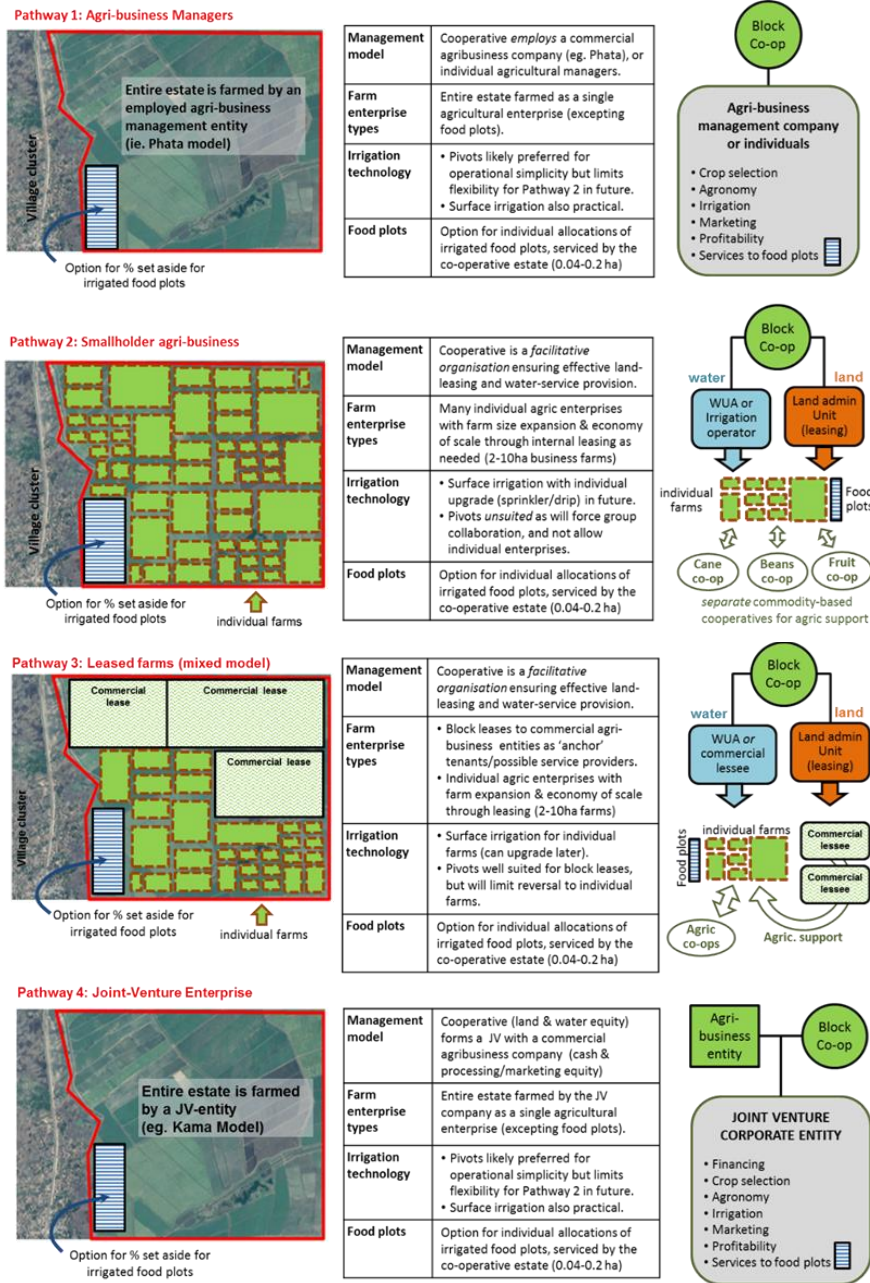
of arrangements. This system gives farmers greater bargaining power with buyers and input suppliers, increases the use of on-farm and postharvest mechanization, yields an aggregated supply of just one rice variety, and has improved storage. And several countries, including Nepal and Malaysia, have launched joint-farming initiatives, whereby farmers pool their resources, including land, under a central management unit.

In the context of (formerly) rice mono-cropped irrigation schemes different models can be employed.

These would simultaneously move to diversify agricultural production, make more efficient use of irrigation water, and realize some economies of scale through the sharing or consolidation of management functions (even in circumstances where smallholder farmers retain ownership of their land). Four illustrative pathways are summarized below and illustrated in Figure 28:

- **Pathway 1 – Agribusiness managers.** Here, a cooperative is owned by the farmers who contribute their shares individually in proportion to their land holdings in the group customary estate. The cooperative employs a commercial agribusiness management company (or individuals) and farms the block as a single enterprise under one or more commodity crops. The owners would be able to provide paid labor services on the farm if they have the relevant skills. They would be paid a dividend or profit share according to their respective shareholding.
- **Pathway 2 – Smallholder agribusiness.** The cooperative devolves individual land ownership/use rights to specific plots with individual ownership in the new scheme, based on percentage shareholding. The cooperative oversees a water user association comprising land-holding members within the block. Here, individuals do not rent but farm on their own plots, with the specific expectation that a natural process of farm consolidation into larger business units will follow, as less-interested or less-successful farmers exit voluntarily (through rental or transfer). The co-op administers land-exchange.
- **Pathway 3 – Leased farms (mixed model).** The cooperative acts as a facilitator/enabler and leases portions of the customary estate to members, outside individuals, and/or agri-business companies to generate revenue. The cooperative function is one of land administration and irrigation water service provision in the block. The cooperative owners would receive payment of net revenue pro-rata to their shareholding. The cooperative would facilitate the formation of a water user association within the farm area.
- **Pathway 4 – Joint-venture enterprises.** The cooperative establishes a contract-partnership arrangement (typically a joint venture) with an agribusiness entity that covers all farm production for the supply of commodity or industrial crops. The cooperative owners would receive payment of net revenue from the joint venture pro-rata to their shareholding.

Figure 28: Four pathways for land consolidation and agricultural development

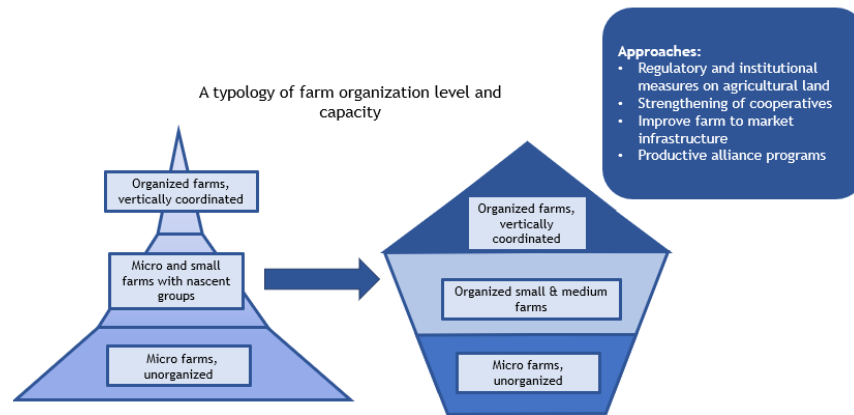


Aggregation and collective action for coordinated and inclusive value chains

Contract farming is not widely applied in the Philippines, although this arrangement has been used to link farmers and agribusiness companies in the tobacco, poultry, and banana industries. Variants of contract farming, including contract farming under so-called productive alliances, are being supported through a number of projects, such as the World Bank-supported PRDP. Lessons from this experience can inform future initiatives. These might be lessons regarding the appropriate types of farm group and enterprise suitable for this model, the appropriate commodities or market contexts, the types of support needed by the partnership and its constituent parts, effective means for addressing problems,

and, importantly, how to wean these partnerships off of public support and enable them to rely in the longer term on commercial banks and commercial providers of advisory and technical services. The experiences as well as the economics of these partnerships and the support programs need to be well documented and shared. An important part of the process of institutionalizing these types of coordinated value chains is understanding where they are and are not feasible in the absence of public subsidy. The pool of well-managed, commercially-oriented farmer groups and cooperatives is still limited in the Philippines. Effective partnerships between farmers and companies require strong farmer organizations. There may be a strong rationale for continued government assistance to help strengthen such entities. The agenda should be geared toward fostering a different pyramid structure, as illustrated in Figure 29. Currently, the bottom of the pyramid is extremely wide, with very small-scale farms that are not organized into producer groups and cooperatives and not involved in coordinated aggregation/distribution channels. The aim is to shrink the bottom of the pyramid and enlarge the middle part (with incremental increases in the farm size of farmers who are organized horizontally and vertically). The agenda then relates to both land (defragmentation, lease market, block farming) and collective action (cooperatives, contracts, productive alliances).

Figure 29: Fostering better structured farming and efficient, inclusive value chains



Modernization

Modernization of extension

As discussed, there is a need for a paradigm shift in the Philippines' approach to extension to better cater to the needs of farmers in what will be an increasingly diversified agricultural sector. Agricultural advisory services can no longer involve a “one-size-fits all” approach but instead will need to be tailored or modified to fit diverse circumstances and needs. Following good international practice, this paradigm shift would be multi-faceted, involving shifts from: (i) being supply-driven to demand-driven; (ii) having a narrow (primary rice productivity) focus to featuring much more diverse (farm, natural resource, risk, and marketing management) content; (iii) being a public service to combining public, private, non-governmental, and other players, (iv) involving predominantly person-to-person contact to featuring multiple delivery modes; and (v) using digital ICT-enabled tools to improve research adoption and extension reach.

To move forward, however, it is important for Philippine stakeholders to undertake a strategic assessment of the evolving extension landscape and to chart out a suitable roadmap. A multi-stakeholder task force should be created, with terms of reference to draft a New Extension Policy and Action Plan. This policy and plan would take into account emerging agricultural knowledge and advisory needs (the “what” of extension) and explore, in depth, the comparative advantage of different potential service providers (the “who”) and the range of potential delivery mechanisms (the “how”).

The policy would help to delimit the areas where the government will need to continue to provide extension services, while pinpointing areas where the government's role will be more to broker or enable other players to step up their advisory services. The process of consultations and deliberation for this new extension policy could be supported by external facilitators. The Extension Action Plan would subsequently lay out how to operationalize the new policy. This plan would include, among other things, recommendations for raising the technical and soft skill capacities of extension-related personnel, plans to reform the current decentralized public delivery system, proposals for licensing or accrediting advisory service providers, strategies for better linking research and advisory services, and proposals regarding how different types of advisory services would be financed (“who pays”).

While the Filipino extension services are already decentralized and there are multiple players involved in their delivery, there still exists room for improvement. To successfully evolve into a pluralistic system, the extension services require some additional and significant changes. One of the most important suggestions is to rethink who should do what and outsource or privatize certain branches of the extension system. The extension paradigm of the past, with its emphasis on service delivery performed by traditional players (government agencies), needs to be viewed through a different lens magnifying the fact that extension services as a system should be viewed through their functions. Therefore, the extension services could be simultaneously and likely more efficiently operated by multiple players.

Globally, a key concept for understanding extension provision in today's context is the fact that financing sources are separated from the provision of services. Public funds can be used for the provision of services by producer organizations, NGOs, or private providers. Some successful examples of countries that outsourced their extension services (either partially or fully) include Chile, France, Mexico, Peru, and Uganda. This approach would strengthen coordination between multiple players to avoid the duplication of services and ensure the efficient allocation of funds to competing needs. Consequently, the delivery of

extension services would be more targeted, likely more efficient, timely, and inclusive. Overall, numerous combinations of financing sources and service providers are possible in a pluralistic system.

Irrigation modernization

As a legacy of decades of policy focusing heavily on self-sufficiency targets, the irrigation infrastructure, technology, and services in the country primarily center on rice production. The modernization of irrigation systems could be beneficial both to raise rice productivity and to open opportunities for farmers to diversify. Modernization requires much more than just rehabilitation; it is a “process of technical and managerial upgrading...with the objective to improve resource utilization and water delivery service to farms. This involves institutional, organizational, and technological changes”.²⁰

Modernization will be a multi-step process, including:²¹

- Diagnosis of the present scheme performance through rapid appraisal.
- Specification of the level of service—rotation, prearranged demand (including duration, flow, and intervals)—and multi-use requirements.
- Specification of institutional responsibilities (including financial obligations) from canal agency to water user groups.
- Choice of the model of configuration of canal control: distributed, centralized, supervisory control and data acquisition (SCADA).
- Determination of the mode of operation of main canals (basic upstream versus downstream control and combination of; or nearly simultaneous operation of flow regulators by experienced operators—computer-assisted in some cases).
- Selection of water level and flow control equipment (including measurement).
- Monitoring and evaluation of upgraded service.

This modernization will require several changes in orientation of irrigation and other policies. One major change is that to be able to design and manage modern irrigation systems for different cropping patterns—both non-traditional rice technologies and production of other crops—NIA and also DA will have to gain knowledge and experience with new design principles and the use of modern technologies. If successfully executed, irrigation modernization could have high payoffs. When water is assured, farmers are willing to invest in hybrid seeds and the right quantities of fertilizer.²²

In addition, there is potential to design new irrigation schemes for a variety of crops, with appropriate extension and other support. The new schemes will have to be designed differently from the ones currently developed in the Philippines by NIA and other agencies. There are also good unexploited diversification opportunities in existing rice irrigation schemes where the experienced irrigator farmers can be found. The new schemes would require improvements and changes to existing irrigation infrastructure to allow more on-demand and measured irrigation delivery and application. To modernize existing irrigation schemes for crops other than rice, there has to be a good understanding of current

²⁰ Thierry Facon introduction to Plusquellec, 2002, as quoted in Burke et. al.

²¹ Burke et. al.

²² This was a finding from the recently closed Participatory Irrigation Development Project (PIDP).

operation and maintenance (O&M) and management arrangements. With that information and a proposed cropping pattern, the required changes to the abstraction works and conveyance and distribution system can be identified to provide water on demand for the selected cropping patterns. Particular attention will have to be paid to climate change resilient technologies, including efficient irrigation methods and balancing reservoirs. Modernization could also help crowd in private investment. The private sector market for field-level irrigation equipment, such as drip, sprinkler, and solar pumps, is not yet well developed in the Philippines. If the demand grows, it is expected that the private sector will respond and play an important role in the affordable supply and installation of efficient irrigation systems.

Adequate funding for management, operation and maintenance (MOM) of irrigation and drainage systems will be key to their sustainability. Very few, if any, irrigation and drainage schemes in the Philippines receive adequate budget for MOM. As a result, about 70% of the available budget is used for staff costs, with little left for maintenance, while the ballpark number is that about 70% of an adequate budget for MOM should be for maintenance. The result is a lack of maintenance, deteriorating systems, and poor irrigation service. There has to be a focus on provision of adequate budget for MOM that is scheme-specific and to be determined through asset management plans. Asset management plans should be produced on a regular five-year basis to identify the maintenance, repair, and replacement costs of Irrigation and drainage systems together with the management costs and the operating costs. These asset management plans, together with modern accounting systems, should be used to inform the budget for MOM for a particular scheme, which would be essential to keep systems in good operational condition. Irrigation should be seen as a key input into agricultural production for which the “user pays” principle is the best practice, rather than seeing irrigation as a free good to which the user has no responsibility to contribute. In any case, sufficient MOM budget should be made available, either through setting of adequate irrigation service fees and/or through a subsidy to be provided by government.

Climate-smart agriculture

An updated sector-wide climate-smart agriculture (CSA) strategy could help find ways to achieve the triple win: to sustainably increase farmers' productivity and incomes, to adapt and build resilience to climate change, and to reduce greenhouse gas emissions where possible. Climate-related risks in agriculture have been the subject of past assessment (Climate Change Commission 2011) or interventions (such as the work by PhilRice). Much of this work has centered on rice. While this is vitally important, a CSA strategy for the Philippines also needs to anticipate climate-related risks that will affect other agricultural subsectors—including aquaculture, livestock, tree and industrial crops, and secondary food crops—and to outline needed investments in infrastructure, technology, data and information systems, and farm management systems. An updated CSA strategy should also explore additional ways to reduce the carbon footprint of the sector. It is recommended that the DA mobilize a multi-stakeholder task force to draft a revised CSA strategy. To do so, it could draw upon one of the available climate vulnerability assessment tools being utilized by national governments and technical agencies.

Information and communication technologies

Information and communication technologies are driven by the ability to collect, use, and analyze massive amounts of machine-readable data about practically every aspect of the value chain. Digital technologies can tackle multiple market failures prevalent in the agri-food system by greatly reducing the transaction costs of matching buyers and sellers across input, output, and financial markets in the food system—and by better targeting poor and vulnerable farmers with digitized support services. Digital agriculture can also improve the data-intensive process of farm decision-making for resource allocation and management by processing and analyzing more precise data faster and by providing advice tailored to the farm. Digital agriculture thus alters the traditional pathways and shifts the opportunities for accelerated agricultural transformation, by optimizing the current food system to increase value addition and increase its productivity without necessarily industrializing in the traditional sense.

Since the key characteristic that differentiates digital technologies is their ability to generate, replicate, store, and transmit digital data at nearly zero marginal cost, technologies are grouped along four categories of data management services, as adopted from the OECD (2019):

- **Data collection.** Digital technologies for data collection include remote sensing, in-situ sensing, crowdsourcing, online surveys, and financial and market tools. Prominent examples are satellite- and drone-mounted data acquisition and in-situ soil, pest, livestock, and biodiversity monitors.
- **Data storage.** Secure and accessible data storage includes cloud storage, distributed ledger technologies, and open databases.
- **Data analysis.** Data processing technologies include crowdsourcing data analysis, artificial intelligence, and big data computations. Well-known examples are soil mapping, watershed and landscape modeling, machine learning, and algorithms.
- **Data distribution.** Distribution technologies include e-platforms, specialized software, and social media. Examples include online trading, payment and service delivery platforms, online property rights and permit registries, and e-platforms for payments and service delivery.

Enhancement of real-time information systems to provide information to help make good decisions in a crisis and for good policy formulation and implementation. The DA would benefit from a real-time

price and production data processing tool for ensuring that market players (including farmers, buyers, truckers, end-customers) are able to respond favorably to changing market outcomes. During this COVID-19 crisis, the use of mobile and internet technology to gather data was leveraged to lessen face-to-face contact and observe social distancing. Various ICTs such as these should be used to continuously collect and generate data over the medium term that are relevant for agricultural operational and monitoring needs, as well as policy decision-making.

Developing and maintaining the COVID-19 Management Information System (MIS) involves various dimensions: (i) data collection and processing across the different trading points; (ii) analysis and presentation of historical and real-time data online and conspicuously in the different trading hubs; and (iii) dissemination of information, including production standards required by buyers. Different parts of the COVID-19 MIS can be managed by DA and the Agribusiness and Marketing Assistance Service (AMAS) including a COVID-19 Response Market Observatory. In the longer term, the infrastructure could be integrated into providing real time market information. This would include digitization of the DA database and monitoring system that covers production/supply, demand/needs, and prices of different commodities. A matchmaking or market-matching app/online system (Google spreadsheets-based) should be developed wherein AMAS, Regional Field Offices (RFOs), LGUs, consumers, producers/suppliers, and other service providers would have access to upload and update their respective supply and need/demand information. The system should be readily accessible to various users through computers, cellphones, and other media.

E-commerce development

E-commerce could play an important role in restoring more normal market function during crisis-related disruptions, and it would make marketing more efficient in the longer term. DA, DTI, and Department of Information and Communications Technology can act as facilitators and strengthen private sector actors and producer organizations to market produce through E-commerce platforms (initially being done now under KADIWA Online). Several IT solutions have worked in other countries; they include a cloud-based application and mobile technology to help farmers gain access to finance (Vietnam) and a mobile application to book logistics services for smallholder farmers (India). Digifarm by Safaricom (Kenya) offers farmers convenient, one-stop access to a suite of products, including financial and credit services, quality farm products, and customized information on farming best practices. Another example from Kenya is Twiga, which links farmers and vendors to fair, trusted, modern markets. To accelerate digital adoption, the Philippine government itself needs to be at the forefront of IT-based solutions and digital payments. While a select number of agricultural permits issued by the DA, such as the SPS import clearances, can be completed online, much still needs to be done to enhance the greater use of IT services.

Road infrastructure

One important factor for agricultural development is the condition of the road infrastructure that will enable the movement of produce from farms to markets and other destinations—the barangay, municipal, city, provincial, and national roads. Several ongoing programs and projects aim to improve the condition of roads in the Philippines, but in some areas in Mindanao a greater increase in investment is needed to increase overall road density and maintain road conditions comparable to other areas. For this to happen, some reforms in the way road planning is done, especially for local roads managed by LGUs, will be critical.

National roads comprise only about 15% of the country's total road network, while local roads make up the remaining 85%. The condition of these roads varies significantly: national roads are now 96% paved, while local roads are estimated to be less than 20% paved. For barangay roads, the institutional arrangement is not even clear, so a consolidated inventory of barangay roads is not available. Greater attention will be needed to identify how LGUs can be assisted in their road planning and management functions. Moreover, road planning needs to be better coordinated between the LGUs, different national agencies supporting LGUs (DA, Department of the Interior and Local Government (DILG), and others), and the Department of Public Works and Highways (DPWH). Many LGUs, especially those with a higher share of rural roads leading to farms in their inventories, have limited technical and financial resources. Provinces and cities have been assisted by DILG to develop their inventories, but currently they cover only provincial and city roads, and not the municipal and barangay roads that constitute roughly more than 70% of the road network.

Key areas for improvement are listed below. Through PRDP, some of these best practices have already started to be mainstreamed into the DA:

- **Better coordinated planning across LGUs and national government agencies.** Facilitate the establishment of inter-LGU coordination protocols for road planning; use a larger geographic area than the area used for planning LGU boundaries; link road planning to planning for ports and other infrastructure.
- **Completing the GIS mapping of all local roads, especially rural barangay roads.** Encourage the use of free and open-source software such as OpenStreetMap to fill gaps in mapping and information; conduct workshops to build capacity to use software like OSM and GIS.
- **Application of available planning tools.** Conduct regular field surveys on the movement of freight and goods, as they can provide more up-to-date information that can be used for road planning or other transportation projects; adopt advanced software (OSM, Cube, GIS, etc.) to assist in survey, mapping, and transport modeling exercises.
- **Improving LGU capacity in roads planning and traffic management.** Build capacity in road planning through training programs; conduct or update the traffic and transport management plan for key cities
- **More transparent project prioritization.** Formalize procedures to identify and establish missing roads so that different agencies, LGUs, and stakeholders can provide inputs; using GIS tools, adopt prioritization criteria agreed with various stakeholders.

Industrialization

Market networks and infrastructure

In consultation with the private sector, develop a national strategy or master plan for the development or modernization of urban wholesale markets and rural aggregation centers. This strategy would be based on current and projected supply and demand for storable and perishable foods, current and planned transport and logistics infrastructure and services, the projected future development of modern retail and food services, and other factors. The plan would propose a hierarchy of private and public market centers, propose a strategy for mobilizing private and public resources, and address physical facility, information exchange, and management standards. The plan could be developed by an inter-

departmental task force. The scope and approach to the work could be informed by similar strategy/master plan work done elsewhere in Asia (China, Korea, Vietnam). Individual municipalities should be encouraged and supported in seeking private investment and/or management for this infrastructure development. Best international practice seeks to integrate multiple services with such market facilities, including logistics, quality testing, market information services, and perhaps other services. Ideally these should be income-generating facilities, to attract third-party management to encourage sufficient volumes of farmers and traders to use the centers and assure their long-term sustainability. Interactions with the community can ensure that the centers are built where farmers and traders most require them. Most importantly, the physical requirements for the operations should be attuned to the requirements of the producer and trading community. For vegetables, for example, the physical requirements for building the trading centers are not excessive, as most trading centers require primarily an empty space with sufficient shelter and information portals; in many cases, cold storage facilities may not be needed for the types of transactions carried out.

Agribusiness incubation and education

Explore with Philippine universities, research centers, and private industry the potential for developing an Agribusiness Innovation and Education Center. This center would support agribusiness start-ups and agri-food technology R&D (related to postharvest management, food processing, and packaging), provide technical and business support services to existing companies, and provide short course and degree programs related to different aspects of agribusiness management. Consider providing seed capital to such a center, although the bulk of start-up costs could be mobilized from non-governmental sources. The center should be self-sustaining through fees for providing services and training.

Agricultural quarantine, food safety, and animal health

Develop new legislation on biosecurity. New legislation is necessary to integrate the quarantine and food safety functions of BAI, BPI, BFAR, and the National Meat Inspection Service into a single regulatory body dealing with all biosecurity concerns. The legislation would harmonize the mandates of these agencies, which are currently embedded in separate laws, and provide a consistent delimitation of their powers. The legislation should expand the scope of the quarantine function beyond animal, plant, and fisheries products, given that biosecurity risks can enter the country in sea containers, used vehicles and other non-agricultural commodities. Finally, the new legislation should separate the regulatory from the developmental functions of the bureaus and allow the bureaus to focus on the development of their respective sectors.

Develop a national multisectoral agricultural quarantine and food safety strategy that sets priorities, addresses institutional strengthening and coordination needs, and lays out approaches for private sector collaboration and consumer engagement. This plan will enable the Philippines to move from a reactive to a preventive posture on agricultural quarantine and food safety and to develop concrete arrangements for operationalizing the concept of food safety as a shared responsibility. The pertinent agencies within the DA, the Food and Drug Administration, and Trade and Industry should act to: (i) strengthen systems for foodborne hazard surveillance and agriculture disease surveillance and reporting, (ii) improve the functioning of the existing network of quality assurance laboratories, (iii) professionalize quarantine officers and food inspectors and implement risk-based inspection plans based upon a registry of agricultural and food businesses in the formal sector, (iv) mainstream the adoption of good agricultural, animal husbandry, and aquaculture practices on farms and hazard control

management systems in food facilities, (v) strengthen border controls on a risk basis and ensure that controls follow good trade facilitation practices, (vi) implement national food safety awareness programs, targeting all stakeholders and age groups, and (vii) further strengthen and invest in One Health to address shared risks to humans, animals, and the environment.

Cluster development and agricultural commodity differentiation

A world-class agricultural cluster seeks to realize economies of scale and agglomeration, foster rapid learning among farmers and firms, and crowd in new investment to raise the competitiveness of focal value chains. The Philippines has already embraced the concept of spatially clustered initiatives centered on specific commodities as embodied in Provincial Commodity Investment Plans (PCIPs) introduced by PRDP. Many of these plans make provisions for infrastructure development and technical support to farmers. Taking this to the next level may require more attention to facilitating the emergence or local entry of pertinent business development services, facilitating private investment in infrastructure for distributing or processing the commodities, and efforts to begin to differentiate these commodities and clusters, perhaps through the use of geographic indications, raising distinctive varieties or breeds, applying certifiable production standards, or other means. (In other words, infuse some of the existing spatial cluster strategies with a much stronger commercial orientation.) Clusters will find themselves competing with one another as well as with imported products. Raising their game will be essential.

Commission a review of existing experience and the feasibility of expanding the application, both for domestic and international markets, of various institutional tools for differentiating Philippine commodities. This review would include attention to promoting/protecting geographic indicators, the application of various “sustainability” standards, the development/application of organic production standards, and perhaps others. This work would be done in conjunction with the Ministry of Commerce and pertinent industry associations, although special attention should also be given to how these instruments can improve the profitability and market positioning of products from organized smallholder farm groups. The assessment would include costed proposals for piloting or upscaling interventions.

Policy Options

Table 8: Policy options for responding to the challenges to agricultural transformation identified in this report

Challenge	Reform action	Nature of the action	Expected result/impact	Agency	Impact	Timeline
Focus on rice production in pursuit of self-sufficiency undermines other sectoral objectives.	Shift strategic emphasis from rice production to improved and broader food security objectives.	Revise/enhance programs and budget allocations.	More resilient, inclusive, competitive, and environmentally sustainable sector. More efficiency in production in competitive rice areas, and more diversified and productive agriculture sector.	DA, Legislature	High	Beginning next budget cycle; phased over next several years.
Inefficient policy instruments undermine sectoral development.	Eliminate input subsidies and other public spending on private goods. Revise programs and budget allocations accordingly.	Changes in programs, regulations, and decrees. Immediately include sunset clause in all recent programs involving these subsidies (including COVID response programs). Phase out other existing subsidy programs.	Better achievement of all relevant sectoral objectives; more efficient public expenditure.	DA, Legislature	High	Preparations beginning immediately; extending over next several budget cycles for full reform.
Political opposition to phaseout of inefficient/ counterproductive subsidies	Put in place decoupled payment-based support system to partially compensate farmers for other subsidies.	Laws and programs.	More political support for reduction/ elimination of other subsidies.	DA/Legislature	Med	Preparations beginning immediately; implementation over 1-2 years.
Fragmented and uncoordinated programs impede achievement of objectives.	Focus on fewer and more holistic programs. Consolidate fragmented programs.	Programs and budget allocations.	Better achievement of objectives.	DA, NEDA, DBM	Med	Next budget cycle.
Little use of evidence-based analysis in decision making, due partly to lack of relevant data and information.	The DA (and other departments) should be required to carry out benefit-cost analyses in designing major programs and projects, as well as periodic impact evaluations during their implementation and after they terminate. Also, strengthen information base for decision making, including the development and use of the Farmer Registry and better use of ICT.	DA decisions and budgetary allocations.	Improved quality of all decisions.	DA	High	Starting immediately.
Domestic price of sugar is much higher than the world price, raising production cost for sugar-using industries. Sugar Regulatory Administration (SRA) has applied quantitative restrictions on imports of sugar, to keep domestic price high.	Law to abolish SRA and replace it with a Sugar Industry Development Administration with a mandate to promote sugar industry development but with no regulatory powers.	Law	Big boost in competitiveness and more job generation in the agri-food processing businesses, as they could import ASEAN sugar at 5% tariff.	DA, Legislature	Med	Pass law in 6 months.
Fragmented, uncoordinated land use reduces productive efficiency and competitiveness.	Support consolidation of land use. This can be accomplished through different approaches, including facilitating an agricultural land leasing market, and improving block or cooperative farming schemes involving the smallholder owners.	Development of strategy; regulatory changes; and legislation.	Lowered production costs; greater competitiveness.	DA, Legislature	Med	Strategy development in short term; other actions in medium term.

Challenge	Reform action	Nature of the action	Expected result/impact	Agency	Impact	Timeline
Extension system needs to be modernized to improve service to farmers	Change system to: (i) be demand-driven rather than supply-driven; (ii) be multi-directional rather than unidirectional; (iii) feature much more diverse content (farm, natural resource, risk, and marketing management) instead of having a narrow (primary rice productivity) focus; (iv) combine public, private, NGO and other players rather than being a public service; (v) feature multiple delivery modes rather than involving predominantly person-to-person contact; and (v) make better use of digital ICT-enabled tools to improve extension reach.	Program design; may require legal/regulatory changes.	Improved information uptake by farmers; better connection to research; eventually improved on-farm productivity and higher incomes.	DA, DOST	Med	Planning to begin immediately; implementation to begin next budget cycle.
Irrigation system needs modernization including institutional, organizational and technological reform.	Modernization requires more than just rehabilitation of the infrastructure. Requires technical and managerial upgrading and re-introducing cost recovery for operations and maintenance, with the objective to improve resource utilization and water delivery service to farms and the sustainability of the irrigation systems.	Program design, administrative changes and reorganization, which may require legal changes. Investments in infrastructure.	Benefits both in raising productivity of rice and in opening opportunities for farmers to diversify.	NIA/ DA/ Legislature	Med	Planning and regulatory reform to begin immediately; implementation over several years. Investments over longer term.
Problems with hard and soft infrastructure for transit reduce competitiveness of agri-food sector.	Key areas for improvements are: Better coordinated roads planning across LGUs and NG agencies; completing the GIS mapping of all local roads, especially rural barangay roads; application of available planning tools; improving LGU capacity in road planning and traffic management; and more transparent project prioritization.	Regulations, investments.	Better connection of farms to markets; higher incomes for producers and lower prices for consumers.	DA, DPWH, DAR, DILG, DTI, Private sector; LGUs	Med	Institutional and regulatory reforms possible in short term. Investments are longer term.
Poorly functioning market networks and infrastructure.	In consultation with the private sector, the government should develop a national strategy for the modernization of urban wholesale markets and rural aggregation centers.	Strategy, regulations, investments (mostly private sector).	More efficient marketing functions; higher prices for producers and lower prices for consumers.	DA, Private sector	Med	Planning for strategy to begin immediately; investments over a longer term.
Inadequate legal framework for biosecurity and food safety.	Develop a strategy and promulgate new legislation on biosecurity and food safety, including (i) national multisectoral agricultural quarantine and food safety strategy; (ii) legislation to coordinate/integrate quarantine, food safety, and biosecurity functions across relevant agencies.	Strategy, legislation.	Greater safety for consumers and general population; improved environment for development of food processing industry.	DA, Legislature	Med	Planning for strategy to begin immediately; regulatory reforms and legislation in medium term.

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Annexes



Annex 1. Services in the Commodity-based Banner Programs of the Department of Agriculture

Rice Program

Production support services in the rice program involve subsidy interventions such as the provision of high-quality seed to adverse ecosystems and production support for High Yielding Technology Adoption. During pest outbreaks, the DA also provides pest control inputs, including insecticides, fungicides, rodenticides, and flamethrowers. As a disaster response measure, the program maintains buffer stocks of registered and certified seed.

Extension support, education, and training services for rice farmers include the conduct of Stakeholders and Farmers Congress, Farmer Field Schools, technology demonstrations for Palaycheck and Palayamanan and hybrid-inbred rice, and training in community seed banking. Specialized training is held to strengthen DA-Regional Crop Protection Center Pest Surveillance teams and investments are made in early warning systems for pest monitoring and surveillance. The Rice Program also invests in Strategic Rice RD&E FSSP projects for technology development, adaptation, and demonstrations on rice and rice-based farming systems. Other service providers are strengthened through various capacity-building and retooling activities. For irrigation, the DA invests in institutional development of Small Water Irrigation System Association and Irrigation Associations. Regional offices also run accessible radio programs for information dissemination and educational campaigns for rice farmers.

For **Research and Development**, the DA has a longstanding collaboration with IRRI, which has culminated in several recent R&D projects to support irrigated and rainfed rice production in various ecosystems. One project is the Philippine Rice Information System, which is an operational monitoring system to support decision-making for increased rice production. The second is the engagement to accelerate the development and adoption of Next-Generation Rice varieties in major ecosystems. The third is the operationalization of the Rice Crop Manager, a decision-support tool for increasing yields and income of rice farmers. The fourth is accelerating the development and dissemination of associated technologies for direct-seeded rice in irrigated and rainfed ecosystems.

The rice program also has invested in **strategic rice R&D for rice farm productivity enhancement and integrated farming systems** through Community-based Participatory Action Research (CPAR), with the latter being a program of the BAR to promote integrated farming systems that combine crop and livestock production. Other collaborative R&D with other Institutions include CPAR Integrated Rice-based cum Sweet potato and Slaughter Goat Production in Bataan (BPSU), Integrated Rice-based Cropping Systems for Climate Resilient Farming Systems in Selected Lahar-laden Areas of Pampanga, Tarlac and Zambales (PAC), Combine Tillage and Weed Control Practices for Upland Rice Ecosystems in Bulacan (BASC), Nutrient Dynamics Assessment of Inorganic and Organic Rice-based Farming in Pampanga River Basin Through Lysimeter and Isotopic Techniques (BSWM), Intensified Rootcrop Production in Rice-based Areas in Central Luzon (TCA) and Rice Black Bug (RBB) *Scotinophara coarctata* (Metsch): Population Density, Damage, Natural Enemies, Evaluation of Management Tools and Promotion of Recommended Management Strategies in Central Luzon (PhilRice). There are also a number of Regional Rice R&D projects such as the Community-Based Participatory Action Research (CPAR) on Rice-Onion Production in

Maquiapo and Pulung Masle, Guagua, Pampanga, CPAR on Integrated Rice-Based Farming System in Botolan, Zambales, Rice Production: The Nueva Ecija Experience and Profiling of Selected Traditional Rice Varieties in Support of DA's Initiative on Rice Exportation.

Irrigation network services of the program include construction and rehabilitation of small-scale irrigation projects such as small water impounding project, shallow tube well, diversion dam, pump irrigation system for open source and diversion dam. While **agricultural and fishery machinery, equipment, and facilities support services** cover the provision of various machineries and equipment such as mini 4W tractor, hand tractor, farm machinery pool for quick response brigade, floating tiller, transplanter, different types of harvesters, reaper, drumseeder, rice straw baling machine, jeepney mounted thresher and other small equipment including rice straw shredder, grain treating machine, rice hull carbonizer. Support facilities include maintenance of bio-con laboratories, establishment of multi-purpose drying pavement and recirculating/LSU dryer with biomass furnace.

Under the FY 2020 General Appropriations Act, the Rice Program has been appropriated about PHP6.95B for its operational budget, the largest among all banner programs. About half (48%) of the program's budget is allocated to production support services. Extension support, education and training services and irrigation network services are each allocated 14% of the budget, followed closely by 13% allocation to agricultural equipment and facilities and 11% to research and development. Market development services seem to have a crosscutting budget that is not lodged specifically in any banner program, while farm-to-market road funds are mostly appropriated under the locally-funded programs.

Corn Program

Aside from corn inputs and planting materials, **production support services** of the Corn Program include provision of input support to cassava farmers such as planting materials and the establishment of biological control programs for Trichogramma and Earwig production and pest and disease surveillance and control. Farm mechanization projects are also provided for corn and cassava producers.

Market development services include market-matching projects in key corn and cassava production areas and major target markets. Some **irrigation support** is also provided through the establishment of open source pumps. **Postharvest development services** of the program covers the establishment of postharvest facilities that provide farmers access to various machineries and equipment such as combined harvester, mechanical sheller, vertical dryer, cassava dryer, and cassava granulator with shredder.

Extension support, education, and training services of the program focus on providing various farmer education trainings. These include technology demos such as the "Tipid-abono" and cassava techno demo, Farmer Field Schools, Entrepreneurial Corn Husk Handicraft training, Post Harvest Technology Promotion, Extension and training, and Cassava Production and Livelihood Trainings. There are two major programs for **Research and Development** in this subsector: the Farmers' Participatory Technology Development Program and the R&D for Cassava Program.

The Corn Program has a total of PHP1.46B appropriations for FY2020, which is second largest among the banner programs but strikingly lower than the Rice Program budget. Postharvest development services and production support services for corn and cassava received the largest allocation with 32% each, followed by 26% for extension support, education and training services. Research and development has 7% funding, while only 3% goes to irrigation network support.

High Value Crops Development Program

Production Support Services involve seed distribution for crops such as mungbean, peanut and lowland vegetables and spices, planting materials distribution for atchuete, mango, rambutan and citrus, industrial crops distribution such as coffee and cacao, production support provision for banana and sweet potato and provision of free fertilizers and other soil ameliorants. **Extension support, education, and training services** are focused on holding Farmer Field Schools and developing information materials for educational campaigns and trainings, and provision of incentives to LGUs to actively promote and support farmer trainings. **Agricultural equipment** often comes in the form of tractors, hand tractors, cultivators, power and knapsack sprayers, coffee dehullers, and plastic and transportation crates, while **facilities** the program often establishes include greenhouses, nurseries, packing houses, onion hanger storages and mango processing facilities.

The HVCDP has about as much budget allocation as the Corn Program with PHP1.44B for FY2020. Similarly, the three highest budgeted interventions are production support services, provision of agricultural equipment and facilities and extension support, education and training services with 34%, 28%, and 25% of the overall budget, respectively. Some research and development (7%) and irrigation services (6%) are also funded.

Livestock Program

Major **technical and production support services** include distribution of production inputs such as frozen semen, forage grass/legume seeds, drugs and biologics, rabies vaccine, and distribution of animals. **Extension support, education, and training services** provide training for Meat Processing and Livestock and Poultry Information-Early Warning System (LPI-EWS). The program provides information materials and incentives to LGUs to support the livestock and poultry subsectors. While limited, the Program provides **agricultural equipment and facilities** upgrading and rehabilitation of regional laboratories, multiplier farms and livestock production centers.

For FY2020, the Livestock Program has a budget of PHP1.11B, most of which is allocated for technical and production support services (55%). The rest of the budget is for extension, education, and training services with 34%, agricultural equipment and facilities provision with 8%, and some research and development support with 3% of the budget.

Organic Agriculture Program

Projects, services, and activities in this program include **provision of production inputs** such as seeds, planting materials, fertilizers and soil ameliorants, livestock, and poultry. **Education, seminars, and training services** are provided on modern production technologies through technology demonstrations and the annual regional organic agriculture congress. The program also upholds the **Philippine National Standards on Organic Agriculture** and Internal Control System. Assistance is provided to third-party **organic agriculture certification**. For **market development**, the program facilitates trade fairs and market-matching with existing organic trading posts. **Irrigation support** is also provided through the establishment and rehabilitation of small-scale irrigation projects.

The Organic Agriculture Program is one of the under-funded banner programs, with only about PHP549M for FY2020. Of this allocation, the majority is focused on providing agricultural equipment and facilities with 34% of the budget, and extension, seminars, and training services with 33%, followed by production

support services with 19%. Resources are also allocated for research and development (11%) and some for irrigation network support (3%).

Halal Food Industry Development Program

The Halal Food Industry Development Program became part of the DA's banner programs in early 2018, in accordance to the Philippine Halal Export Development and Promotion Act of 2016 (RA 10817). Its objective is to make the Philippines an active player in international markets for halal products. Institutionalizing measures that promote integrity, quality, and growth is paramount in creating a strengthened Philippine Halal industry that is export competitive. Research and product development, quality assurance and value-adding mechanisms are crucial pillars of the program.

Most of the activities in the initial phase (2017–18) focused on establishing **regulatory and policy mechanisms** (i.e., Policy Framework for the establishment of the HFIDP Advocacy, Campaign, Production, Trainings, Research and Development) to promote exportation of Philippine Halal agri-fishery products. It seeks to provide **institutional guidance and sectoral standards** to producers, manufacturers and processors to ensure that Philippine products meet international Halal standards. Halal awareness and promotion campaigns are conducted to stimulate and engage the sector at an increasing rate. The second phase (2019–22) of the program aims to intensify Halal food agri-fishery production, while the last phase (2023–27) will focus on increasing access to local and international markets of Halal agri-fishery products. Since the program is in its initial stages, all of its budget (about PHP23M) is allocated for extension support, education, and training services.

Annex 2. Comparative Matrix of DA's Legacy Banner Program

		DA Banner Programs						DA Foreign-assisted Project	DA-attached Agencies and Bureaus	
		Rice Program	Corn Program	HVCDP	Livestock Progr	Organic Agricultu	Halal Program	PRDP	DAR	PCA
Consolidation	Land consolidation / land leasing market								v Block Farming Agribusiness Venture Agreement (AVA)	
	Professionalization of cooperatives			v Strengthening of farmer groups through cooperative business trainings				v IREAP: financial, accounting and management trainings for cooperatives upgrading and enhancing production and processing technologies of coopeartives		
	Cluster development							v IREAP: Vertical clustering of farmer groups/cooperatives		
	Productive Alliances							v IREAP: Assisting the formation of productive alliances to increase capacities of producer groups		v Kaanib Coco Agro-Industrial Hub (KCAHP) - strategic partnership and productive alliances between PCA and coconut farmer's organization or cooperatives, local government units (LGUs), and social business enterprises among others

		DA Banner Programs						DA Foreign-assisted Project	DA Locally-funded Projects		DA-attached Agencies and Bureaus			
		Rice Program	Corn Program	HVCDP	Livestock Pro	Organic Agricul	Halal Program	PRDP	FMRDP	SAAD	Fisheries (BFAR)	DAR	ATI	PhilMech
Modernization	Mechanization & mechanization services	√ 2018: distributed 2,000 machineries and equipment 2020: received 36% of national budget for agri mechanization	√ 2018: distributed 1,200 machineries and equipment PhilMech-developed technologies in 2018 mostly targeted for non-rice commodities 2020: received 23% of national budget for agri mechanization 2020: received 28% of national	√ 2018: PhilMech-developed technologies in 2018 mostly targeted for non-rice commodities 2020: received 23% of national budget for agri mechanization	√ 2020: received 6% of national budget for agri mechanization	√ 2020: received 8% of national budget for agri mechanization		√ IREAP: upgrading and enhancing production and processing technologies of coopeartives		√ production equipment	√ distribution of fiberglass reinforced plastic boats	√ provision of services through the Agrarian Reform Community Connectivity and Economic Support Service (ARCESS)		√ developm ent of agri-entrepren eurship through the delivery of postharve st and processin g equipmen t that add value to farmers' produce
	Extension: new paradigm and approaches	√ Techno demo farms financial literacy trainings	√ community-based sustainable corn production and technology demonstration farms	√ Techno demo farms Training of Trainors	√ Extension and Training Support for Smallhold Livestock and Poultry Raisers Techno demo farms Training of Trainors of 4Ks program for Indigenous People	√ training provision techno demo farms		√ capacity building of LGUs and farmer groups		√ technical trainings across rice, corn, high-value crops, and livestock & poultry-related livelihood projects	√ training and capacity building on the construction of FRP boats as a livelihood intervention	√ Capacity Development Program for ARBs	√ DA's Strategic Framework for Agriculture and Fisheries Extension (AFE)	

		DA Banner Programs						DA Foreign-assisted Project	DA Locally-funded Projects		DA-attached Agencies and Bureaus		
		Rice Program	Corn Program	HVCDP	Livestock Pro	Organic Agricu	Halal Program	PRDP	FMRDP	SAAD	Fisheries (BFAR)	BAI	ATI
Modernization	"Greening of Agriculture"	v Solar-powered irrigation systems	v Solar-powered irrigation systems Mainstreaming of sustainable farming technologies	v Climate-resilient technologies	v Adoption of Sustainable Technologies in Livestock and Poultry Raising	v organic production		v Climate-resilient technologies			v Climate-resilient technologies Intensified Resource Protection, Management and Resource Enhancement Programs		v Strengthening AFE Stakeholders Capacity in Climate Change Adaptation and Risk Management
	ICT applications	v Rice Crop Manager				v Institutionalization of Organic Agriculture Information System and Strengthened M&E		v governance tools (applied geotagging tools, e-vs-a)	v governance tools (applied geotagging tools)	v governance tools (applied geotagging tools)		v Philippine Animal Health Information System (Phil-AHIS) with Surveillance and Vaccine System, Laboratory Information System and Livestock Movement Monitoring System	

		DA Banner Programs						DA Foreign-assisted Project	DA Locally-funded Projects	
		Rice Program	Corn Program	HVCDP	Livestock Pro	Organic Agricu	Halal Program	PRDP	FMRDP	SAAD
Industrialization	Agribusiness incubation	√ agricultural trading centers, DA-AMAS market matching; trade events	√ agricultural trading centers, DA-AMAS market matching; trade events	√ agricultural trading centers, DA-AMAS market matching; trade events	√ boar auction centrum Support to Livestock and Poultry Production and Enterprise	√ organic trading posts, DA-AMAS market matching; trade events		√ IREAP: shared facilities and equipment, business development, networking IBUILD: market access	√ market access	√ establishment of community enterprises
	Product transformation	√ Mainstreaming of PRDP PCI, VCA and product value addition	√ Mainstreaming of PRDP PCI, VCA and product value addition	√ Mainstreaming of PRDP PCI, VCA and product value addition	√ Mainstreaming of PRDP PCI, VCA and product value addition	√ Mainstreaming of PRDP PCI, VCA and product value addition	√ roadmap development	√ PCI, VCA and product value addition		
	Differentiation									
	Food Safety									

		DA-attached Agencies and Bureaus										
		Fisheries (BFAR)	BAI	BAFS	NMIS	BPI	NDA	FPA	DAR	ACPC	PCA	SRA
Industrialization	Agribusiness incubation	√ community fish landing centers							√ Enterprise Development for ARBs Credit and Microfinance Programs	√ financial services, credit	√ Kaanib Enterprise Development Project (KEDP) Market Development Services	
	Product transformation	√ development of fisheries commodity roadmaps Comprehensive Post-harvest, Marketing and	√ Animal Trade Competitiveness Enhancement Program to make local livestock and poultry produce and by-products competitive in the international trade								√ Under R&D, the Food Product Development (FPD)	
	Differentiation											
	Food Safety	√ quality assurance laboratories mandated to provide laboratory services on the verification of physical, chemical and microbiological examinations of fish and fishery product for export, import and local consumption consistent with RA 10611, also known as the "Food Safety Act of 2013.	√ Animal Health Protection and Welfare Program for prevention, control and eradication of animal diseases ISO Quality Management Program to ensure that its core processes are at par with global standards and best practices like ISO 9001 QMS. 17025 Laboratory Standards and 17020 Inspection Standards Laboratory Testing/Analysis for Disease Diagnosis Under Food Safety Act of 2013, BAI is mandated to enforce food safety standards and regulations in the primary and post harvest stages of food derived from animals	√ Under Food Safety Act of 2013, BAFS is mandated to develop food safety standards for fresh plant, animal, fisheries and aquaculture foods	√ Aims to harmonize Philippine meat inspection laws with international standards to enable the domestic meat processing industry to participate in global trade Regulatory agency under the Food Safety Act of	√ Exercise inspection and certification and/or treatment activities on imported and exportable plant products Regulate imports of fresh fruits and vegetables; should require phytosanitary	√ Regulatory agency under the Food Safety Act of 2013 for milk production and post harvest handling	√ Regulatory agency under the Food Safety Act of 2013 for pesticides and fertilizers used in the production of plant and animal food			√ Regulatory agency under the Food Safety Act of 2013 for fresh coconut	√ Regulatory agency under the Food Safety Act of 2013 for sugarcane production and marketing

