FEBRUARY 2022

DISCUSSION PAPER SERIES NO. 2022-05

Modernizing Agriculture and Fisheries: Overview of Issues, Trends, and Policies

Roehlano M. Briones

CONTACT US:

RESEARCH INFORMATION DEPARTMENT
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris - North Tower
EDSA corner Quezon Avenue, Quezon City, Philippines

publications@pids.gov.ph
(+632) 8877-4000

https://www.pids.gov.ph

Modernizing Agriculture and Fisheries: Overview of Issues, Trends, and Policies

Roehlano M. Briones

PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

February 2022

Abstract

This paper offers an overview towards assessing the implementation of the Agriculture and Fisheries Modernization Act (RA 8435), the country's landmark legislation on the sustainable and equitable development of its agriculture and fisheries. The study presents a Theory of Change implicit in the AFMA, and reviews the Philippines' agricultural development trends, within an overall economic context of structural change. It concludes with a synthesis of past AFMA program reviews.

Keywords: Agricultural development, modernization, technical progress, inclusive growth, smallholders, structural change

Table of Contents

List of Tables

List of Figures

Modernizing Agriculture and Fisheries: Overview of Issues, Trends, and Policies

Roehlano M. Briones*

Introduction

The Philippine Constitution identifies a "sustained increase in the amount of goods and services produced by the nation for the benefit of the people" as a goal of the national economy. To this end, it mandates the State to "promote industrialization and full employment based on sound agricultural development and agrarian reform, through industries that make full and efficient use of human and natural resources, and which are competitive in both domestic and foreign markets" (Article XII, Sect. 1). Drawing on this Constitutional provision, Congress enacted the country's key legislation for sustainable and equitable development of Philippine agriculture, namely Republic Act (RA) 8435, the Agriculture and Fisheries Modernization Act (AFMA) of 1997.

The AFMA emphasized the welfare of small farmers and fisherfolk (SFF) in its push towards modernization of agriculture. Section 2) the Law states: "Thus, it is hereby declared the policy of the State to enable those who belong to the agriculture and fisheries sectors to participate and share in the fruits of development and growth in a manner that utilizes the nations resources in the most efficient and sustainable way possible by establishing a more equitable access to assets, income basic and support services and infrastructure."

A quarter century has passed since the enactment of AFMA and its ambitious program of agriculture modernization. Several key policy questions arise:

- How far has process of agriculture modernization gone?
- Is modernization on track, ahead of expectation, or lagging behind?
- Given real-world developments in the past twenty-five years, what elements of the AFMA framework/objectives remain relevant, and which need to be updated?
- What are the future prospects for continuing or completing the task of AF modernization?
- What types of policies are needed to ensure AF modernization?

A study that seeks to answer these questions comes with auspicious timing, providing a retrospective from the late 1990s up to the end of the current administration, while offering analysis and advice to the incoming administration from 2022 onward. Moreover, the phrasing of the aforementioned questions reveals its innovative approach towards AF modernization assessment, compared with that done in previous studies. That is, it adopts a more explicit results-based monitoring approach, re-examining the law in terms of a coherent Theory of Change (TOC) with accompanying performance indicators; compares progress made against given objectives; and offers recommendations moving forward, both for the medium and long term.

* Research Fellow II, Philippine Institute for Development Studies.

The AFMA (Section 3) states nine objectives, as follows:

i) To modernize the agriculture and fisheries sectors by transforming these sectors from a resource-based to a technology-based industry
ii) To enhance profits and incomes in the agriculture and fisheries sectors…
iii) To ensure the accessibility, availability, and stable supply of food at all times;
iv) To encourage horizontal and vertical integration, consolidation, and expansion of agriculture and fisheries activities;
v) To promote people empowerment by strengthening people's organizations, cooperatives and NGOs;
vi) To pursue a market-driven approach to enhance the comparative advantage of our agriculture and fisheries sectors in the world market;
vii) To induce the agriculture and fisheries sectors to ascend continuously the value-added ladder;
viii) To adopt policies that will promote industry dispersal and rural industrialization;
ix) To provide social and economic adjustment measures that increase productivity and improve market efficiency while ensuring the protection and preservation of the environment and equity for SFF.

Section 2 offers a conceptual framework for understanding AF modernization based on the aforementioned AFMA objectives and other relevant AFMA provisions. Section 3 reviews trends in Philippine agriculture in relation to the modernization discussed in Section 2. Past reviews of AFMA programs are summarized in Section 4. Section 5 concludes.

Theories of agriculture modernization

Economic context

Modernization of agriculture is best understood within a context of modernization of the whole economy. As national income accounts came into widespread use, per capita GDP became a standard measure of economic activities Based on this measure, a key stylized fact of *structural change* emerged, namely the change in composition of economic activity from agriculture to industry with rising per capita income (e.g. Clark, 1940). Indeed, the process of modern economic growth was described as one of "industrialization" and the "industrial economy" became synonymous with a "developed economy".

Among the early pioneers of modeling structural change was Lewis (1954). His original model did not contrast agriculture with industry, but rather a dual structure of a typical developing economy involving a capitalist and a subsistence sector. There are two key distinctions between these sectors, namely *marginal product of labor*, and *growth by capital accumulation*.

First: marginal product of labor denotes the reduction in output associated with the removal of one labor unit. In the capitalist sector, labor is scarce, and its wage is driven by to the value of marginal product by forces of supply and demand following the neoclassical model. IN contrast, in the subsistence sector, labor is in surplus, i.e. its marginal product is effectively zero: one unit of labor can be removed without significant decline in output. In this sector, wages are driven down to the level of subsistence.

Second: the process of capital formation requires savings, in turn requiring the existence of a class of households that receive a surplus from earning profit income. This class of households exists only in the capitalist sector; in contrast, in the subsistence sector, savings is practically non-existent, and hence capital formation simply does not occur.

Economic development proceeds in two phases. First is a classical phase, where surplus labor begins to move into the capitalist sector as capital stock accumulates, driving economic growth. However, wages remain stagnant as long as a significant pool of surplus labor remains. Second is the neoclassical phase, when surplus labor is finally exhausted, and the subsistence sector melds into the capitalist sector; wages are set by marginal product throughout the economy, and begins to trend upward, even as capital formation continues.

Gabardo et al (2017), in their review of explanations of structural change, note that such dual economy models inspired other economists to apply neoclassical modeling to the phenomenon of structural change. While early models adopted a one-sector approach based on the aggregate production function (e.g. Solow, 1956), later neoclassical growth models extended to multiple sectors. Structural change can result from a shift in demand associated as related to with the Engel effect: as income increases, household income expenditure shifts share to of non-food products rise with income (Kongsamut et al 2001). There are also supply-side effects: with capital deepening, resources move away from agri-based industries, which are labor-intensive, towards more capital-intensive industries (Acemoglou and Guerrieri, 2008). Neoclassical models currently dominate the current economic literature on growth and structural change; there are nonetheless active research programs based on alternatives, i.e. post-Keynesian models a lá Pasinetti (1981); agent-based evolutionary models such as Ciarli at al (2010).

Even the old-style dual economy models have been considerably enriched over the past several decades. The original Lewis model was extended by Ranis and Fei (1961) to highlight the implications of agricultural productivity: they point out that an economy with a stagnant agriculture and high enough population growth may never quite exhaust the pool of surplus labor. In their model, the way to catch up with population growth is for agricultural productivity to increase. That is, agricultural growth and modernization must evolve in parallel to overall growth and modernization. Boserup (1965) extends this further by documenting cases in which population growth lead to land scarcity, and induces land-saving innovations.

Another strand of literature re-examines the category of “agriculture” and sees it as too limiting to primary activities (crop cultivation, livestock and poultry raising, aquaculture, and capture fishery). Agriculture though is embedded in an **agri-food system**, inclusive of activities that rely on inputs from agriculture (i.e. agro-processing, food logistics, etc.), as well as ancillary sectors that supply agriculture (e.g. fertilizer, agricultural machineries, agricultural services). In general, the agri-food system is **not** expected to suffer a relative decline over the course of per capita income growth. There is in fact some evidence that that the opposite is true, that agriculture plus linked sectors, broadly defined as “agribusiness”, may actually retain a stable or even rising share in aggregate output. The expanding agri-food system may indeed be another driver of agricultural transformation as backward and forward linkages with industry and services both enable and benefit from the development of agriculture (Timmer, 1988).

Constraints to development at varying scales

The preceding discussion highlights the role of resource misallocation – essentially market failures – that constrain the pace of modernization in agriculture. The salience of misallocation varies by scale of the underlying constraint. At the top level are industry- and economy-wide ("macro") constraints, associated with persistence of surplus labor in agriculture, the high cost of intersectoral migration, and the slow pace of capital accumulation in the modern sector.

Well-recognized as well are **micro** constraints, described in Otsuka and Fan (2021) in terms of "behavior of rural households, namely the constraints they face and the determinants of their decision making (p. 8)". Schultz (1964) was probably first to highlight the importance of micro constraints in agricultural development, popularizing the "efficient but poor" hypothesis.

Labor markets fail owing to high cost of monitoring labor; farm households therefore prefer to employ family workers (who benefit from household income) rather than other workers for whom they must pay a high transaction cost. This fact interacts with farm size and rigidities in land markets: farm households tend to rely mostly on family labor, limiting farm size. The relationship though is not monotonic; at larger farm sizes, it becomes economical to deploy machines in lieu of labor; based on data from farm households in India, the optimal farm size is 24 acres (about 10 ha). However, the average farm size in the survey areas is only 3.1 acres; creating redundant (i.e. surplus) labor; consolidating farm land to the optimum size results in an output expansion of 42 percent, and a labor force reduction of 16 percent (Foster and Rosenzweig, 2017).

Financial services are also prone to market failure. Implicated here are transaction costs as well as asymmetric information, which give rise to adverse selection and moral hazard. Under these conditions, access to credit is closely linked to wealth; in a rural setting, this also tends to be associated with land ownership. Landless farmers are therefore at a disadvantage in the financial market.

Lastly, access to technology is also skewed against smallholders. They may lack information or the educational background to properly make use of innovations, or the innovation (like farm machinery) may require capital up-front, which runs into the financing constraints mentioned above. Hence, state- or privately-provided extension service may be one way to accelerate adoption of new technologies (Otsuka and Fan, 2021).

Less recognized in the literature are constraints prominent at the intermediate level, i.e. communities and townships, or **meso** constraints. Coordination may be needed at this meso level, whether by action of the state, or more realistically, by collective action of a group of farmers or fisherfolk. Richards (2017) found benefits from clustering in a sample of soybean farmers in Brazil. In West Java, Indonesia, Wardhana, Ihle, and Heijman (2017) found that clustering significantly reduces poverty rates in sub-districts; and that agricultural growth benefits from localization externalities, i.e. farmers are expected to perform well when they are able to share inputs, knowledge, information, or labor.

Galvez-Nogales (2010) describes the advantage from farmer clusters from forming vertical, horizontal, and support relationships. Vertical relationships along a "value chain"

coordinate between suppliers of raw materials and production inputs, producers, processors and exporters, institutional buyers, and retailers. Similarly, Hayami (2010) has pointed out that large plantations for cash crops have emerged historically to improve coordination with downstream processing and logistics.

Horizontal relationships meanwhile realize benefits from coordinated production across numerous farmers through cooperatives or smalholder arrangements. In Bangladesh, benefits from adopting integrated pest management (IPM) in isolation tends to be dissipated when neighboring farmers maintain conventional practices (Dasgupta, Meisner, and Wheeler, 2006). Synchornization of planting has been deemed essential in the control of pest, disease, and water flow in the Philippine setting (PhilRice, 2020). Finally, support relationships from service organizations such as business service providers, research institutes, community organizers, and local governments, and strengthen quality and sustainability features of the chain.

Scope of agricultural modernization under AFMA

AFMA is divided into 120 sections, grouped into an introductory part, five Titles, and General Provisions. The introductory sections begin with a Declaration of Policy, followed by a Statement of Objections (Section 3). Title 1 of the law covers Production and Marketing Support. The Title is further divided into chapters corresponding to: Strategic Agriculture and Fisheries Development Zones (SAFDZs); the Agriculture and Fisheries Modernization Plan (AFMP); credit; irrigation; information and marketing support; other infrastructure; and product standardization and food safety. Title 2 covers Human Resource Development. Title 3 covers Research and development (R&D) and extension. Title 4 covers rural nonfarm employment, in turn divided into chapters related to: Basic Needs Program; rural industrialization; and training of workers. Lastly, Title 5 covers trade and fiscal incentives. The concluding set of General Provisions relate to budgeting, finance, the formation of a Congressional Oversight Committee on Agriculture and Fisheries Modernization (COCAFM), and other matters.

A Theory of Change for AFMA

Although AFMA itself do not spell out an explicit Theory of Change (TOC), implicit in its provisions are a set of premises that can worked out as a TOC as in Figure 1. The law defines AF modernization "the process of transforming the agriculture and fisheries sectors into one that is dynamic, technologically advanced, and competitive, yet centered on human development guided by the sound practices of sustainability and principles of social justice." This is translated on the rightmost side of the figure in terms of the ultimate impacts of AFMA interventions. Note that the AFMA objectives are alluded to in the figure with bold italic labels, hence impacts stated in terms of quality of life, income of SFF, food security, and sustainability.

AFMA policies are listed in the middle part of the Figure are guided by a set of *principles* listed on the leftmost side of the figure, namely empowerment, achieving global competitiveness, and budget allocation. Based on these principles, AFMA policies are subdivided into those that are *market-enabling*, namely policies support or manage provision of goods and services already provided by the private sector (including SFF); and interventions that involve *direct provision* of goods and services by the State. Market enabling interventions relate to land use planning; credit provision; information

and marketing support; product standardization; the Basic Needs Program; rural industrialization; training of workers; and trade and fiscal incentives.

The framing of the AFMA interventions can be seen as responding to macro, meso, and micro constraints. With respect to macro constraints, AFMA acknowledges recognizes the fact of structural change, while insisting on the key role of agriculture key role in in this process. Section 4 of the law states:

> "Rural industrialization" refers to the process by which the economy is transformed from one that is predominantly agricultural to one that is dominantly industrial and service-oriented. Agriculture provides the impetus and push for industry and services through the market hat it creates, the labor that it absorbs, and the income that it generates which is channeled to industry and services.

This is reinforced in Section 96:

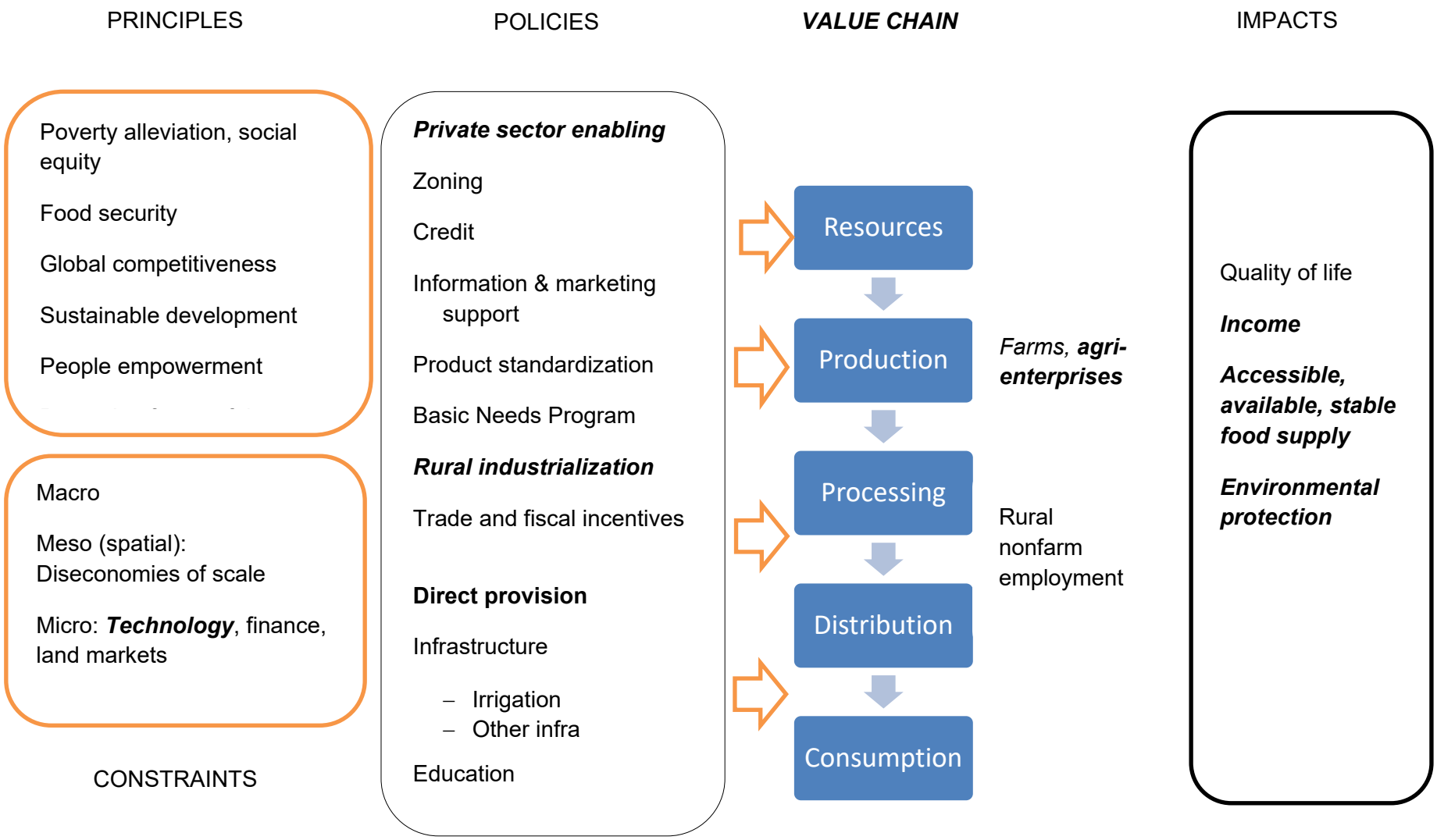
> Economic history, however, shows that as an economy modernizes the number of workers employed in its agricultural sector declines. It is therefore necessary to formulate policies and implement programs that will employ workers efficiently in rural areas in order to improve their standard of living, and reduce their propensity to migrate to urban areas.

This thinking acknowledges that the AF modernization cannot be isolated from a broader process of modernization involving AF-related activities, encompassing the entire agricultural value chain from resources to production, processing, distribution, and consumption. This accounts for the AFMA objective of enabling SFF to ascend the value-added ladder, "by subjecting their traditional or new products to further processing (Sect 3)," so as to boost their employment and incomes, whether on-farm, off-farm, or non-farm.[2]

AFMA also seeks to address micro constraints at the level of farms and enterprises through direct provision of irrigation, other infrastructure, public education, and promotion of new technology through R&D and extension. Lastly, meso constraints are meanwhile addressed by favoring the formation of agri-enterprises, people empowerment, and area-based planning as an overarching strategy.

[2] A publication of the Bureau of Agricultural Statistics (PSA, 2012) includes under the concept "agricultural household", those households *that operates an aggregate area of at least 1,000 square meters for growing crops, raising livestock and/or poultry, regardless of number*. For these households, no distinction is made as to share of nonfarm income in total household income.

Figure 1: A Theory of Change for the Agriculture and Fisheries Modernization Act



Source: Author's diagram

Area-based planning is organized under the heading of Strategic Agriculture and Fisheries Development Zones (SAFDZs). These refer to respectively, agricultural areas identified by the Bureau of Soils and Water Management (BSWM) in coordination with the National Mapping and Resources Information Authority (NAMRIA). SAFDZs are designated as centers of government support for developing agricultural production, agro-prorcessing, and marketing activities in an environmentally and socio-culturally sound manner (see Section 5.2 below).

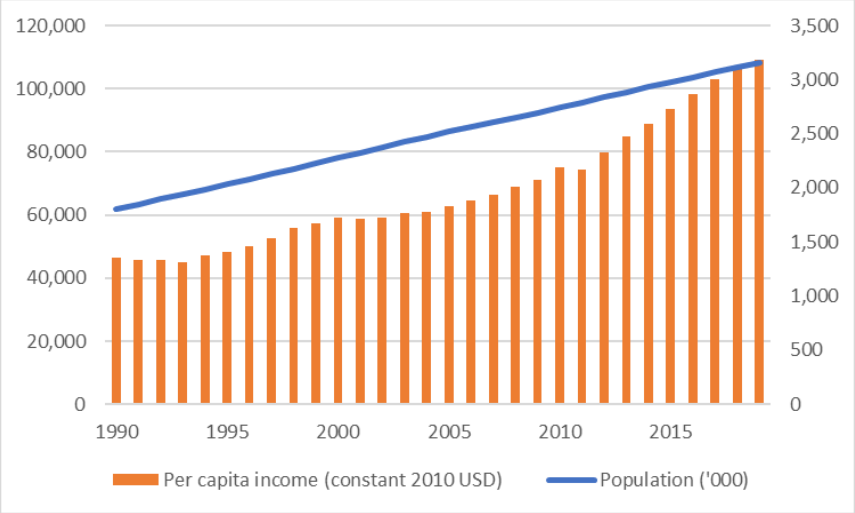
Agricultural modernization in the Philippines

Economic context

Economic development of the country has allowed per capita income to rise together with its population.

Key indicators of the broader economic context of agricultural modernization relate to demography, economic growth, and economic structure. Figure 2 highlights the continuing growth of the country's population, as well as its long-term expansion as measured by per capita income. By 2019 population had reached 108 million, from just 62 million in 1990, though the pace of population growth was fastest in the 1990s (2.34 percent on average), slowing down to 1.57 percent per annum in the 2010s. Meanwhile per capita income in 2019 had reached USD 3,182 (in 2010 prices). gaining 135 percent since 1990. In fact starting in just 2009, per capita income grew 53 percent, as growth accelerated to 4.3 percent per year, from an average of just 2.3 percent in 1990 – 2009.

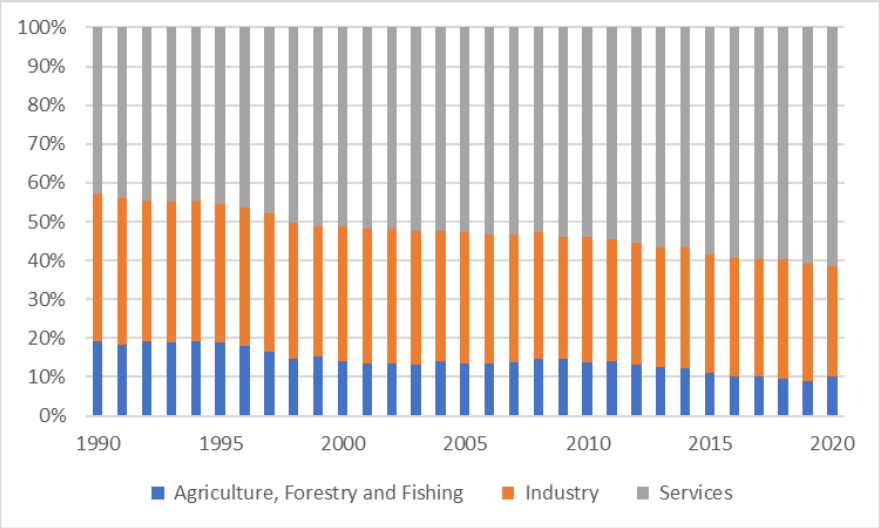
Figure 2: Population and per capita income, Philippines, 1990 - 2015



Source: World Bank (2020)

Figure 3 shows the composition of GDP by basic sector (agriculture, industry, and services). In 2019, the share of agriculture in GDP was down to 9 percent (rising slightly to 10 percent in 2020 owing to pandemic-induced contraction of industry and services). Even back in 1990, agriculture already had the lowest share in GDP among the basic sectors (at just 19 percent), while services had largest share at 43 percent. By 2020 the share of services had gone up to 61 percent.

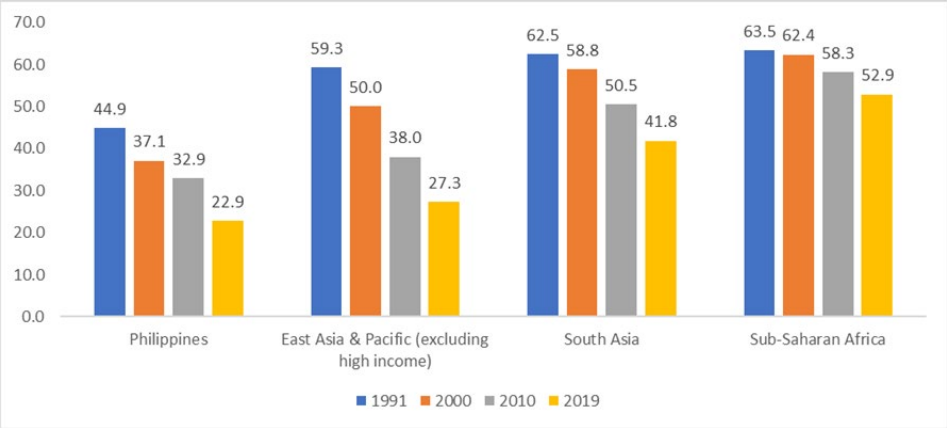
Figure 3: Shares in GDP by basic sector, 1990 – 2020



Source: PSA OpenStat (2020)

As a share in employment, agriculture's contribution had likewise been declining (Figure 5). From 1991 to 2019, employment share of agriculture shed 22 percentage points. Philippines is by no means unique among developing economies; in South Asia the decline in the indicator was 20.7 percentage points, while that of East Asia and the Pacific (EAP) was 32 percentage points. Sub-Saharan Africa (SSA) seemed to undergo the least structural change with a decline of only 11 percentage points over the same period.

Figure 4: Share of agriculture in total employment, 1991 – 2019, selected years (%)



Source: World Bank (2021)

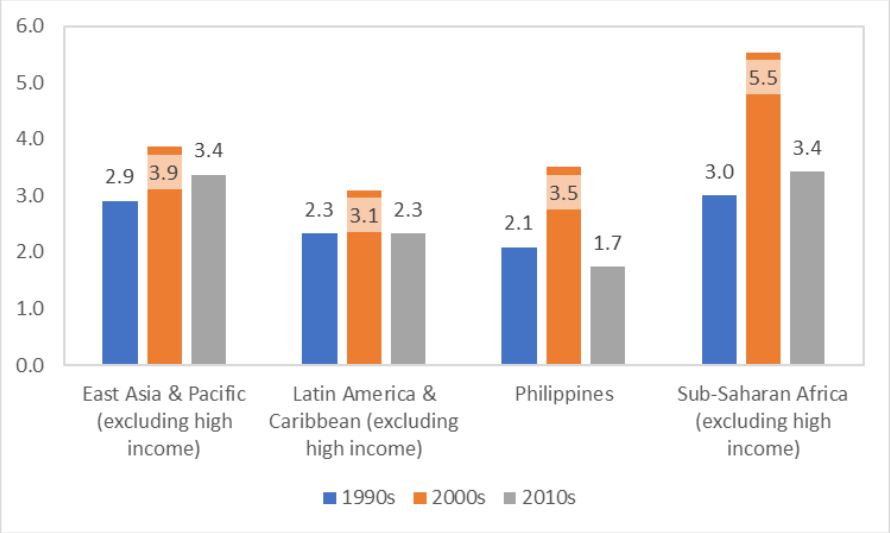
Performance of agriculture

Growth and structural change

Growth in agriculture for the Philippines compared favorably with those of other developing economies until the 2010s.

Within the country, growth of agriculture lags behind the other sectors, hence its declining output share. However, compared with other developing economies, growth of Philippine agriculture stayed abreast until recently (Figure 4). In the 1990s, growth rate of Philippine agriculture was averaged 2 percent, well within striking distance of other developing regions worldwide, especially Latin America and the Caribbean (LAC), East Asia and the Pacific (EAP). Sub-Saharan Africa (SSA) led the with an average 3 percent growth over the decade. Growth of Philippine agriculture accelerated in the 2000s in pace with other developing regions, powered by the commodity price boom at the time. Philippines was to suffer a marked slow down to just half its growth pace from the previous decade, far below average for other developing regions, e.g. SSA and EAP at 3.4 percent, and LAC at 2.3 percent.

Figure 5: Average growth rates of agricultural GVA, by decade, 1991 – 2019, constant 2010 USD (%)



Source: World Bank (2020)

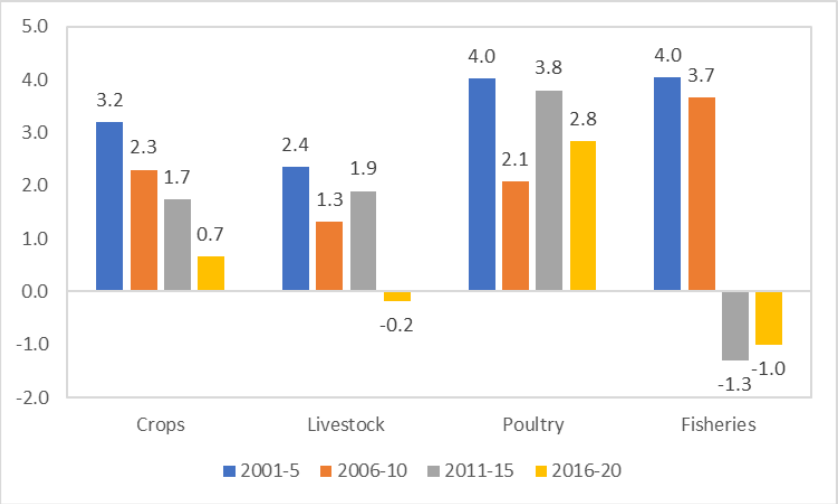
Growth by subsector

The crops sub-sector has been the major driver of overall sector growth; the resource-based sub-sector (fisheries) was in steady decline in the 2010s.

The major subsectors comprising agriculture are crops, livestock, poultry, and fisheries. These subsectors contribute, respectively, 56, 15, 14, and 14 percent, to the value of agricultural output in 2020. Among the crops the top five are paddy rice, maize, coconut, sugarcane, and banana. Among livestock, the most important contributor is swine; for poultry the chief contributor is chicken (both broiler and chicken eggs). Lastly, for fisheries, the main sources are aquaculture of seaweed, milkfish, and tilapia; as well as the capture of tuna, roundscad, and other species, by both commercial fishers and municipal fisherfolk.

The biggest sub-sector (crops) started out at a fast clip in the 2000s, but faltered in the 2010s, holding back overall growth of the sector (Figure 6). Fisheries was likewise a strong performer in the 2000s, but actually shrank in absolute terms in the 2010s, as a result of decades of unsustainable fishing and destruction of aquatic habitats. Livestock was a more consistent contributor to overall growth, but eventually also suffered a severe contraction starting 2019 owing to animal disease. Poultry is the one relatively consistent growth performer since the late 1990s.

Figure 6: Growth rates of value of production, constant 2018 prices, 2001 – 2020 (%)



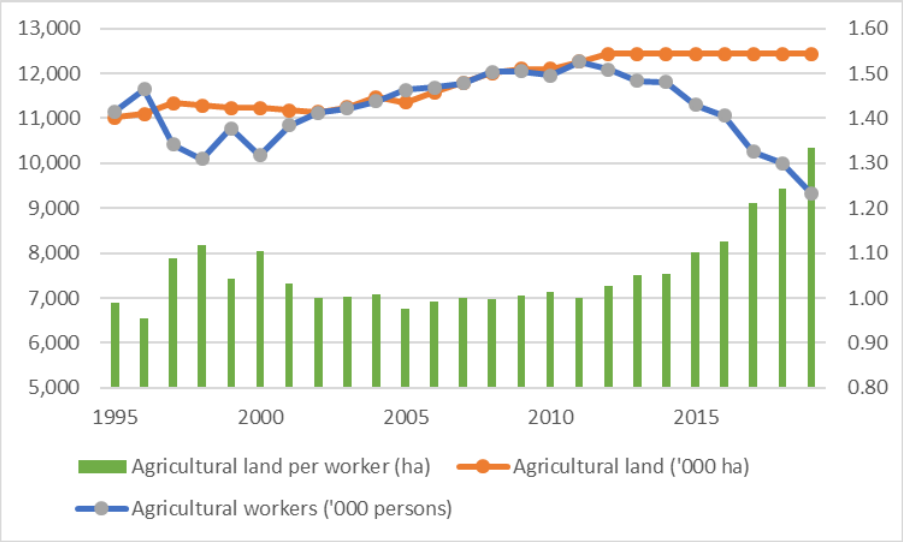
Source: PSA Openstat

Sources of growth

Rising output in agriculture is associated with increasing capital stock.

Expansion of agricultural output can occur by increases in factors of production, namely land, labor and capital; as well as by improvements in agricultural productivity. Land and labor trends are shown in Figure 7.

Figure 7: Land and labor indicators, Philippine agriculture, 1995 – 2019



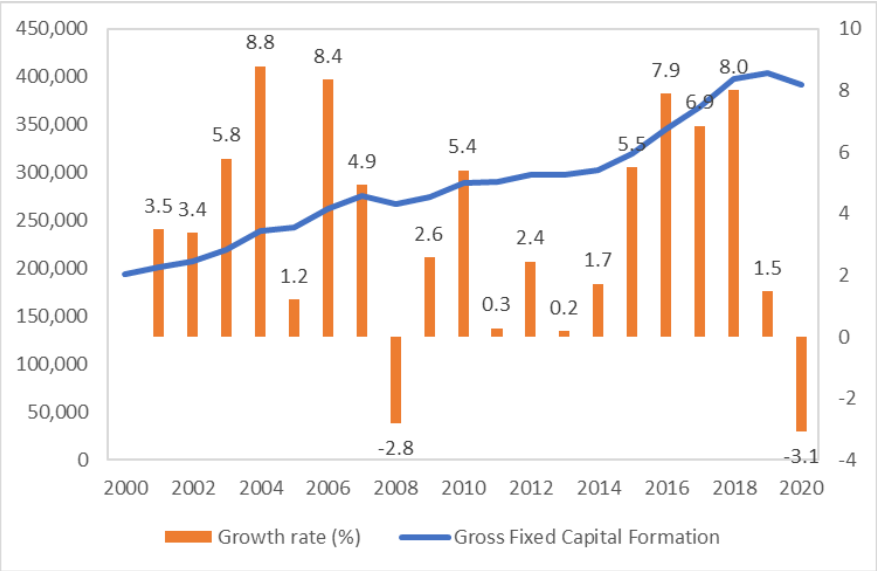
Sources: Land data from FAO (2021); labor data from PSA (2020)

Based on FAO data, total agricultural area of the country had been gently increasing since the mid-1990s up to 2013, and had become stable since then at 12.44 million ha. The number of agricultural workers in the late 1990s had trended erratically owing to a severe El Nino and a financial crisis; from 2000 onward that number had been increasing, despite the declining share of agriculture in employment, up to 2011. Since then, during a period of high economic growth, the absolute number of agricultural workers had been falling owing to intersectoral migration as job opportunities and rising nonagricultural wages pulled labor out of agriculture.

A constant land area and declining number of workers implies an increasing quantity of land per worker. From its lowest figure of 0.98 ha in 2005, land per worker reached 1.33 ha by 2019. The total number of workers in agriculture combines both operators (own-account workers) and hired workers. Based on Census of Agriculture data, the average farm size per operator had been falling from 3.6 ha in 1960, to 2.3 ha in 2002, and further down to 1.3 ha in 2012. It remains to be seen whether the trend had reversed in the 2010s, which will be shown by the results of the 2020 Census of Agriculture (not likely to be released soon).

Data on capital stock in agriculture is difficult to find. Partial information is available from the flow of investments in the form of Breeding Stocks and Orchard Development, which captures an important (but by no means complete) form of capital in agriculture (Figure 8). Investment in this form has been increasing over time (with exceptions for 2008, the global financial crisis, and 2020, the global pandemic). Continued positive investment suggests that capital stock has been expanding, potentially at an increasing rate.

Figure 8: Gross Fixed Capital Formation in Breeding Stocks and Orchard Development, Philippines, 2000 – 2020, in constant 2018 prices (Php millions)



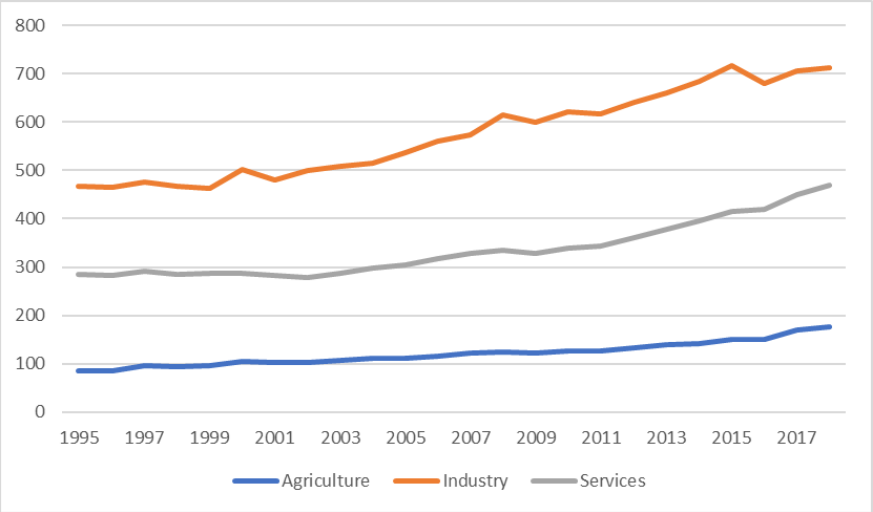
Source: PSA (2021)

Labor productivity in agriculture has been increasing, but at a slower pace than in other countries.

Another source of growth is increasing productivity. One measure of productivity is based on labor, measured in GVA per worker (Figure 9). Among the basic sectors, labor productivity in 1995 was lowest in agriculture, followed by services. Industry had by far the highest labor productivity compared with services and agriculture; the average services worker was producing only three-fifths that of the industrial worker, whereas the agricultural worker was producing less than one-fifth. Agricultural GVA per worker rose at a faster pace than industry GVA per worker in the succeeding years; by 2019 the proportion was up to one-fourth, a significant gain, but still very remote from reaching parity.

Accelerated growth in labor productivity growth for agriculture in the 2010s was due to the absolute decline in number of agricultural workers, driving up productivity growth to 4.1 percent per year, compared with just 2.8 percent before 2010. The decline in workers also contributed to poverty reduction (World Bank, 2018). Throughout Asia, the movement of labor from low productivity to high productivity occupations was a key factor in reducing poverty. Moreover, the response of poverty to growth is higher the more robust the growth of agriculture (Ravago et al, 2019).

Figure 9: GVA per worker by basic sector, Philippines, 1995 - 2018

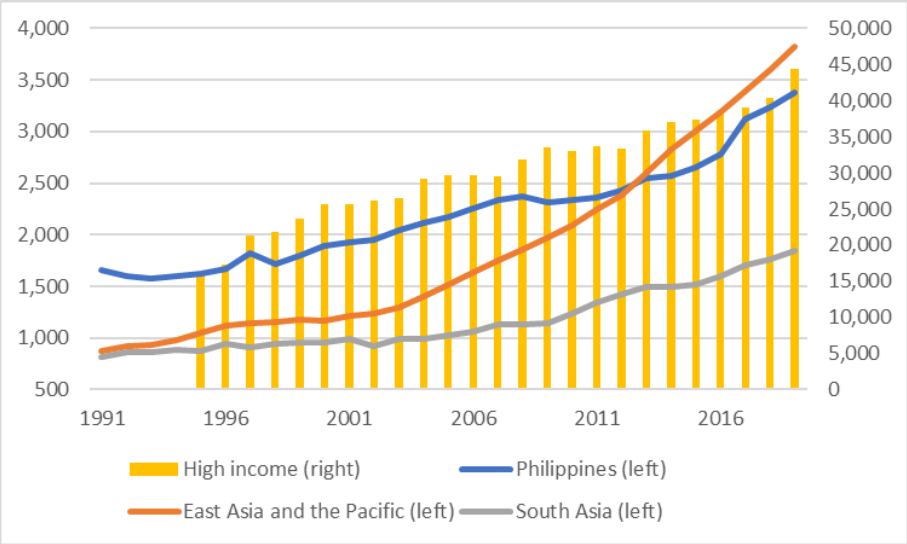


Source: PSA Openstat

Over the period 1991 to 2019, agricultural GVA per worker doubled (Figure 10). This accounts for the convergence in labor productivity between agriculture and industry noted in Figure 8. While this seems impressive, this pales in comparison with EAP where agricultural GVA per worker more than quadrupled over the same period; even South Asia managed to raise output per worker by 224%, and high income countries by 276% over a shorter period (1995 – 2019).

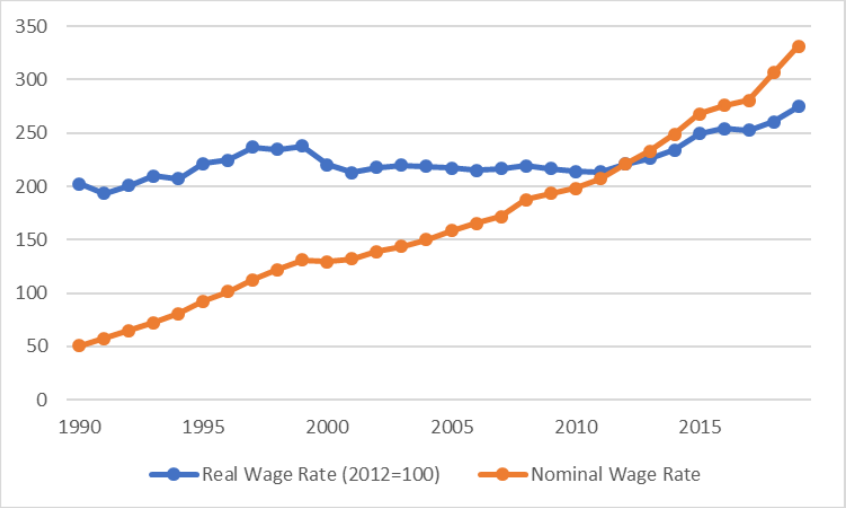
Figure 11 shows trends in agricultural wages, which is a proxy measure of average product (under conditions of labor surplus) as well as labor productivity at the margin (under conditions of labor scarcity). Nominal wages had been rising inexorably since the 1990s to 2019. The trend in the real wages has been much more erratic. Over a fairly extended period (2001 to 2011), real wages per day varied within a narrow Php 2013 to Php 220 band, before beginning an accelerated rise starting 2012, the period of rapid economic growth in the country. While it is premature to affirm a "Lewis turning point" in that decade. Indeed, the recent pandemic has likely restored a modicum of labor surplus back to agriculture.

Figure 10: Agricultural GVA per worker, 1991 – 2019 (constant 2010 USD)



Source: World Bank (2021)

Figure 11: Nominal and real wage rates in pesos per day, 1990 – 2019



Source: PSA (2021)

Growth of total factor productivity ranges is mediocre at best and negative at worst.

A more comprehensive productivity measure is total factor productivity (TFP). Table 1 presents cross-country estimates from USDA-ERS (2021). For Philippines, rapid agricultural growth in the 1960s coincided with low stagnant TFP, hence the rapid growth that decade must have been due to factors of production (land, labor, capital). TFP became a more important driver of agricultural growth in the 1970s, but could not be sustained as the economic crash of the early 1980s also slammed the brakes on TFP. The rate of TFP growth only picked up in the 1990s and 2000s. TFP unfortunately suffered a decline from 2011 to 2016, i.e. actual output growth was lower than expected given the observed growth in factors of production. In contrast, from the 2000s onward, TFP growth in most other countries in the Table actually accelerated and sustained a relatively fast pace.

Table 1: Annual growth in agricultural TFP, selected Asian countries, 1961 – 2016 (%)

	1961-70	1971-80	1981-90	1991-00	2000-10	2011-16
Philippines	0.4	2.6	0.6	1.6	1.5	-0.3
Indonesia	2.1	1.4	0.5	1.1	3.0	1.9
Malaysia	2.9	2.5	3.1	1.6	2.5	0.7
Myanmar	-0.4	1.6	-0.3	3.7	5.5	-1.8
Thailand	1.0	2.4	-0.6	3.0	1.9	2.0
Viet Nam	0.0	1.6	1.6	1.8	2.8	2.0
Bangladesh	-0.1	0.6	-0.8	0.1	2.5	1.1
India	0.8	0.4	1.5	0.8	2.3	2.5
Pakistan	2.4	0.1	2.8	1.0	-0.1	0.4

Source: USDA-ERS (2021)

Trends in international trade

Agricultural exports of neighboring countries have left that of the Philippines far behind.

Table 2 presents agricultural export trends for Philippines, Indonesia, Thailand, and Vietnam. In 1980 agricultural exports in the Philippines was USD 2.4 billion, about half the level in Indonesia and 35 percent lower than that of Thailand (data for Vietnam for that year is not available). Agricultural exports first shrank to just USD 1.68 billion in 1990, before recovering and reaching USD 7.2 billion in 2019. Growth averaged 3.8 percent per year over the period.

Table 2: Agricultural exports, selected Asian countries, 1980 – 2019, in USD millions

	1980	1990	1997	2000	2010	2019
Indonesia						
Agricultural exports	4,774	4,154	8,548	7,764	35,957	42,953
Share in total exports	22	16	15	12	23	26
Philippines						
Agricultural exports	2,412	1,683	2,299	2,026	4,129	7,225
Share in total exports	42	21	9	5	8	10
Thailand						
Agricultural exports	3,712	7,786	13,021	12,220	35,136	42,982
Share in total exports	57	34	23	18	18	17
Vietnam						
Agricultural exports			3,063	3,954	16,835	29,943
Share in total exports			33	27	23	11

Source: WTO (2021)

However, this is dwarfed by the 6.2 percent annual growth of Indonesia, and the 4.5 percent annual growth of Thailand; even Vietnam managed to grow its agricultural exports by 11 percent per annum since 1997.

Agriculture used to contribute a significant share (42 percent) of exports in 1980, but has since diminished to just a 10 percent share by 2019; in contrast, Indonesia has managed to increase its agricultural export share from 22 to 26 percent over the same period. The experience of Thailand and Vietnam is rather different; agricultural export share has

also fallen steeply as with the Philippines, but overall export growth was much more rapid than in the Philippines hence agricultural exports by 2019 was six times higher in the case of Thailand and four times higher in the case of Vietnam.

Past AFMA program reviews

Overview

Two major reviews of AFMA have been conducted, namely UAP (2007), and by DAP in 2015. The former was the first major undertaking to review AFMA implementation. It was sponsored by DA, and focused on AFMA provisions, especially the mandated interventions. The latter meanwhile was a rapid assessment and update of the aforementioned study, also organized along the lines of AFMA Chapters/Titles, under the auspices of the Philippine Council for Agriculture and Fisheries (PCAF) of DA. Two major reviews of the AFMA have been conducted, both under the auspices of DA. The first was published under University of Asia Pacific (UAP) as a set of reports covering the various chapters of AFMA (UAP, 2007). Owing to length limitations, the following review focuses on market-enabling programs as classified in Section 3.2.

Land use and planning

Strategic Agriculture and Fisheries Development Zones

The AFMA introduced an area-based approach to agricultural development planning based on delineated zones.

The AFMA provides for the categorization of agricultural lands into three levels. At the highest level are Network of Protected Areas for Agricultural and Agro-Industrial Development (NPAAAD), which includes all irrigated areas, irrigable lands already covered by irrigation projects with firm funding commitments; alluvial plains highly suitable for agriculture; agro-industrial croplands, highlands (elevation 500 m or higher) with potential for growing semi-temperate crops; agricultural lands that are ecologically fragile; and mangrove areas and fish sanctuaries. Such lands are identified to ensure the efficient utilization of land for agriculture and agro-industrial development.

The second level is the Strategic Agriculture and Fisheries Development Zones (SAFDZs), which are areas within NPAAAD that shall serve as centers where development of agriculture and fisheries sectors are catalyzed in an environmentally and socio-culturally sound manner. SAFDZs are to be delineated by DA in consultation with DAR, DTI, DENR, DOST, concerned LGUs, organized farmers and fisherfolk groups, private sector and communities. Criteria for delineating SAFDZs are as follows:

a) Agro-climatic conditions conferring a competitive advantage for agriculture
b) Strategic location for establishment of agriculture or fisheries infrastructure, industrial complexes, production and processing zones;
c) Strategic location for market development;
d) Dominant presence of agrarian reform communities (ARCs) and smallholders.

The third level consists of Model farms, which are areas within SAFDZs suitable for economic scale production. Farmer-landowners within the model farms shall be given

the option to enter into management agreement with corporate entities to upgrade towards high end quality production and productivity.

Pursuit of area-based development was frustrated by failure to properly delineate SAFDZs.

According to UAP (2007), delineation of SAFDZ was commenced soon after passage of AFMA. In practice, this activity was largely delegated to LGUs. The BSWM compiled the submission of LGUs into SAFDZ Handbooks for each region. The Handbooks contained maps of the different sub-development zones by province and municipality, together with information on existing and alternative land use. Complete submissions were gathered from 91 percent of all cities and municipalities. The total SAFDZ area summed up to 10.64 million ha; the crop development sub-zones already cover all existing cropped areas and a substantial portion of marginal grasslands. Clearly LGUs, without specific guidance in terms of delineation criteria, simply proposed their existing agricultural areas as SAFDZs. Operationalizing the SAFDZs and the model farms were problematic. It soon became clear that the current organizational structure and budgeting system of DA and devolved functions to LGUs was incompatible with the SAFDZ-based agro-industrial development.

Other problems with the SAFDZ delineation is that many LGUs have apparently double-counted agricultural areas, resulting in a SAFDZ even larger than the total land area of the LGU. After publication of the Handbooks, the SAFDZs were not regularly updated, contrary to the provisions of the AFMA IRR (Barrios, 2016).

Agriculture and Fisheries Modernization Plan

The lead agency for AFMA is conducting its business without the benefit of an Agriculture and Fisheries modernization Plan.

Section 13 of the AFMA mandates the formulation and implementation of a medium- and long-term Agriculture and Fisheries Modernization Plan (AFMP). The Plan is to be developed in consultation with farmers, fisherfolk, the private sector, NGOs, POs, and the appropriate government agencies. It shall focus on five major concerns, namely: food security; poverty alleviation and social equity; income enhancement and profitability, especially for farmers and fisherfolk; global competitiveness; and sustainability.

The first AFMP was prepared and disseminated in 2001 – 2004, with technical assistance from World Bank (Barrios, 2015). A coherent AFMP document was developed for the 2011-2015 update of AFMP. DA-Planning Service with National Agriculture and Fisheries Council (NAFC) engaged a consulting firm to prepare the update. This version of the Plan though covers core functions, namely infrastructure, RDE, regulatory services, policy and planning (including credit facilitation), and climate change. However, another set of chapters covers commodities (by banner program), and the regions; this organization of the AFMP is probably an imposition of DA. The latest update (2018-2022) has been drafted but has not been officially adopted by DA.

Credit

AFMA solidified on-going, market-oriented reform in the agricultural credit system.

From the colonial period, credit of all forms had been regulated under interest rate ceilings set by law (Act No. 2655 of 1915), amended later by Presidential Decree to give the Monetary Board leeway to adjusting the ceiling rate. From the 1970s onward, government adopted Directed Credit Programs (DCPs) as the primary strategy for agricultural lending. Loans were extended by government non-financial institutions to specific groups of farmers, based in a particular area and cultivating a target crop. Credit was treated like a production input and subsidized accordingly, similar to seeds and fertilizers (Geron, 2016).

By the mid-1980s, subsidized credit was collapsing under the weight of uncollectible loans. Government then implemented a series of market-oriented reforms. The Central Bank repealed interest rate ceilings in 1982 (CB Circular 905). DCPs began to be phased out; Land Bank of the Philippines (LBP) functioned as a government financial institution (GFI) tasked with rural credit (UAP, 2007).

AFMA affirmed that interest rates are to be market determined. All DCPs were to be phased out within four years of effectivity of the law, with funds transferred to the Agro-Industry Modernization Credit and Financing Program (AMCFP). AFMA also consolidated agricultural credit guarantees under the Agriculture and Fisheries Credit Guarantee Fund.

As a result, there has been a gradual shift in source of small farmer loans from informal to formal lenders. Nonetheless financing of smallholder agriculture remains inadequate, with the financial system still suffering from the restrictions due to the agrarian reform program (UAP, 2007). These findings have been echoed in the DAP review, nearly a decade later; it credit availability to smallholders remains low because of stringent documentary requirements and risk avoidance. Meanwhile, alternative conduits such as cooperatives have struggled to collect on loans extended, owing to management problems. Risk continues to discourage agricultural lending, although recently crop insurance has been expanding in support of rural finance (Barrios and Villejo, 2016).

Information & marketing support

Implementation of the marketing support provisions of AFMA remain incomplete.

Section 40 of AFMA envisions a Marketing Assistance System to ensure highest possible income for farmers and fisherfolk by matching supply and demand in both domestic and foreign markets. DA is thereby mandated to establish a National Marketing Assistance Program (NMAP), with the Agribusiness Market Assistance Service (AMAS) of DA as the lead.

A further instruction to DA (Section 41) is to set up a National Information Network (NIN), an information network which links all offices and levels of the Department with various research institutions and local end-users, providing easy access to information and marketing services related to agriculture and fisheries. The NIN shall be established down to municipal level.

The review by UAP (2007) finds that AMAS has indeed been established; however, its budget (at the time only Php 20 million) is far below what is needed to fulfill its mandate. The lack of budget of AMAS is linked to duplication of marketing services in the various banner programs, each with their respective funding. AMAS performance in its function is showing mixed results owing to lack of human and financial resources.

The DAP review (Barrios, 2016b) finds that mobilization plan for NIN has been completed. However the hardware requirement of the NIN was not procured and the full NIN is yet to be put in place. Likewise, the NMAP is yet to be established, rendering marketing strategies of the Department fragmented and incomplete.

Product standardization

Product standards for agriculture and fishery products is on-going and are adopted on voluntary basis.

Section 60 – 64 of AFMA concerns product standardization and consumer safety. The statement of policy affirms the role of the state in setting and implementing product standards to ensure consumer safety and promote competitiveness of agriculture and fisheries products. The mandate for product standardization is vested in the Bureau of Agriculture and Fisheries Products Standards (BAFPS), tasked with formulating and enforcing quality standards for processing, preserving, packaging, labeling importing, exporting, distributing and advertising agriculture and fisheries products. The Bureau is also empowered to conduct regular inspections of agri-fisheries establishments and marketplaces.

UAP (2007) found that thus far, the BAFPS had marginalized within the DA bureaucracy, having no individual budget from Congress. Moreover, combination of standard setting and enforcement function within a single Bureau was seen as problematic. In the DAP review, Saliendres and Munsayac (2016) found that, in contrast, the BAFS was active in defining standards, undertaking the R&D necessary for technically sound specifications. However, it had opted out of compulsory enforcement, relying rather on voluntary compliance. In this way, apparently, it addresses the problem pointed out the earlier review.

Rural nonfarm employment

Rural nonfarm employment initiatives under AFMA have not taken off.

Provisions on Rural Non-farm Employment (Title 4) encompass a Basic Needs Program (Chapter 2), Rural industrialization (Chapter 3), and Training of Workers (Chapter 4). Training of Workers is discussed in Chapter 2; the following covers Basic Needs Program and Rural industrialization. For the former, DA is mandated to come up with a Program to cushion the impacts of liberalization; the IRR specifies that the Program will be realized as a community-based program under AFMP and SAFDZ.

Meanwhile the Rural industrialization and industry dispersal program is envisioned to result from the interplay of market forces. Nevertheless, government support is mandated through Board of Investments (BOI) incentives for business and industry related to agriculture; and provision of integrated services and information (e.g. investment and marketing mission, investment prioritization for rural areas, employment as a criterion for minimum wage setting, etc.)

In practice, the Basic Needs Program has not taken off owing to lack of funding. As with the NMAP, this has been blamed on duplication of other activities already being performed by other agencies such as LGUs, the DTI, and so on (UAP, 2007). Likewise, under the DAP review, Tabunda (2016) observes that rural industrialization has failed to take off. For instance, BOI investments from the agriculture, fisheries and forestry sector have thus far found no takers.

Trade and fiscal incentives

Trade and fiscal incentives under AFMA mostly benefit large enterprises.

Section 109 of AFMA provides for duty-free importation of all types of agriculture and fisheries inputs, equipment and machinery, by enterprises engaged in agriculture and fisheries, as certified by DA (in consultation with Department of Finance and Board of Investment). To qualify for exemption, the imports must be for the exclusive use of the importing enterprise. The exemption was to last for only five years upon effectivity of the Act, subsequently extended to 2015 by RA 9281. In practice, only the large agribusiness firms availed of tariff- and duty-free importation (UAP, 2007). Small and medium agri enterprises were mostly excluded as requirements for international trading (e.g. applying for letters of credit) require money and paperwork that are affordable only to the larger firms (Gonzales, 2015).

Concluding remarks

Implementation of AFMA has had a mixed record. The country's agricultural sector has certainly progressed over the past quarter century since passage of AFMA, but the degree of progress towards AF modernization, namely the extent to which AFMA objectives have been addressed, remains to be evaluated. There are some initial indications though of problems and gaps, such as weak productivity growth (except perhaps among cereal crops), and declining comparative advantage of agriculture. Similarly, many provisions of AFMA have been implemented, but other provisions have not well implemented, such as the area-based planning around SAFDZs. In short, further research is needed into quantifying the extent of AF modernization, inasmuch as the reviews cited extensively in Section 5 focused on the strategies adopted by AFMA. As an alternative to this activity-based review, further research should organize assessment around the objectives of AFMA. Such a results-based assessment is is potentially a more fruitful approach towards evaluating agriculture and fisheries modernization under the AFMA framework.

References

Acemoglu, D., and V. Guerrieri, 2008. Capital deepening and nonbalanced economic growth. *Journal of Political Economy* 116(3): 467 – 498.

Barrios, E. 2016. Chapter 1: Strategic Agriculture and Fisheries Development Zones. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 53-82.

Barrios, E. 2016. Chapter 2: Agriculture and Fisheries Modernization Plan. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 84-101.

Barrios, E. , and S. Villejo. 2016. Chapter 3: Credit. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 102-139.

Barrios, E. 2016. Chapter 5: Information and Marketing Support Service. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 171 – 193.

Boserup, E. 965. *The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure*. London: Allen & Unwin.

Briones, R. 2017. Transformation and diversification of the rural economy in Asia. IFAD Research Series 20. International Fund for Agricultural Development, Rome.

Ciarli, T., A. Lorentz, M. Savona. 2010. The effect of consumption and production structure on growth and distribution: a micro to macro model. *Metroeconomica* 61(1):180 – 218.

Clark, C. 1940. *The Conditions of Economic Progress*. London: MacMilan.

Dasgupta, S., C. Meisner, and D. Wheeler. 2006. Is environmentally friendly agriculture less profitable for farmers? Evidence on Integrated Pest Management in Bangladesh. *Review of Agricultural Economics* 29(1):103-118.

Foster, A. D., and M. R. Rosenzweig. 2017. Are there too many farms in the world? Labor-market transaction costs, machine capacities and optimal farm size. NBER Working Paper 23909. Cambridge, MA: National Bureau of Economic Research.

Gabardo, F., J. Pereima, and P. Einloft. 2017. The incorporation of structural change into growth theory: a historical appraisal. *EconomiA* 18(3):392-410.

Galvez-Nogales, E. 2010. Agro-based clusters in developing countries: staying competitive in a globalized economy. Agricultural Management, Marketing, and Finance Occasional Paper 25. Rome: FAO.

Gonzales, E. 2016. Chapter 11: Trade and fiscal incentives. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 366-408.

Hayami, Y. 2010. Plantations agriculture. In: Evenson, R., and P. Pingali, eds. *Handbook of Agricultural Economics* Vol. 4. Amsterdam: Elsevier.

Kongsamut, P., S. Rebelo, D. Xie. 2001. Beyond balanced growth. *Review of Economic Studies* 68(4): 869 – 882.

Lewis, A., 1954. Economic development with unlimited supplies of labor. *Manchester School of Economic and Social Studies* 22(2):139–91.

Otsuka, K., and S. Fan. 2021. Agricultural development in a changing world. In: Otsuka, K., and S. Fan, eds. *Agricultural Development: New Perspectives in a Changing World*. Washington, D.C.: International Food Policy Research Institute.

Pasinetti, L. 1981. *Structural Change and Economic Growth*. Cambridge, England: Cambridge University Press.

PhilRice. 2020. Pinoy rice knowledge bank. Munoz, Philippines: Phillippine Rice Research Institute.

Philippine Statistics Authority. 2013. Socio-Economic Characteristics of Farmers in the Philippines. Quezon City: PSA.

Ranis, G., and J. Fei, 1961. A theory of economic development. *American Economic Review* 51(4):533–65.

Ravago, M., A. Balisacan, and M. Sombilla. 2019. 1. Current structure and future challenges of the agricultural sector. In: M. Ravago, A. Balisacan, and M. Sombilla, eds. *The Future of Philippine Agriculture under a Changing Climate*. Singapore: ISEAS Publishing.

Richards, P. 2017. It's not just where you farm; it's whether your neighbor does too. How agglomeration economies are shaping new agricultural landscapes. *Journal of Economic Geography* 18(1):87-110.

Saliendrez, M., and Y. Munsayac. 2016. Chapter 7: Product standardization and consumer safety. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 216 – 262.

Schultz, T. 1964. *Transforming Traditional Agriculture*. New Haven, CT: Yale University Press.

Solow, R. 956. A contribution to the theory of economic growth. *Quarterly Journal of Economics* 70(1): 65-94.

Tabunda, C. 2016. Chapter 10: Rural Non-Farm Employment. In: Barrios, E. and associates. A Rapid Assessment of the Agriculture and Fisheries Modernization Act (AFMA) (Phase I Evaluation). Development Academy of the Philippines, Pasig City, 322-365.

Timmer, C. 1988. The agricultural transformation. In: H. Chenery and T. Srinivasan, eds. *Handbook of Development Economics* Vol. 1. Amsterdam: Elsevier North Holland, 275-331.

Wardhana, D., R. Ihle, and W. Heijman. 2017. Agro-clusters and rural poverty: a spatial perspective for West Java. *Bulletin of Indonesian Economic Studies* 53(2):161 – 186.

World Bank. 2018. Making Growth Work for the Poor: A Poverty Assessment for the Philippines. Washington, D.C.: World Bank.