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Working Paper

To what extent has Philippine agriculture Undergone integration and consolidation? State of agri-enterprise development in the Philippines

PIDS Discussion Paper Series, No. 2022-13

Provided in Cooperation with:
Philippine Institute for Development Studies (PIDS), Philippines

Suggested Citation: Inocencio, Arlene B.; Baulita, Alexis; Inocencio, Albert Dale (2022) : To what extent has Philippine agriculture Undergone integration and consolidation? State of agri-enterprise development in the Philippines, PIDS Discussion Paper Series, No. 2022-13, Philippine Institute for Development Studies (PIDS), Quezon City

This Version is available at:
https://hdl.handle.net/10419/280886

APRIL 2022

DISCUSSION PAPER SERIES NO. 2022-13

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April 2022

Abstract

This study is part of an overall assessment of the Agriculture and Fisheries Modernization Act (AFMA or R.A. 8435) which aims to evaluate the accomplishments of AFMA, assess the prospects towards completing its objectives, and frame policy recommendations accordingly. Specifically, this component is tasked with assessing AFMA Objective 4: "To encourage horizontal and vertical integration, consolidation, and expansion of agriculture and fisheries activities, group functions and other services through the organization of cooperatives, farmers and fisherfolk's associations, corporations, nucleus estates, and consolidated farms and to enable these entities to benefit from economies of scale, afford them a stronger negotiating position, pursue more focused, efficient and appropriate research and development efforts, and enable them to hire professional managers" (Section 3.d). The review uses key indicators for horizontal and vertical integration in Philippine crops, livestock and poultry, and fisheries markets. Cases from Philippine Rural Development Program (PRDP) and ARBO-AVAs were analyzed in terms of the four outcomes specified in Objective #4. The results indicate high concentrations for most agricultural crops, livestock and fishing markets. In terms of vertical integration however, most agriculture markets appear to be mostly (weakly) partially integrated. These observations affect the state of market competition and profitability in agriculture markets. If the results can be validated, this study suggests that there are opportunities to better achieve AFMA Objective 4 and improve the outcomes for the agriculture, livestock and fishing markets through: (1) adjustments in the cluster development programs and activities; (2) establishment of an effective M&E system; (3) better defined roles for government and establishment of the appropriate institutional structures; and (4) a deeper understanding of the implications of horizontal and vertical integrations.

Keywords: horizontal and vertical integration, market concentration, consolidation, agriculture crops, livestock, fishery

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To What Extent Has Philippine Agriculture Undergone Integration and Consolidation? State of Agri-Enterprise Development in the Philippines

Arlene Inocencio, Alexis Baulita, and Albert Dale Inocencio*

1. Introduction

It has been 25 years since the passage of Republic Act (RA) 8435 or the Agriculture and Fisheries Modernization Act of 1997 (AFMA). This RA was passed to transform the agriculture and fisheries sectors to become technology-based, advanced and competitive, while ensuring that small farmers and fisherfolk have equal access to assets, resources and services, are empowered and organized to increase bargaining power and protected from unfair competition and are food secure. Specifically, AFMA has 10 objectives, as indicated in Section 3:

(a) To modernize the agriculture and fisheries sectors by transforming these sectors from a resource-based to a technology-based industry;
(b) To enhance profits and incomes in the agriculture and fisheries sectors, particularly the small farmers and fisherfolk, by ensuring equitable access to assets, resources and services, and promoting higher-value crops, value-added processing, agribusiness activities, and agro-industrialization;
(c) To ensure the accessibility, availability and stable supply of food to all at all times;
(d) To encourage horizontal and vertical integration, consolidation and expansion of agriculture and fisheries activities, groups, functions and other services through the organization of cooperatives, farmers' and fisherfolk's associations, corporations, nucleus estates, and consolidated farms and to enable these entities to benefit from economies of scale, afford them a stronger negotiating position, pursue more focused, efficient and appropriate research and development efforts and enable them to hire professional managers;
(e) To promote people empowerment by strengthening people's organizations, cooperatives and NGOs and by establishing and improving mechanisms and processes for their participation in government decision-making and implementation;
(f) To pursue a market-driven approach to enhance the comparative advantage of our agriculture and fisheries sectors in the world market;
(g) To induce the agriculture and fisheries sectors to ascend continuously the value-added ladder by subjecting their traditional or new products to further processing in order to minimize the marketing of raw, unfinished or unprocessed products;
(h) To adopt policies that will promote industry dispersal and rural industrialization by providing incentives to local and foreign investors to establish industries that have backward linkages to the country's agriculture and fisheries resource base;
(i) 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 small farmers and fisherfolk; and
(j) To improve the quality of life of all sectors.

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AFMA Component Programs and DA's F2C2 Program. The AFMA components include the strategic agriculture and fisheries development zones (SAFDZs), the agriculture and fisheries modernization plan (AFMP), credit, irrigation, information and marketing service, other infrastructure, product standardization and consumer safety, human resources development, research, development and extension (RDE), rural non-farm employment, trade and fiscal incentives, governance, and budget and finance. No explicit programs are formulated to just deliver a specific objective. All these interventions must have all been assumed to contribute to achieving all the objectives including the agriculture integration and consolidation (Objective #4).

To operationalize the AFMA, the Department of Agriculture (DA) in consultation farmers and fisherfolk, the private sector, NGOs, people's organizations and other government agencies/offices has been tasked with the formulation of Agriculture Fisheries Modernization Plan (AFMP). Since the AFMA Implementing Rules and Regulations (IRR) in 1998, the AFMP 2011-2017 appears to be the first medium term plan. This plan examined the 2004 to 2010 trends and averages to serve as baselines. There is already a draft AFMP covering 2018-2023 although it does not appear to be utilized for its intended purpose.

Consolidation is one of the eight paradigms of the DA which comprise its food security development framework strategies (a-e) and enablers (f-h): (a) modernization; (b) industrialization; (c) export promotion; (d) consolidation of small- and medium-sized farms; (e) infrastructure development; (f) higher budget and investment; (g) legislative support; and (h) roadmap development. The OneDA Reform Agenda, has identified 18 pillars and key strategies, with the first six relating to consolidation: (i) Bayanihan agri clusters; (ii) collective action/cooperatives development; (iii) province-led agriculture and fisheries extension system (PAFES); (iv) mobilization and empowerment of partners; (v) diversification; and (vi) credit support.

However, the passage of Department of Agriculture (DA) Administrative Order (AO) No. 27 in 2020 can be considered as the first deliberate and more systematic attempt at farm and fisheries clustering and consolidation (F2C2) at a bigger scale. This has been confirmed in the whereas clause of the AO which states that "no formal, comprehensive and holistic government initiative and assistance program on farm and fisheries clustering and consolidation has (heretofore) been adopted and implemented at the national level".

The F2C2 program is supposed to encourage small farmers and fishers "to adopt the strategy of clustering and consolidation of their production, processing, and marketing activities as community business enterprises, which pool assets, labor and other resources" (AO 27, series of 2020, Section 2). This Administrative Order recognizes that clustering and consolidation as a development strategy will facilitate the following: (1) economies of scale in agriculture production; (2) better access to markets, financing and investments for ventures and development projects; (3) strengthened active role and contribution of farmers and fishers to the economy; and (4) acceleration of agriculture growth and countryside development. Specifically, seven outcomes are expected from F2C2: (a) economies of scale in commodity production; (b) linkages to commodity markets and global value chain; (c) improved bargaining and market power of producers; (d) better access to credit, financing and investments, and access to domestic and export markets; (e) greater availability and wider utilization of agri-aqua technologies, farm mechanization, logistics and transport support, and post-harvest facilities; (f) big brother-small brother partnerships, joint ventures, and contract

growing arrangements; and (g) raise overall productivity of the sector and the incomes of farmers and fishers.

The F2C2 program is meant to address the shrinking farm holdings, high levels of poverty in the sector, low farm productivity, the need to increase production and incomes, access to resources, and technologies and markets. The F2C2 is intended to promote merging of contiguous lands, grouping together of crops, livestock, fish producers considering proximity of production areas, similarity of inputs, shared production activities and processes, common final products.

1.1. General and Specific Objectives

This study is part of an overall assessment of AFMA which will: (a) ascertain progress achieved by the agriculture and fisheries sector in attaining the objectives of the AFMA; (b) identify and evaluate constraints and opportunities that have determined the past pace of progress as well as the prospects for future agriculture and fisheries modernization; and (c) discuss strategies going forward to facilitate the attainment of AFMA objectives.

This component aims to evaluate the accomplishments of AFMA, assess the prospects towards completing its objectives, and frame policy recommendations accordingly. Specifically, this component:

(i) Reviews available literature and data for assessing AFMA Objective 4: To encourage horizontal and vertical integration, consolidation, and expansion of agriculture and fisheries activities, group functions and other services through the organization of cooperatives, farmers and fisherfolk's associations, corporations, nucleus estates, and consolidated farms and to enable these entities to benefit from economies of scale, afford them a stronger negotiating position, pursue more focused, efficient and appropriate research and development efforts, and enable them to hire professional managers (Section 3.d);
(ii) Develops a Theory of Change (TOC) which will serve as a framework for evaluation of AFMA Objective 4, tracing linkages from AFMA interventions to outcomes and impacts; to apply the TOC in evaluating the extent to which horizontal and vertical integration, consolidation and expansion of agriculture and fisheries activities have increased, using evidence and indicators reviewed under Study Objective #1;
(iii) Provides plausible explanations for the pace and magnitude of improvement in horizontal and vertical integration, including the role of AFMA-mandated intervention/s;
(iv) Identifies a benchmark for determining the prospects for achieving horizontal and vertical integration in agriculture and fisheries activities, and assesses prospects for attaining this benchmark; and
(v) Draws out policy implications for government and other key stakeholders of agriculture and fisheries modernization.

While this study takes off from the AFMA Objective #4, it considers the relevant programs and activities of the DA along this objective up to the passage of A.O. #27 s2020 on F2C2. We do not expect to find any systematic nor holistic program for clustering and consolidation at a national scale (A.O. 27) but we examine programs which maybe closest to the operationalization of Objective #4.

The next section reviews the literature on clustering and integration. Section II is followed by discussion of the study design and methodology. The results section presents the trends in horizontal and vertical integration in Philippine crops, livestock and poultry, and fisheries markets. In addition, two cases where some agribusiness clustering and integration may have been facilitated and implemented are discussed. The last section sums up the key findings and conclusions, and provides some policy directions with respect to the fourth objective of AFMA.

2. Review of related literature

This chapter reviews the literature on clustering and consolidation and integration to provide benchmarks or basis for comparison and assessment. While clustering has not been explicitly mentioned in AFMA Objective #4, it has been explicitly defined in F2C2. Clustering together with integration can create sustainable economic growth. In fact, experiences in other countries has been largely favorable indicating the potential for speeding up agricultural development (FAO 2010, WB 2009). Part of this review is to distinguish clusters from other instruments or approaches to growth, and the link between clustering and competition. The modalities of farm consolidation follow and discussion of clusters and integration ends this section.

2.1. Clusters and Other Approaches[1]

Clusters are an "agglomeration of companies, suppliers, service providers, and associated institutions" in an industry (World Bank 2009, p.1). FAO (2010, p.3) defines a cluster as the "geographical concentration of industries which gain advantages through co-location". Porter (1998) presents a broader definition as "geographic concentrations of inter-connected companies and institutions in a particular field".

Cluster initiatives are distinguished from value chains, special economic zones (SEZs), growth pole projects or industrial policy. According to the ITD-WB (2009), cluster projects are different mainly by their focus on actively engaging both private and public sector stakeholders throughout the process. Clusters are also supposed to exploit informal institutional capital such as trust and cooperation.

Value chains vs. Clusters. A value-chain approach is transaction-oriented, focuses on transactional efficiency within the chain and is linear (WB 2009). A cluster approach on the other hand is systemic. It has a strategy orientation. Clusters are geo-graphically centered while value chains can span across geographies (WB 2009). Clusters promote active participation of supporting institutions outside the value chain to avoid coordination and information failures.

SEZs vs. Clusters. SEZs are geographic concentrations of firms created to provide better infrastructure, and research and development (R&D), and offer of government incentives. High tech parks, science parks, industrial zones, and export processing zones are examples. Often established by direct industrial policy intervention to promote regional economic growth. Clusters on the other hand, are much less top down, and there is less emphasis on concentration of physical infrastructure. Government's role is more that of a catalyst, providing a productive business environment. Clusters are usually smaller in span than industrial zones, which can spread over an entire city, province, or region (WB 2009).

[1] This section largely draws from the WB (2009).

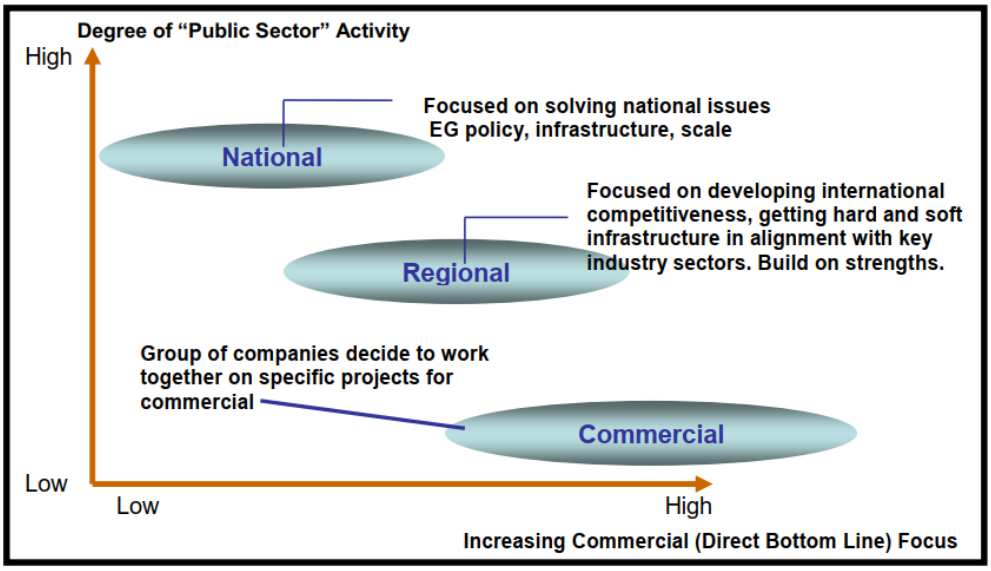
Growth poles vs. Clusters. Growth poles attract firms to a region through tax-incentives, infrastructure development, and other business support facilities. The government acts as a master planner, targeting industries and locations using a wide range of incentives. Clusters depend on market-based solutions which leverage existing economic activities in a particular location with government playing an important supporting role in a process driven by the private sector. This process is supposed to avoid the mistakes of unnatural investments in unnatural locations that fail to catalyze sustainable growth (WB 2009).

Industrial policy vs Clusters. Industrial policy rests on a zero-sum international competition notion and ends up protecting some industries deemed to have potential to achieve certain scale and level of sophistication to eventually stand on their own (WB 2009). In contrast, the cluster approach views competition differently and even stimulates rivalry. It is aims to promote opening of local markets to allow imports in order to ensure efficiency of the supply chain. Clusters tend to improve local demand conditions, have a positive-sum view of competition and do not consider it a threat.

2.1.1. Types of Clusters and Key Challenges

Clustering is one form of collaboration. It creates an environment that allows other types of collaboration to thrive specifically in networking between firms and development of supply chains. Maxwell Stamp PLC (2013) defined three types of clusters in terms of degree of public sector activity and commercial focus: national, regional and commercial.

Figure 1. Type of Clusters



Source: Maxwell Stamp PLC (2013)

The National Clusters are groups of companies and organizations that work together to address the cluster's development challenges. They usually deal with policy, infrastructure, and scale challenges. Regional Clusters are classic Michael Porter-type clusters, based on the premise that an industry will thrive in a specialized, network environment. The emphasis is on creating a supportive atmosphere for cluster participants and strengthening ties between participating firms, their suppliers, and related and supporting organizations. Stakeholders can include

enterprises, suppliers, educational organizations, professional support organizations and companies, among others. Commercial Clusters are groups of companies who have decided to work together on a variety of projects. They are membership-based, with a dedicated support person often included in the cost structure (Maxwell Stamp PLC, 2012).

Otsuka and Ali (2020, p.2) following Porter (1998) defined two types of clusters in terms of sectoral: (1) agro-based clusters (ABC) and (2) industrial clusters (IC). An agro-based cluster is a "geographically proximate and interlinked group of commercial farmers of a product or a group of closely-related products, and related interconnected companies for input supply, service provision, and processing." An IC is "a geographically proximate group of interconnected companies and associated institutions" in a sector or sub-sector. These companies have commonalities and complementarities.

The ABCs are further classified into agricultural clusters (AC) and agro-industrial clusters (AIC). The ACs are those which do not involved processing while the AICs include processing and value adding designed to meet exports and supermarkets quality requirements. In ACs, the products are fresh and deemed as low-quality, without strict grading and processing. In contrast, in AICs, the products are graded, processed before they are marketed. The products in ACs are sold in local wet markets where product quality is not an important consideration and the farmers purchase inputs directly from the suppliers, with no value addition and processing. In contrast, the connection of the farmers, agro-processors, and marketing agents are stronger in AICs with arrangements like contract farming.

According to the authors, a key challenge to developing economies is to develop ABCs and transform the ACs into AICs. Otsuka and Ali found that there has been no consolidated strategy to realize this transformation. The authors assert that provision of improved technologies and basic rural infrastructure will not be enough. ABCs often have low product quality, face high transaction costs, financial constraints, and high costs of inputs and poor input quality. And collective action does not happen automatically and difficult to sustain.

So, while the traditional model of agricultural development focused on the improvement of farm production, Otsuka and Ali (2020, p.6) believe that in order to transform ACs into AICs, government should: "(1) mobilize stakeholders along the whole value chain (i.e., seed suppliers, farmers, agro-processors, and traders) into various groups such as farmers' cooperatives and agro-processors' associations; (2) train stakeholders in the value chain through these groups; (3) promote their collective actions; and (4) set up an appropriate regulatory framework to implement quality standards."

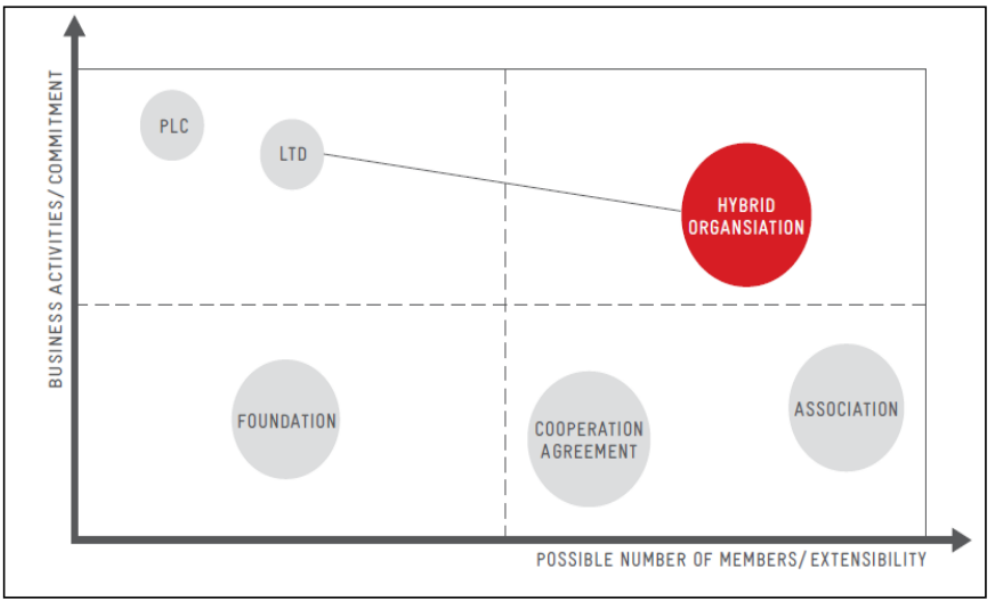
2.1.2. Preferred Organizational and Legal Model

The legal form that a cluster chooses is determined by the cluster's purpose. When deciding on a legal status for a certain cluster, the following four questions should be asked (Maxwell Stamp PLC 2013): (a) what is the vision/mission and purpose of the cluster; (b) how closely do the partners in the cluster wish to cooperate; (c) what is the role of commercial activities in the cluster; and (d) how quickly should new members be integrated – exclusivity versus inclusivity.

According to Maxwell Stamp PLC "structure follows strategy". The possible legal forms for clusters as shown in the figure below are: association (non-profit or for-profit, private limited

company (LLC), joint stock company, hybrid forms (mix of association and public or private limited company) and foundation.

Figure 2. Matrix of Legal models for clusters



Source: "Cluster Management – a Practical Guide" by GTZ, December, 2007

There are advantages and disadvantages to each legal form. Many choose to register clusters as associations since it is a much faster process and allows them to qualify for grants. However, this legal form is restricted because it prohibits the conduct of any commercial operations. Being an LLC allows the cluster entity to engage in for-profit activities while also reclaiming VAT. However, the registration process is time consuming and can be a deterrent to forming such type of enterprise.

As a legal form for clusters, the hybrid type of legal identity is often recommended. Registration as an association is sufficient for the cluster to operate during the early stage of cluster creation, when members determine their vision, mission, and goals, as well as the norms of engagement and communication. However, when the cluster matures and is ready to engage in joint commercial activities, the most appropriate legal structure is an LLC (Maxwell Stamp PLC, 2012).

2.1.3. Clusters and Competitiveness[2]

Clusters may develop over time to take advantage of the economic benefits of location-specific externalities and synergies. Cluster initiatives can be designed to take advantage of and accelerate the spillovers that influence economic performance within and across clusters. However, competitiveness is not a one-size-fits-all solution; stakeholders will finally acknowledge that it is a complicated problem for which no single policy or major action can provide a solution. Working toward competitiveness is impossible without a robust incentive

[2] This section largely draws from the WB (2009).

structure in place to ensure that resources go to the industrial sectors with the greatest comparative advantage, and within those, to the most economically efficient enterprises.

The key elements that contribute to the success of agro-based clusters is summed up in Box 1 below.

Box 1. Key Elements in the Success of Agro-based Clusters

(1) Clustering in the agricultural sector presents many benefits: a) create a fertile environment for the establishment of inter-firm cooperation; b) work as systems that facilitate the diffusion of innovations (both technical and organizational); and c) are a means to channel public support to increase the competitiveness of the agricultural and agro-industrial sectors in a given territory.
(2) Farmers and small- and medium-sized agribusiness can benefit from participating in ACs: Cluster-based policies are often used to support SMEs and smallholder farmers, by allowing them to achieve scale economies and share costs related to training, info sharing, certification and technology application.
(3) Clustering in the agricultural sector will most likely need to be induced: Agricultural clusters and other natural resource-based clusters do not develop spontaneously because, even if natural resources are abundant, they tend to follow an unsatisfactory development pattern.
(4) Governments will need to catalyze the process of cluster development, facilitate it, and to some extent bankroll it: As part of this facilitating role, the public sector will need to provide an enabling environment for cluster development and upgrading.
(5) FDI plays an important role in the development of agricultural clusters: FDI is a key contribution to the restructuring and modernization of ACs in developing countries.
(6) Academic and research institutes are key to cluster development: Public institutions specialized in technology and innovation are "key actors for the adaptation, appropriation and dissemination of the main technologies" in each AC.
(7) Private sector institutional support is important to the development of ACs: Innovation processes in the agricultural sector rely on the innovative impulses of global value-chain actors. Without investment in agricultural R&D, developing country clusters will be kept dependent on more advanced clusters.
(8) Collective actions are the cornerstone of ACs' competitiveness: ACs may be formed around agricultural practices or social or ethnic networks.
(9) ACs tend to develop, by and large, around high-value export-oriented agricultural products: ACs focused on local markets remain relatively underdeveloped in comparison to those focusing on exports.
(10) ACs are rapidly evolving to meet the challenges of the new agriculture: These include: a) the need to introduce market-driven innovations in fresh and convenience products; b) the need to further improve the control of food safety risks; c) foreign competition; d) the increasingly stringent environmental regulations; and e) energy and water issues.
(11) Agricultural cluster policies are not isolated: They relate to multiple subjects, including knowledge and innovation, spatial planning and agricultural logistics.
(12) ACs can contribute considerably to local and regional development: The progress and growth of ACs seem to have many spillover benefits on local and rural development. ACs can contribute to create national/regional brand identity.

Source: Adapted from FAO (2010, p.61–69).

2.2. Farm Consolidation

Farm consolidation can take several forms (World Bank 2020): (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. According to World Bank (2020), The county can learn from the experiences of other countries on the modalities of consolidation.

For the first modality, evidence suggests that land consolidation 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 (World Bank 2020). In the case of China, prior to reforms on land titling, farmers were reluctant to migrate due to fear of expropriation of their lands. With the new system rural households have retned out their lands as sale and lease of land rights were made possible.

An example of the second modality is Vietnam's model called "big tenant, small landlord" has been developed to consolidate small pieces of land into large fields (World Bank 2020). In this large field program operated in various arrangements, the farmers integrated their small rice lands into one consolidated area. This system was meant to enhance the bargaining power of farmers in selling their output and buying of inputs. The consolidation also made possible the increased farm mechanization and use of postharvest facilities.

Another form is the informal joint farming by producer organizations. World Bank (2020) also cites the case of southern Cambodia where smallholder farmers informally coordinated their use of combine harvesters for paddy. Nepal and Malaysia have also promoted joint-farming initiatives where farmers pooled their lands under one management unit (World Bank, 2020).

According to the World Bank (2020), the government will have a critical role in the above modalities. Specifically, it can facilitate effective partnerships between producer organizations, buyers, technical service providers, and financial lenders. In addition, government assistance will also be needed in strengthening such entities by ensuring fair and objective agribusiness venture agreements and contracts, and for supporting farmers in moving up the value chain ladder, including the production of inputs, marketing, processing, and logistics (World Bank, 2020).

Forms of Consolidation under Agribusiness Venture Arrangements (AVA)
Agribusiness venture agreements can take the following forms (Department of Agrarian Reform Administrative Order (A.O.) No. 9, series of 1998): (1) Joint Venture Agreement; (2) Lease Agreement; (3) Contract Growing/Growership Arrangement; (4) Management Contract; (5) Production, Processing, and Marketing Agreements; and (6) Build-Operate-Transfer Scheme. AO. No. 2, s. 1999 complements AO #9 as it gives the rules and regulations for joint economic enterprises in agrarian reform areas. Box 2 defines the different forms of AVA.

Box 2. Forms of Agribusiness Venture Arrangements (AVA)

(1) Joint Venture Agreement (JVA) is an AVA scheme wherein the ARBs and investors form a **joint venture corporation** (JVC) to manage farm operations. The beneficiaries contribute the use of the land held individually or in common and the facilities and improvements, if any. On the other hand, the investor furnishes capital and technology for production, processing and marketing of agricultural goods, or construction, rehabilitation, upgrading and operation of agricultural capital assets, infrastructure and facilities.

(2) Lease Agreement is an AVA scheme wherein the beneficiaries bind themselves to give the former landowner or any other investor general control over the use and management of the land for a certain amount and for a definite period.

(3) Contract Growing/Growership/Production Arrangement is an AVA scheme wherein the ARBs commit to produce certain crops which the investor buys at pre-arranged terms (e.g., volume, quality standard, selling price). This may come in the form of production and processing agreements.

(4) Management Contract is an AVA scheme wherein the ARBs hire the services of a contractor who may be an individual, partnership or corporation to assist in the management and operation of the farm for the purpose of producing high value crops or other agricultural crops in exchange for a fixed wage and/or commission.

(5) Marketing Agreement is an AVA scheme wherein the investor explores possible markets/buyers for the ARB's produce and in turn receives commission for actual sales. It is distinct from the direct marketing arrangement/contracts of ARBs or their cooperative/association wherein the regional/provincial marketing assistance officer of DAR helps or assists in the sale and marketing of ARBs produce to a regular market, e, g., institutional buyers such as Cargill Philippines or San Miguel Corporation (SMC) for yellow/hybrid corn. This arrangement is under the DAR marketing assistance program (MAP) and not considered as an AVA scheme.

(6) Build-Operate-Transfer (BOT) is an AVA scheme wherein the investor builds, rehabilitates or upgrades, at his own cost, capital assets, infrastructure and facilities applied to the production, processing and marketing of agricultural products and operates the same at his expense for an agreed period after which the ownership thereof is conveyed to the ARBs who own the land where such improvements and facilities are located.

Lifted from Section 3 of DAR A.O. No. 9, s. (1998).

2.3. Clustering and Integration

Howard (2006) states that food system can be thought of as a long chain, with food passing different hands and stages from farmers up to consumers. The links may be formal or informal such as through mergers, acquisitions, joint ventures or strategic alliances. According to Howard, there are three processes by which emerging clusters of firms disrupts this chain and control it from "the gene to the supermarket shelf:" (1) horizontal integration; (2) vertical integration; and (3) global expansion.

The first process refers to consolidation of ownership and control within one stage of the food system, such as processing, for a commodity. A commonly used measure is the ratio of the market share of the top four firms in a specific industry compared to the total market, also called the concentration ratio (CR4). The CR4 is important because when four firms control 40% of the market, it is no longer competitive (Howard 2006). This means that the largest firms will have a disproportionate influence on not just the price of a commodity, but also the quantity, quality and location of production.

For vertical integration process, firms are supposed to be linked at more than one stage of the food chain from upstream suppliers or downstream buyers. Howard (2006) cited a firm which is involved in both pork production and pork packing and a firm which distributes seed, fertilizer and pesticides, and owns and operates grain elevators, barges and railroad cars; manufactures animal feed; produces chickens, processes chickens for sale in meat cases, and for frozen dinners.

According to Howard (2006), the global expansion process is meant to increase the market share of agribusiness firms. On the retail end of the food chain, the prediction was for 6 global food retailers to dominate the market. Estimates at that time suggested that the top 5 already accounted for more than half the market (Howard 2006). The entry of WalMart into food retailing and its expansion to other continents (such as South America, Europe and Asia) began the massive wave of mergers. In fact, Wal-Mart was supposed to be the only US based company big enough to compete with European firms like Carrefour, Ahold and Metro (each of which has stores in more than 20 countries). Before Wal-Mart became a major player in food sales the top 5 retail chains in the US controlled less than a quarter of the market (Howard 2006).

Efficiency and Distributional Consequences of Consolidation, Vertical Coordination, and Market Power in Food Sector

Clodius and Mueller's (1961) structure-conduct-performance (SCP) framework to food industries began the discussion of concentration and market power in agriculture. They identified the key strategic structural characteristics of markets as: (a) the number and size distribution of buyers and sellers; (b) the extent of product differentiation; and (c) the conditions of entry. They presumed structure to determine market conduct which entails price and output decisions, the determination of product characteristics, policies on product promotion, and nature of interactions with rival firms or entrants. Conduct was presumed to determine market performance which considers the price-average cost margin, production efficiency, relative promotion expenditures, the design/quality of products, and industry innovation.

The consequences of market power when it is present is based on a simple partial equilibrium microeconomic model that may not be realistic for most modern markets. Firms with market power tend to produce less or below socially optimal to maximize profits. Producing less will drive prices up. This process leads to some efficiency losses. Apparently, these losses appear to be very small relative to the market's total surplus.

Along the lines above, Otsuka and Ali (2020) cited the following advantages of clustering: (1) low transaction cost resulting from geographical proximity of transacting entities; (2) ease of imitation of innovative ideas; (3) less costly and more effective provision of service such as dissemination of research results, training of stakeholders, availability of trained workforce at competitive rates, and networking of stakeholders.

Role of Government in Building Clusters

The essential role of government is to enable cluster development either through direct access to funds or less direct means such as the development of enabling policy frameworks, strategic action plans, and well-trained and motivated public servants. Box 3 lists the critical roles government can play in building clusters (Maxwell Stamp PLC 2013). Even the areas for future development supposedly for Croatia, appear to be applicable to other economies. The recommendations to enhance and strengthen the implementation of existing policy for clusters can provide insights.

Box 3. The Role of Government in Building Clusters

<table>
<tr>
<td>Government Role in Cluster Creation

1. Lay the foundation of support
2. Create policies which support and encourage not prevent and discourage
3. Collaborate and cooperate in networks
4. Create and support communication channels
5. Re-organize government services delivery structures
6. Re-organize government information delivery services
7. Create entrepreneurial support and learning networks
8. Build a specialized work-force
9. Use cluster as a context for learning
10. Promote the development of cluster skill-centers
11. Stimulate innovation and entrepreneurship
12. Provide national and seek funding
13. Create enabling financing vehicles
14. Allocate resources and investments to maximize impact and send signals
15. Promote competitive funding programs
16. Invest in cluster-based R&D
17. Promote the use of incubators
18. Create technology centers
19. Use clusters as a promotional tool
20. Support the development of export networks</td>
<td>6 Areas for Future Strategic Development
1) improving he management of cluster development policy
2) Strengthening of clusters and cluster members
3) Promoting innovation and transfer of new technologies
4) Strengthening of export potential and internationalization of clusters
5) Strengthening the knowledge and skills for cluster development
6) Effective use of funds and programs

Recommendations
1) Build scale and capacities of clusters
2) Categories of clusters + continuity of support
3) Internationalization of clusters
4) Measuring Progress –sales, exports, output, jobs
(a) Number of clusters supported
(b) Number of member companies
(c) Range of cluster activities
(d) Export promotion initiatives undertaken
(e) Sales and exports of all cluster companies
(f) Employment and annual change
(g) R&D expenditure (% of sales)
(h) R&D project contracts with universities
(i) Cluster budget
(j) Cluster staff
5) Forum of expertise and capacity building on clusters
6) Communications policy
7) Inter-ministerial coordination and communication
8) Priority infrastructure and projects of national importance</td>
</tr>
</table>

Source: Maxwell Stamp PLC (2013)

3. Research design and methodology

To carry out this study, it is necessary to define consolidation, integration and clustering and agri-business. This chapter also presents the methodology and data sources.

3.1. Industry Cluster and Clustering, Consolidation

An industry cluster is defined as a geographical concentration of industries or inter-connected companies and institutions which gain advantage from the co-location (Porter 1998). Clusters can be "an array of linked industries and other entities which can extend to downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies or common inputs." The clusters can include government, universities, standard-setting agencies, think tanks, vocational training providers, and trade associations that provide specialized training, education, information, and research and technical support (Porter, 1998). In such clusters, there are inter-firm rivalries and collaboration or "co-opetition", innovation and rapid transmission and adoption of ideas, and generation of local externalities, such as a skilled labor pool, the availability of specialized inputs – physical, technical and legal (such as those relating to certification) – and enhanced access to information on technologies and markets, among others (FAO 2010).

In the case of agricultural clusters, they can facilitate delivery of government farm support services. The potential benefits could be far beyond production at the farm through cost reductions from economies of scale. Savings can come from using labor-saving mass production techniques, which reduce costs and also permit more timely farm operations and better product standardization. Clustering and consolidation could also improve the upstream and downstream links of the farm value chain. Among the upstream links are financing and farm inputs procurement. In accessing finance, a farmers' cluster can borrow a sizable loan from the bank, which favors both sides of the transaction. The bank would prefer a few large loans over a large number of small ones and save on transaction costs. On the other hand, individual small farmers would seldom qualify for bank loans, lacking assets for collateral. In farm inputs procurement, a farmers' group can obtain quantity discounts for volume purchases of seeds, fertilizers, chemicals, machines, and others. Such discounts would not otherwise be offered when an individual small farmer buys them on his own (Habito, 2021).

On the downstream side of the chain, a farmers' cluster can pool its members' produce to be able to negotiate better prices with bulk buyers such as traders or institutional buyers. The cluster could also opt to sell their product in processed or semi-processed form, earning more from value adding, and giving them a greater share of the final product price.[3] Farmers can also take direct part in transport and logistics, if their group invests in its own trucks and/or transport facilities to bring their products to the market or institutional buyers. The opportunities to benefit from clustering could transcend the entire span of the farm value chain (Habito, 2021).

[3] Examples of process form are production of coco sugar, coco coir, muscovado sugar, and tablea while examples of semi-processed form are drying and roasting coffee.

3.2. Horizontal and Vertical Integration[4]

There are two dynamics of consolidation, namely, horizontal consolidation and vertical integration. Horizontal consolidation occurs when two or more business firms in the same industry and state of a production cycle merge. This form of consolidation is common and can occur at all levels of the food and agriculture sector. This type can include consolidation of ownership of farm lands.

Vertical coordination or integration is defined as one firm acquiring another in the same industry but at different stage of the production cycle. This integration can be in the form of production contracting or strategic alliances, or can span the full marketing chain.

Companies pursue horizontal consolidation or vertical integration to reduce uncertainty, costs of production, and transaction costs. Horizontal integration will lead to economies of scale and economies of scope and will increase revenue.

A higher concentration is not unique to agribusiness. A common concern with this is the associated monopoly power which can lead to higher prices. This in turn can distort production and consumption decisions and lead to losses in allocative efficiency. Reduced competition can also lead to lower productive efficiency, less innovation, and slower productivity growth in affected industries. Some studies argued that increased concentration can slow growth and increase inequality across the economy (Odunze 2015).

Vertical integration can increase the firms' competitiveness and profitability. These benefits can come about from internalizing transaction costs between stages of the production cycle. Also, the uncertainty of some cost components can be reduced.

3.3. Measuring consolidation and economic concentration

The four-firm ratio (CR4) is commonly used to measure of the degree of horizontal integration or market concentration. This indiactor is computed as the sum of the market shares of the top four biggest firms in an industry in terms of total sales. A CR4 of below 40 is an indication that the market is less concentrated. A ratio between 40 and 70 indicates moderate concentration while a CR4 above 70 means that the market is highly concentrated (Medalla 2018).

A second measure of horizontal market concentration is the Herfindahl-Hirschmann Index (HHI). This index is the sum of the squares of the market shares of each firm in an industry. Following Medalla (2018), markets with HHI less than 1,500 are considered to have low concentration. Those with HHI between 1,500 and 2,500 are deemed moderately concentrated. Markets with HHI above 2,500 are considered as highly concentrated.

For vertical integration, there are two known measures (Adelman 1955): (a) income or value added to sales ratio, and (b) inventory to sales ratio. The first is defined as income or value added of a business unit as a percentage of total sales for all business units. If all firms and industries are completely integrated, then all sales will be to the final consumers (Alfaro, Conconi, Fadinger, Newman (2014); Maddigan 1981; Adelman 1955). So, if the income to sales ratio would be equal to one (1), then there is complete vertical integration. For less integrated businesses or where there are more interfirm transactions, the larger the sales and

[4] This part draws from Odunze (2015).

the smaller the ratio. A vertical integration measure of zero entails that a company must be selling all its outputs and not using some of them or buying all its requirements for a product.

An alternative measure uses the input-output (I-O) coefficients to measure vertical integration. One advantage of this measure is that it is not distorted by the nearness of the firm to primary production (Adelman 1955). The firm's integration index in activity j is given as (Alfaro, et al. 2014):

$$V^{i}_{f,k,c} = \sum_i IO^{f,k}_{ij} ,$$

where k represents a primary sector, and c, a country. The measure of vertical integration based on the firm's primary activity is as follows:

$$V_{f,k,c} = V^{i}_{f,k,c} , j = k.$$

The input-output (I-O) coefficients for each firm is calculated using the formula below:

$$IO^{f}_{ij} = IO_{ij} \times I^{f}_{ij} ,$$

where *f* represents a firm, *i, j* are industries, IO_{ij} is the input-output coefficient for the sector pair *ij*, stating the value of *i* required to produce a peso worth of *j*, I^{f}_{ij} is equal to one if and only if firm *f* owns both plants in sector *i* and *j* if not, it is zero. Thus, the higher IO_{ij} for an *i*-producing plant owned by the firm, the more integrated in the production of *j* the will be measured to be.

Similar to horizontal integration, vertical integration was categorized into partially (weak) and highly (strong) integrated. These are determined by the ratio of value added to sales of the respective industry. Values over 0 but below 0.5 are considered partially or weakly, and those from 0.5 to 1 as highly or strongly integrated. The value of 0 means there is no integration, while 1 means the market fully is integrated vertically.

3.4. Data Sources

The main source of data will be the Philippine Statistics Authority (PSA), other domestic data sources such as the Department of Agriculture (DA), the Department of Trade and Industry (DTI), the Department of Labor and Employment (DOLE), the Cooperative Development Authority (CDA) and the National Irrigation Administration (NIA) for the cooperatives and irrigators association. Where relevant, the FAO, US cluster mapping and other sources of international dataset may be accessed for benchmarking. The table below shows the details of the data coming from PSA and DA.

Table 1. Data Sources

Source	PSA	DA – PRDP	DAR
Specific	ASPBI; CPBI	I-REAP	ARBOs
Enterprises covered	1,536 (2010); 2,461 (2012); 2,564 (2013); 2,690 (2014); 2,646 (2015)	1,060 enterprises 148,005 members	433 AVAs 45,399 ARBs 52,271 ha
Coverage	Formal sector: corporations & partnerships; coops/foundations/assoc; singles proprietorship with employment of 10 & above; single proprietorship with branches (with less than 10 employees)	Micro (not more than P3Mn Capex&Opex), small (above P3Mn-P15Mn), medium (above P15Mn-P50Mn)	Lease agreements; growership agreements; other agreements
Geographic coverage	Nationwide	Nationwide	Nationwide
Years	2010, 2012-2015	2013-2020	2012-2015

3.5. Distribution of ASPBI Samples

Table 2 shows the distribution of ASPBI samples by legal organization (L.O.) for 2010 and 2015. Stock corporations accounted for 62% of total in 2010.

Table 2. Distribution of ASPBI Samples by Legal Organization, 2010 & 2015

Sector	PSIC	Single Proprietorship	Partner-ship	Govt Corp	Stock Corp	Non-stock, non-profit corp	Coop	Others	Grand Total	*% of Total*
2010										
Growing non-perennial crops	A011	191	2	-	214	-	2	1	410	*27*
Growing perennial crops	A012	17	1	1	124	1	29	2	175	*11*
Plant propagation	A013	-	-	-	-	-	-	-	-	*0*
Animal Production	**A014**	129	4	-	402	-	-	13	548	*36*
Support activities to agriculture and post-harvest crop activities	A015	34	-	2	29	16	6	13	100	*6*
Silviculture and other forestry activities	A021	-	-	1	7	1	3	1	13	*1*
Logging	A022	-	-	-	1	-	-	-	1	*0*
Support services to forestry	A024	-	-	-	-	-	-	-	-	*0*
Fishing	A031	93	5	1	59	-	3	-	161	*10*
Aquaculture	A032	8	-	-	120	1	3	-	132	*9*
Grand Total		**472**	**12**	**5**	**956**	**19**	**46**	**30**	**1,540**	*100*
% of Total		*31*	*1*	*0*	*62*	*1*	*3*	*2*	*100*	
2015										
Growing non-perennial crops	A011	143	1	1	301	4	25	7	481	*18*
Growing perennial crops	A012	33			223	1	55	1	312	*12*
Plant propagation	A013	1							1	*0*
Animal Production	**A014**	**377**	**8**	**1**	**671**	**1**	**15**		**1,073**	*41*
Support activities to agriculture and post-harvest crop activities	**A015**	**120**	**10**	**2**	**71**	**50**	**17**	**47**	**317**	***12***
Silviculture and other forestry activities	A021				6	1	5	1	13	*0*
Logging	A022				1				1	*0*
Support services to forestry	A024	4				4			7	*0*
Fishing	**A031**	**213**		**1**	**55**		**2**		**271**	***10***
Aquaculture	A032	27			139		3	1	170	*6*
Grand Total		**917**	**19**	**5**	**1,466**	**61**	**122**	**57**	**2,646**	*100*
% of Total		*35*	*1*	*0*	*55*	*2*	*5*	*2*	*100*	

but only 55% in 2015. These are followed by single proprietors from 31% to 35% on the same periods. In 2015 sample, there were 2.6 times more cooperatives than in 2010 which were mostly engaged in growing perennial crops (45%) and non-perennial crops (20%). Animal production comprises 46% of stock corporations.

Table 3 presents the distribution of ASPBI samples by size for 2010 and 2015. Of the total sample establishments, 52 to 57% have less than 20 employees. About a third have 10 to 19 total employees. Less than a quarter of the establishments have 20 to 29. While Thirteen percent have total employment of 1 to 4 employees and 11% have 5 to 9 employees.

Table 3. Distribution of ASPBI Samples for 2010 & 2015 by Size

Size	Total Employment	2010		2015	
		No. of establishment	% of Total	No. of establishment	% of total
0	**1-4**	81	**5**	336	**13**
1	**5-9**	148	**10**	285	**11**
2	**10-19**	566	**37**	875	**33**
3	20-49	349	23	616	23
4	50-99	150	10	271	10
5	100-199	117	8	118	4
6	200-499	84	5	107	4
7	499-999	26	2	28	1
8	1000-1999	11	1	14	1
9	2000 and over	8	1	6	0
TOTAL		**1,540**		**2,656**	

Sources: ASPBI 2010, 2015.

4. Results and discussion

This section is divided into four parts: (a) integration, consolidation, expansion results; (b) agriculture sector outcomes, and the two sets of case studies, profiles of the enterprises/agribusinesses and their outcomes. The first part discusses the two measures of horizontal integration, and also two measures of vertical integration. These measures characterize the general market conditions for the agriculture sub-sectors. The second part presents the agriculture sector outcomes closest to those which can be expected from AFMA Objective 4. The last two parts are case studies which indicate elements of integration and consolidation and their outcomes.

4.1. Integration Consolidation, Expansion

This part discusses the results of the horizontal and vertical integration analyses for agriculture sector commodity groups: crops, livestock and poultry, agriculture services, forestry and fishing. The vertical integration presents two measures for 2010 to 2015, and I-O based measures for 2006, 2012, and 2018.

4.1.1. Horizontal Integration (HHI, CR4)

Based solely on the market concentration measure using both HHI and CR4, it is clear that most agricultural markets are highly concentrated. Just under the crops markets alone, most

fall under high concentration with only three that are found to have low concentration and five that are moderately concentrated. The crops markets that have low concentration are: the growing of sugarcane including muscovado, the growing of cavendish banana, and the growing of rubber trees. The moderately concentrated markets are as follows: the growing of orchids; the production of horticultural specialties and nursery products; the growing of other banana varieties; the growing of coconut, including copra-making, tuba-gathering and coco-shell charcoal making in the farm; and the growing of other tropical fruits.

For banana and pineapple, the options were to grow through plantations which were almost all managed by cooperatives of agrarian reform beneficiaries under contract agreements with multinational corporations (MNCs). Contract growing, joint venture, and leaseback agreements became available over time. In growership arrangements, the grower or agent provides land and labor as his counterpart and shares expenses with the principal. According to Aldaba (2008), "each firm has its own brand and support facilities. In the banana industry, the major exporters were Lapanday with a market share of 25%, Del Monte with 20%, and Dole Stanfilco, Marsman-Drysdale and others which account for the remaining share of 55%. In the pineapple industry, the major exporters are Del Monte, Dole, and Tiboli Agricultural Development Corporation" (Aldaba 2008, p.42).

Table 4. Market Concentration classification for Crops, 2010-2015

PSIC	Description	Concentration	Trend/Market Structure
A01113	Growing of oil seeds (except ground nuts) such as soya beans,sunflower and growing of other oil seeds, n.e.c.	High	Only 2010 data
A01121	Growing of paddy rice, lowland, irrigated	High	Increasing (except 2010 & 2015)
A01122	Growing of paddy rice, lowland, rainfed	High	Only 2012 data
A01130	Growing of corn, except young corn (vegetable)	High	Increasing since 2012
A01140	Growing of sugarcane including muscovado sugar-making in the farm	Low	Fluctuating
A01161	Growing of abaca	High	(Monopoly)
A01171	Growing of leafy and stem vegetables such as : cabbage, broccoli,cauliflower, lettuce, asparagus, pechay, kangkong and other leafy or stem vegetables	High	Fluctuating then decreasing
A01172	Growing of fruit bearing vegetables such as: tomato, eggplant,cucumber, amplaya, squash, gourd and other fruit bearing vegetables, n.e.c.	High	Fluctuating then decreasing
A01181	Growing of onion	High	(Monopoly)
A01185	Growing of cassava	High	Fluctuating
A01187	Growing of melons and watermelons	High	Fluctuating
A01189	Growing of other roots, bulbs, tuberous crops and vegetables	High	(Monopoly)
A01191	Growing of orchids	Moderate	Fluctuating
A01192	Growing of flowers or flower buds, (except orchids)	High	
A01193	Production or growing of horticultural specialties and nursery products	Moderate	Fluctuating
A01194	Growing of plant materials used chiefly in medicinal/ pharmaceutical or for insecticidal, fungicidal or similar purposes	High	Only 2010 data
A01211	Growing of banana, cavendish	Low	Decreasing then increasing
A01212	Growing of other banana	Moderate	Decreasing then increasing
A01220	Growing of pineapple	low	Increasing (except 2012)
A01231	Growing of calamansi	High	(Monopoly)
A01232	Growing of dalandan	High	(Monopoly)
A01234	Growing of pomelo (suha)	High	Decreasing then increasing
A01235	Growing of citrus fruits, n.e.c.	High	Only 2010 data
A01240	Growing of mango	High	Increasing
A01250	Growing of papaya	High	(Monopoly)
A01260	Growing of coconut, including copra-making, tuba gathering and coco-shell charcoal making in the farm	Moderate	Fluctuating
A01271	Growing of coffee	High	Decreasing then increasing
A01272	Growing of cocoa	High	Increasing then fluctuating
A01273	Growing of tea	High	(Monopoly)

PSIC	Description	Concentration	Trend/Market Structure
A01281	Growing of perrenial spices and aromatic crops such as: ginger, pepper, chile, achuete, laurel, etc.	High	(Monopoly)
A01282	Growing of plants used primarily in medical/ pharmaceutical purposes such as : lagundi, banaba, ginseng, oregano, etc.	High	(Monopoly)
A01291	Growing of other tropical fruits, e.g. jackfruit, guavas, avocados, lanzones, durian, rambutan, chico, atis, mangosteen, makopa, etc.	Moderate	Decreasing (except 2013)
A01292	Growing of perennial trees with edible nuts, e.g. pili nuts, cashew nuts, etc	High	(Monopoly)
A01293	Growing of rubber tree	Low	Fluctuating
A01296	Growing of oleaginous fruits except coconut	High	Fluctuating
A01299	Growing of other fruits and perennial crops, n.e.c.	High	(Monopoly)
A01300	Plant propagation	High	Increasing (except 2014)

Notes: Low refers to having HHI <1,500 and CR4 <40; Moderate refers to having HHI 1,500<2,500 and CR4 40-70; and High refers to having >2,500 and CR4 >70

Source of basic data: Inocencio, et al. (2021).

For the markets under livestock and poultry, a clear majority are highly concentrated. There are only three markets with low concentration and one that is moderately concentrated. The markets considered to have low concentration are hog farming, layer chicken production, and chicken egg production. The broiler chicken production is a moderately concentrated market.

Table 5. Market Concentration classification for Livestock/Poultry, 2010-2015

PSIC	Description	Concentration	Trend/Market Structure
A01411	Beef cattle farming (including feed lot fattening)	High	Increasing
A01420	Raising of horses and other equines	High	Only 2015 data
A01430	Dairy farming	moderate	Increasing
A01441	Sheep farming including sheep shearing by the owner	High	(Monopoly)
A01442	Goat farming	High	Decreasing
A01450	Hog farming	Low	Increasing (except 2013 & 2015)
A01461	Chicken production, broiler	Moderate	Decreasing then increasing
A01462	Chicken production, layer	Low	Fluctuating
A01463	Chicken production, native	High	(Monopoly)
A01471	Raising of duck broiler	High	Decreasing
A01472	Raising of quail	High	Increasing
A01475	Raising of game fowl	High	Fluctuating
A01479	Raising of poultry (except chicken), n.e.c.	High	Decreasing
A01481	Chicken egg production	Low	Increasing (except in 2013)
A01482	Duck egg production	High	(Monopoly)
A01489	Production of eggs, n.e.c.	High	Only 2012 data (Monopoly)
A01491	Sericulture (silkworm culture for the production of cocoon)	High	Only 2010 data
A01492	Apiary (bee culture for the production of honey)	High	(Monopoly)
A01493	Vermiculture	High	Only 2013 data (Monopoly)
A01496	Raising of semi-domesticated or wild animals including birds, reptiles, insects (e.g. butterfly) and turtles	High	Fluctuating
A01498	Game propagation and breeding activities	High	(Monopoly)
A01499	Raising of other animals, n.e.c.	High	Fluctuating

Notes: Low refers to having HHI <1,500 and CR4 <40; Moderate refers to having HHI 1,500<2,500 and CR4 40-70; and High refers to having >2,500 and CR4 >70

Source of basic data: Inocencio, et al. (2021).

Similar to the previous two markets, most of agri-services markets are highly concentrated although the trends appear to be decreasing over time. Only one market was considered to have generally low concentration: contract animal grooming services. There were two that were considered moderately concentrated, operation of irrigation systems through cooperatives, and

egg-hatching, sex determination and other poultry services, and both have decreasing/rising trends for the same period.[5]

Table 6. Market Concentration classification for Agri-Services, 2010-2015

PSIC	Description	Concentration	Trend/ Market Structure
A01511	Operation of irrigation systems through cooperatives	Moderate	Decreasing then increasing
A01512	Operation of irrigation systems through non-cooperatives	High	(Monopoly)
A01520	Planting, transplanting and other related activities	High	(Monopoly)
A01531	Plowing, seeding, weeding, thinning, pruning and similar services	High	Decreasing then increasing
A01532	Fertilizer applications	High	Only 2012 data
A01533	Chemical and mechanical weed control, disease and pest control services	High	Fluctuating then increasing
A01534	Services to establish crops, promote their growth and protect them from pests and diseases, n.e.c.	High	Fluctuating
A01550	Rental of farm machinery with drivers and crew	High	Decreasing (except 2015)
A01561	Artificial insemination services	High	Only 2010 data
A01562	Contract animal growing services on a fee basis	Low	Decreasing then increasing
A01563	Egg-hatching, sex determination a nd other poultry services	Moderate	Fluctuating
A01564	Services to promote propagation, growth and output of animals	High	(Monopoly)
A01565	Farm management services	High	Decreasing (except 2015)
A01569	Other support activities for animal production, n.e.c.	High	Only 2015 data
A01571	Preparation of crops for primary markets, i.e. cleaning, trimming, grading, disinfecting; threshing, grading, bailing and related services	High	Decreasing then increasing
A01581	Growing of paddy rice for seed purposes	High	Only 2015 data

Notes: Low refers to having HHI <1,500 and CR4 <40; Moderate refers to having HHI 1,500<2,500 and CR4 40-70; and High refers to having >2,500 and CR4 >70

Source of basic data: Inocencio, et al. (2021).

All markets under forestry have high concentrations as of 2015. This situation suggests that entering into these markets would require significant investment.

Table 7. Market Concentration classification for Forestry, 2010-2015

PSIC	Description	Concentration	Trend/Market Structure
A01582	Growing of seedlings for reforestation	High	Only 2015 data
A02110	Growing of timber forest species (e.g. gemelina, eucalyptus, etc.), planting, replanting, transplanting, thinning and conserving of forest and timber tracts	High	Increasing then fluctuating
A02120	Operation of forest tree nurseries	High	Fluctuating
A02201	Production of roundwood for forest-based manufacturing industries	High	(Monopoly)
A02400	Support services to forestry	High	Fluctuating

Notes: Low refers to having HHI <1,500 and CR4 <40; Moderate refers to having HHI 1,500<2,500 and CR4 40-70; and High refers to having >2,500 and CR4 >70

Source of basic data: Inocencio, et al. (2021).

Most of the fishing markets (15 out of 18) have high concentrations, making it difficult for new entrants to be competitive. Only commercial ocean fishing using vessels over 3 tons has low

[5] Aldaba (2008) indicated that the poultry subsector is dominated by five major integrators that control almost 80 percent of the chicken supply in the Philippines. The remaining 20 percent is supplied by other commercial farms and backyard raisers. At that time, the five biggest firms consisted of Swift Foods, Vitarich Corporation, San Miguel Foods, Purefoods, and Tyson's Agroventures. The San Miguel Group owns both San Miguel Foods and Purefoods.

concentration. The markets of operation of freshwater fish-pens and fish cages, and prawn culture in brackish water have moderate concentration.

Table 8. Market Concentration classification for Fishing, 2010-2015

PSIC	Description	Concentration	Trend/Market Structure
A03111	Ocean fishing, commercial (using vessels over 3 tons)	Low	Decreasing
A03112	Coastal fishing, municipal (using vessels of less than 3 tons)	High	Decreasing then increasing
A03113	Fish corral fishing	High	Only 2010 data
A03121	Catching fish, crabs and crustaceans in inland waters	High	Fluctuating then increasing
A03130	Support service activities incidental to fishing	High	(Monopoly)
A03211	Operation of freshwater fishpond, except fish breeding farms and nurseries	High	Increasing (except in 2012 & 2015)
A03212	Operation of freshwater fish pens and fish cage	Moderate	Decreasing then increasing
A03213	Operation of f reshwater fish breeding farms and nurseries	High	Fluctuating
A03214	Culture of freshwater ornamental fish	High	(Monopoly)f
A03221	Operation of marine fish tanks, pens, cage except fish breeding farms and nurseries in sea water	High	Increasing then leveled off
A03222	Operation of marine fish breeding farms and nurseries	High	(Monopoly)
A03224	Gathering of fry	High	Decreasing then increasing
A03240	Prawn culture in brackish water	Moderate	Fluctuating then decreasing
A03251	Culture of freshwater crustaceans (except prawns), bivalves, and other mollusks	High	Increasing
A03261	Pearl culture	High	Decreasing
A03271	Seaweeds farming	High	(1-2 firms only)
A03280	Support service activities incidental to aquaculture	High	Only 2010 data

Notes: Low refers to having HHI <1,500 and CR4 <40; Moderate refers to having HHI 1,500<2,500 and CR4 40-70; and High refers to having >2,500 and CR4 >70

Source of basic data: Inocencio, et al. (2021).

Vertical Integration (Value Added/Sales) for 2010-2015

Using the measure earlier defined, as can be seen in table 8, most of the markets have weak vertical integration by 2015. Only a few markets do not have data to draw from. The markets with partially strong integration are spread out among the classes of markets. These include the growing of coconut, including copra-making, tuba gathering and coco-shell charcoal making in the farm; growing of cocoa; growing of perennial trees with edible nuts; growing of rubber tree; growing of oleaginous fruits except coconut; operation of irrigation systems through cooperatives and non-cooperatives; growing of timber forest species; and pearl culture.

Table 9. Measure of Vertical Integration, 2010-2015

2009 PSIC Code	Industry Description	2010	2012	2013	2014	2015	Vertical Integration
	Philippines	**0.40**	**0.23**	**0.28**	**0.26**	**0.25**	**w. partial; decreasing**
A01121	Growing of paddy rice, lowland, irrigated	**0.67**	-	0.38	0.33	0.37	**w. partial**
A01130	**Growing of corn, except young corn (vegetable)**	**0.64**	0.45	0.49	0.48	0.43	**w. partial**
A01140	**Growing of sugarcane including muscovado sugar-making in the farm**	**0.55**	0.45	**0.56**	0.47	0.27	**w. partial**
A01185	Growing of cassava	**0.66**	-	-	-	-	**w. partial**
A01191	Growing of orchids	0.40	0.36	0.45	**0.52**	0.50	**w. partial**
A01192	Growing of flowers or flower buds, (except orchids)	**0.59**	0.49	0.50	0.48	0.48	**w. partial**
A01193	Production or growing of horticultural specialties and nursery products	0.32	0.44	0.36	**0.52**	0.34	**w. partial**
A01212	Growing of other banana	0.34	**0.65**	0.43	0.39	0.36	**w. partial**

2009 PSIC Code	Industry Description	2010	2012	2013	2014	2015	Vertical Integration
A01220	**Growing of pineapple**	**0.59**	0.45	0.26	0.24	0.23	**w. partial**
A01240	**Growing of mango**	**0.71**	-	**5.55**	-0.18	0.15	**s. to w. partial**
A01250	Growing of papaya	-	**5.16**	-	-	-	
A01260	Growing of coconut, including copra-making, tuba gathering and coco-shell charcoal making in the farm	**0.72**	**0.63**	**0.56**	**0.60**	**0.68**	**s. partial**
A01271	**Growing of coffee**	-	-0.84	**0.82**	0.39	0.22	
A01272	**Growing of cocoa**	-	0.48	**0.53**	**0.70**	-	**s. partial**
A01292	Growing of perennial trees with edible nuts, e.g. pili nuts, cashew nuts, etc	-	-0.78	-	-	-	
A01293	**Growing of rubber tree**	**0.78**	**0.57**	**0.51**	0.45	**0.64**	**s. partial**
A01296	Growing of oleaginous fruits except coconut	-	0.25	**0.57**	**0.54**	0.44	**s. partial**
A01300	Plant propagation	-	0.38	0.31	**0.64**	-	
A01411	Beef cattle farming (including feed lot fattening)	**0.55**	0.24	0.33	0.10	0.23	**w. partial**
A01430	Dairy farming	-	0.38	0.20	0.29	**0.54**	
A01442	Goat farming	-	-	-	**0.58**	-	
A01462	Chicken production, layer	**0.63**	-	0.23	0.20	0.19	**w. partial**
A01475	Raising of game fowl	-	0.09	**0.51**	0.41	-	
A01511	Operation of irrigation systems through cooperatives	-	0.50	**0.78**	**0.73**	0.45	**s. partial**
A01512	Operation of irrigation systems through non-cooperatives	**0.83**	**0.87**	-	-	-	**s. partial**
A01565	Farm management services	-	**0.73**	0.24	**0.68**	-	
A01571	Preparation of crops for primary markets, i.e. cleaning, trimming, grading, disinfecting, threshing, bailing and related services	**0.59**	0.23	0.06	0.38	0.18	**w. partial**
A02110	Growing of timber forest species (e.g. gemelina, eucalyptus, etc.), planting, replanting, transplanting, thinning and conserving of forest and timber tracts	**0.65**	0.10	0.44	**0.52**	**0.81**	**s. partial**
A02120	Operation of forest tree nurseries	**0.66**	0.27	0.36	0.13	-	
A02201	Production of roundwood for forest-based manufacturing industries	-	**0.51**	-	-	-	
A02400	Support services to forestry	-	0.47	**0.99**	0.03	0.03	
A03111	Ocean fishing, commercial (using vessels over 3 tons)	0.31	0.30	0.28	0.30	0.41	**w. partial**
A03112	Coastal fishing, municipal (using vessels of less than 3 tons)	-	0.47	**0.54**	0.32	0.36	**w. partial**
A03121	Catching fish, crabs and crustaceans in inland waters	**0.60**	-	0.38	-	-	
A03251	Culture of freshwater crustaceans (except prawns), bivalves, and other mollusks	-	**0.59**	0.49	-	-	
A03261	Pearl culture	**0.57**	0.47	0.45	0.49	**0.53**	**s. partial**
A03271	Seaweeds farming	**0.80**	-	-	0.08	0.04	**w. partial**

Notes: This is measured as the ratio of income using value added to sales using value of output. Full refers to having a ratio of 1, "w. partial" refers to weak partial having a ratio below 0.50 and "s. partial" refers to strong partial having a ratio between 0.5 and below 1.
Source: Author's Calculation

4.1.2. Vertical Integration Using the Input-Output Coefficients

Tables 10 to 12 present the alternative vertical integration measure for all the agriculture industries using the input-output tables for 2006, 2012 and 2018. The estimates show that most of the crops markets are partially integrated although 12 of the 20 sub-sectors, the integration appears to be increasing over time (Table 10). The abaca and tobacco sub-sectors stand out as relatively highly integrated.

Table 10. Vertical Integration of Agricultural Crops, 2006, 2012, 2018

I-O Codes	Description	2006	2012	2018	Degree of V. Integration	V. Integration Trend
001	Palay	0.298465	0.273944	0.241656	partially integrated	decreasing
002	Corn	0.286507	0.285465	0.302586	partially integrated	increasing
003	Coconut	0.101897	0.185535	0.114530	partially integrated	increasing
004	Sugarcane including muscovado sugar-making in the farm	0.420238	0.335538	0.322021	partially integrated	decreasing
005	Banana	0.216882	0.211853	0.189191	partially integrated	decreasing
006	Mango	0.150188	0.242498	0.165591	partially integrated	increasing
007	Pineapple	0.192434		0.085092	partially integrated	decreasing
008	Coffee	0.158579		0.136022	partially integrated	decreasing
009	Cassava	0.107440		0.088681	partially integrated	decreasing
010	Rubber	0.225776		0.234170	partially integrated	increasing
011	Sweet potato	0.132035		0.139504	partially integrated	increasing
012	Citrus Fruits	0.165797		0.305870	partially integrated	increasing
013	**Abaca**	**0.408860**		**0.627209**	**highly integrated**	**increasing**
014	**Tobacco**	**0.296428**		**0.658707**	**highly integrated**	**increasing**
015	Papaya	0.152709		0.283871	partially integrated	increasing
016	Other fruits, n.e.c.	0.128976		0.208794	partially integrated	increasing
017	Leafy and stem vegetable	0.242234		0.171351	partially integrated	decreasing
018	Horticultural specialties and nursery products	0.343870		0.281282	partially integrated	decreasing
019	Cacao	0.036328		0.222724	partially integrated	increasing
020	Other agricultural crops, nec	0.129637		0.176959	partially integrated	increasing

Source: PSA (2022).

It is interesting to note that most of the markets for livestock and poultry are highly integrated. More importantly, the integration appears to be increasing over time for most of these markets (Table 11). The forestry sectors are all partially integrated by the integration is increasing over time. Of the six fishing sub-sectors, ocean fishing, and prawn culture and operation of fish arms are highly integrated (Table 12).

Table 11. Vertical Integration of Poultry and Livestock Industries, 2006, 2012, 2018

I-O Codes	Description	2006	2012	2018	Degree of V. Integration	V. Integration Trend
021	**Hog farming**	**0.426337**	**0.421644**	**0.715605**	**highly integrated**	**increasing**
022	**Cattle farming (including feed lot fattening)**	**0.489739**		**0.704891**	**highly integrated**	**increasing**
023	Livestock farming (including feed lot services), n.e.c.	0.517449		0.554732	partially integrated	increasing
024	**Other animal including dairy production**	**0.709685**		**0.707352**	**highly integrated**	**decreasing**
025	**Chicken**	**0.490474**	**0.442313**	**0.621488**	**highly integrated**	**increasing**
026	**Poultry farming (except chicken)**	**0.267490**		**0.623086**	**highly integrated**	**increasing**
027	**Egg production**	**0.507566**		**0.767607**	**highly integrated**	**increasing**

Source: PSA (2022).

Table 12. Vertical Integration of Forestry and Fishing Industries, 2006, 2012, 2018

I-O Codes	Description	2006	2012	2018	Degree of V. Integration	V. Integration Trend
028	Agricultural, Forestry and Fishing Activities and Services	0.270969	0.226765	0.328896	partially integrated	increasing
029	Forestry	0.143144	0.143145	0.597106	partially integrated	increasing
030	**Ocean fishing (including fish corals)**	**0.199112**	**0.341391**	**0.637716**	**highly integrated**	**increasing**
031	Inland and coastal fishing	0.253941		0.413959	partially integrated	increasing
032	**Prawn culture and Operation of fish farms and nurseries**	**0.257677**		**0.680110**	**highly integrated**	**increasing**
033	Pearl culture and pearl shell gathering	0.608294		0.486562	partially integrated	decreasing
034	Seaweeds farming	0.287228		0.452500	partially integrated	increasing
035	Mollusks and other crustacean farm operations (except prawn farm operations) and other fishing activities, n.e.c	0.257677		0.257047	partially integrated	decreasing

Source: PSA (2022).

4.2. Agriculture Sector Outcomes

As indicated at the start of this study, AFMA Objective 4 did not specify the relevant outputs nor outcomes. However, following the DA AO No. 27, greater consolidation, horizontal and vertical integration and expansion are supposed to result in the following: (1) economies of scale in agriculture production; (2) better access to markets, financing and investments for ventures and development projects; (3) strengthened active role and contribution of farmers and fishers to the economy; and (4) acceleration of agriculture growth and countryside development.

4.2.1. Contribution to GVA

In lieu of the first outcome, the contributions of agriculture, fishing and forestry to the gross value added are presented. Palay had the largest percentage at 21% in 2020. It is followed by fishing and aquaculture at 13%, and livestock at 12%. The products with the lowest contributions are Cacao, Abaca, and Tobacco, all at 0.1% of the agriculture gross value added.

Table 13. Gross Value Added of Agriculture, Fishing and Forestry, 2010 – 2020

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GVA AHFF (P Bn at 2018 prices)	**1,500**	**1,551**	**1,598**	**1,645**	**1,676**	**1,688**	**1,672**	**1,743**	**1,763**	**1,784**	**1,781**
As % of total											
Palay	***22***	***22***	***23***	***23***	***23***	***22***	***21***	***22***	***22***	***20***	***21***
Corn	*5*	*6*	*6*	*6*	*6*	*6*	*5*	*6*	*5*	*6*	*6*
Coconut including copra	*6*	*6*	*6*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
Sugarcane including muscovado sugar	*1*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*1*	*2*
Banana	***9.3***	***9.0***	***8.8***	***8.0***	***8.0***	***8.1***	***8.0***	***7.8***	***7.8***	***7.6***	***7.5***
Mango	*2.5*	*2.3*	*2.2*	*2.3*	*2.4*	*2.5*	*2.2*	*2.0*	*1.9*	*1.9*	*1.9*
Pineapple	*1*	*1*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Coffee	*1*	*1*	*1*	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	*0.3*	*0.3*	*0.3*
Cassava	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Rubber	*1*	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*
Cacao	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Abaca	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Tobacco	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Other agricultural crops, n.e.c.	*6*	*6*	*6*	*5*	*5*	*5*	*6*	*5*	*5*	*5*	*5*
Livestock	***12***	***12***	***12***	***12***	***12***	***13***	***13***	***13***	***13***	***13***	***12***
Poultry and egg production	***8***	***8***	***8***	***8***	***8***	***9***	***9***	***9***	***10***	***10***	***10***
Other animal production	*2*	*2*	*2*	*3*	*3*	*3*	*3*	*3*	*3*	*4*	*4*
Forestry and logging	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*
Fishing and aquaculture	***14***	***13***	***13***	***13***	***13***	***13***	***13***	***13***	***13***	***13***	***13***
Support activities to agriculture, forestry and fishing	***8***	***8***	***8***	***8***	***8***	***9***	***9***	***9***	***9***	***10***	***10***

Source: PSA 2021.

In terms of annual growth rates, 13 out of 20 products have negative growths in 2020 (Table 14). Of the seven with positive growth rates, the fastest growing is sugarcane at 21.29, followed by Cacao at 9.9 growth rate.

Table 14. GVA Annual Growth Rates of Agriculture, Fishing and Forestry, 2010 – 2020

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GVA AHFF		**3.38**	**3.08**	**2.93**	**1.87**	**0.74**	**-0.96**	**4.25**	**1.12**	**1.20**	**-0.19**
Palay		**5.67**	**7.43**	**2.36**	**1.69**	**-4.71**	**-3.41**	**7.67**	**-1.41**	**-5.87**	**3.14**
Corn		9.39	6.25	0.19	4.46	-3.82	-4.52	9.06	-1.48	3.28	2.43
Coconut including copra		-1.97	3.64	-2.57	-5.51	0.26	-5.74	1.01	5.53	1.05	-2.85
Sugarcane including muscovado sugar		59.72	-8.86	-6.94	1.74	-7.37	-2.83	27.42	-16.60	-8.95	21.29
Banana		**0.40**	**0.39**	**-6.63**	**2.42**	**1.96**	**-2.45**	**1.56**	**1.77**	**-2.07**	**-1.28**
Mango		**-4.36**	**-2.41**	**6.38**	**8.37**	**3.09**	**-9.88**	**-9.18**	**-2.86**	**4.25**	**-0.07**
Pineapple		2.92	6.80	2.59	1.93	2.47	0.94	2.17	1.82	0.68	-0.11
Coffee		**-6.81**	**1.40**	**-11.63**	**-4.15**	**-5.21**	**-4.88**	**-10.04**	**-3.55**	**-1.70**	**0.84**
Cassava		5.34	1.25	6.46	7.79	7.26	1.66	2.08	-2.72	-3.42	-0.97
Rubber		**7.29**	**3.49**	**-0.05**	**1.37**	**-11.74**	**-9.08**	**11.53**	**3.70**	**2.54**	**3.13**
Cacao		**-3.04**	**1.15**	**0.25**	**0.69**	**0.38**	**0.06**	**-1.74**	**0.25**	**4.11**	**9.90**
Abaca		**-3.72**	**0.38**	**-0.48**	**-0.05**	**-0.43**	**-0.70**	**-2.50**	**-0.61**	**4.15**	**-1.72**
Tobacco		-5.35	-1.41	-2.24	-1.98	-2.41	-2.73	-4.52	-2.80	4.14	-1.63
Other agricultural crops, n.e.c.		-2.53	2.25	0.85	1.40	1.46	1.00	-2.34	0.22	4.04	-1.31
Livestock		**2.64**	**1.56**	**9.18**	**0.24**	**3.60**	**2.96**	**3.42**	**3.66**	**-0.84**	**-6.90**
Poultry and egg production		**4.20**	**3.75**	**7.44**	**0.23**	**8.73**	**1.79**	**5.04**	**5.31**	**5.81**	**-2.43**
Other animal production		8.08	2.43	10.60	2.97	3.59	5.33	6.35	9.29	31.78	-3.22
Forestry and logging		42.53	6.52	45.39	6.51	-24.35	-4.34	-1.43	22.93	4.99	-4.33
Fishing and aquaculture		**-2.14**	**0.54**	**4.26**	**3.20**	**1.43**	**-0.96**	**2.13**	**-0.58**	**2.51**	**-1.30**
Support activities to agriculture, forestry and fishing		**6.08**	**2.25**	**6.29**	**4.82**	**5.44**	**2.92**	**4.71**	**3.37**	**5.77**	**5.01**

Source of Basic Data: PSA 2021.

4.2.2. Employment

Growing of cavendish banana is the largest employer among the crops sub-sectors, employing a total of 46,555. This is followed by the growing of sugarcane, with 34,508 employed in the same year. In terms of percent of paid to total employment, almost all markets, with available data, have over 95%, with the lowest, the production of horticultural specialties and nursery products, at 93%.

Table 15. Total & Average Employment, % of Paid to Total for Crops, 2012

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A01121	Growing of paddy rice, lowland, irrigated	-	-	-	-
A01122	Growing of paddy rice, lowland, rainfed	34	609	18	96.6
A01130	Growing of corn, except young corn (vegetable)	10	874	87	100
A01140	Growing of sugarcane including muscovado sugar-making in the farm	309	34,508	112	99.6
A01171	Growing of leafy and stem vegetables such as: cabbage, broccoli, cauliflower, lettuce, asparagus, pechay, kangkong and other leafy or stem vegetables	17	719	42	99.7
A01172	Growing of fruit bearing vegetables such as: tomato, eggplant, cucumber, amplaya, squash, gourd and other fruit bearing vegetables, n.e.c.	12	481	40	100
A01185	Growing of cassava	-	-	-	-
A01187	Growing of melons and watermelons	4	45	11	95.6
A01191	Growing of orchids	12	230	19	97
A01192	Growing of flowers or flower buds, (except orchids)	9	315	35	95.6
A01193	Production or growing of horticultural specialties and nursery products	14	285	20	93
A01211	Growing of banana, cavendish	153	46555	304	99.5
A01212	Growing of other banana	10	1834	183	100
A01220	Growing of pineapple	20	7,642	382	99.9
A01231	Growing of calamansi	-	-	-	-
A01232	Growing of dalandan	4	241	60	100
A01234	Growing of pomelo (suha)	-	-	-	-
A01240	Growing of mango	-	-	-	-
A01250	Growing of papaya	11	232	21	99.1
A01260	Growing of coconut, including copra-making, tuba gathering and coco-shell charcoal making in the farm	26	1,116	43	97.1
A01271	Growing of coffee	3	97	32	100
A01272	Growing of cocoa	5	212	42	92.9
A01282	Growing of plants used primarily in medical/ pharmaceutical purposes such as: lagundi, banaba, ginseng, oregano, etc.	s	s	-	-
A01291	Growing of other tropical fruits, e.g. jackfruit, guavas, avocados, lanzones, durian, rambutan, chico, atis, mangosteen, makopa, etc.	10	327	33	98.2
A01292	Growing of perennial trees with edible nuts, e.g. pili nuts, cashew nuts, etc	-	-	-	-
A01293	Growing of rubber tree	22	5581	254	99.1
A01296	Growing of oleaginous fruits except coconut	17	2007	118	98.8
A01300	Plant propagation	8	67	8	95.5

Source: CPBI 2012.

Under livestock and poultry, the market of hog farming employs the most, followed by broiler chicken production. Just like the crops market, majority of the markets here also have over 95% ratio of paid employees.

Table 16. Total & Average Employment, % of Paid to Total for Livestock and Poultry, 2012

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A01411	Beef cattle farming (including feed lot fattening)	20	396	20	98.7
A01430	Dairy farming	12	159	13	88.7
A01442	Goat farming	s	s	-	-
A01450	Hog farming	397	10,506	26	98.2
A01461	Chicken production, broiler	273	6,702	25	98
A01462	Chicken production, layer	-	-	-	-
A01463	Chicken production, native	98	2,207	23	96.9
A01471	Raising of duck broiler	3	131	44	100
A01472	Raising of quail	5	69	14	95.7
A01475	Raising of game fowl	4	55	14	100
A01479	Raising of poultry (except chicken), n.e.c.	13	242	19	95.9
A01481	Chicken egg production	109	3,049	28	98.1
A01482	Duck egg production	-	-	-	-
A01489	Production of eggs, n.e.c.	3	53	18	100
A01492	Apiary (bee culture for the production of honey)	-	-	-	-
A01496	Raising of semi-domesticated or wild animals including birds, reptiles, insects (e.g. butterfly) and turtles	5	132	26	94.7
A01499	Raising of other animals, n.e.c.	-	-	-	-

Source: CPBI 2012.

Under Agri-services, the operation of irrigation systems through non-cooperatives employs the most number in 2012, followed by contract animal growing services on a fee basis. Unlike the previous markets, agri-services has four out of twelve markets that have lower than a 90% paid employment rate, with three of them at 80% or below.

Table 17. Employment: Total & Average Employment, % of Paid to Total for Agri-Services, 2012

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A01511	Operation of irrigation systems through cooperatives	77	790	10	61.8
A01512	Operation of irrigation systems through non-cooperatives	4	5,371	1,343	98.9
A01531	Plowing, seeding, weeding, thinning, pruning and similar services	-	-	-	-
A01532	Fertilizer applications	5	138	28	89.9
A01533	Chemical and mechanical weed control, disease and pest control services	-	-	-	-
A01534	Services to establish crops, promote their growth and protect them from pests and diseases, n.e.c.	6	1,423	237	100

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A01550	Rental of farm machinery with drivers and crew	6	51	9	52.9
A01562	Contract animal growing services on a fee basis	183	3,947	22	97.7
A01563	Egg-hatching, sex determination and other poultry services	35	1,006	29	93.9
A01564	Services to promote propagation, growth and output of animals	3	146	49	98.6
A01565	Farm management services	-	-	-	-
A01571	Preparation of crops for primary markets, i.e. cleaning, trimming, grading, disinfecting; threshing, bailing and related services	21	230	11	80

Source: CPBI 2012.

The growing of timber forest species and the provision of support services to forestry are the top two employers among the markets under forestry in 2012. They employed 460 and 328 people respectively in that year. Despite this, they have the lowest percentage of paid to total employment among the markets in forestry, both below 90%, with the provision of support services at a notable 12.8%.

Table 18. Total & Average Employment, % of Paid to Total for Forestry, 2012

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A02110	Growing of timber forest species (e.g. gemelina, eucalyptus, etc.), planting, replanting, transplanting, thinning and conserving of forest and timber tracts	10	460	46	87.4
A02120	Operation of forest tree nurseries	6	60	10	96.7
A02201	Production of roundwood for forest-based manufacturing industries	3	187	62	99.5
A02400	Support services to forestry	6	328	55	12.8

Source: CPBI 2012.

In fishing, the top employer by far, in terms of total employed in 2012, is commercial ocean fishing using vessels over three tons, with 16,475 employees. This is followed by the operation of freshwater fishponds, except fish breeding farms and nurseries, which employed only 1,267 in that same year. Similar to the earlier markets, most of the markets in fishing have over 90% of paid to total employment, with the only outlier being the culture of freshwater ornamental fish, at 51%.

Table 19. Total & Average Employment, % of Paid to Total for Fishing, 2012

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A03111	Ocean fishing, commercial (using vessels over 3 tons)	220	16,475	75	97.9
A03112	Coastal fishing, municipal (using vessels of less than 3 tons)	40	811	20	92.4
A03121	Catching fish, crabs and crustaceans in inland waters	s	s	-	-
A03130	Support service activities incidental to fishing	s	s	-	-
A03211	Operation of freshwater fishpond, except fish breeding farms and nurseries	58	1,267	22	97
A03212	Operation of freshwater fish pens and fish cage	41	678	17	96.8
A03213	Operation of freshwater fish breeding farms and nurseries	-	-	-	-

2009 PSIC Code	Region/Industry Description	Number of Establishments	Total Employment	Average Size of Employment	% of Paid to Total Employment
A03214	Culture of freshwater ornamental fish	15	725	48	51
A03221	Operation of marine fish tanks, pens, cage except fish breeding farms and nurseries in sea water	7	201	29	91
A03222	Operation of marine fish breeding farms and nurseries	-	-	-	-
A03224	Gathering of fry	7	226	32	92.9
A03240	Prawn culture in brackish water	31	570	18	98.9
A03251	Culture of freshwater crustaceans (except prawns), bivalves, and other mollusks	11	323	29	91
A03261	Pearl culture	6	727	121	100
A03271	Seaweeds farming	s	s	-	-

Source: CPBI 2012.

4.2.3. Research and Development Efforts

According to the 2012 data on research and development expenses in the crops markets under agriculture, fishing, and forestry, most either have no data, or have ratios of their R&D expenses to output and value added lower than 0.5. Only three crops markets have more than 0.5 ratios with respect to value of output and to value added, with two of them being the same for both categories. These two are the growing of fruit bearing vegetables and the growing of pineapple. The other market with an over 0.5 ratio to value of output is the growing of coffee. The other market with an over 0.5 ratio to value added is the lowland rainfed growing of paddy rice.

Table 20. Research & Development (R&D) Expenses for Crops, 2012

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A01121A11:L26A11:L25A11:L22	Growing of paddy rice, lowland, irrigated		-	-
A01122	Growing of paddy rice, lowland, rainfed	4,910	**0.41**	**1.04**
A01130	Growing of corn, except young corn (vegetable)	1,266	**0.05**	**0.12**
A01140	Growing of sugarcane including muscovado sugar-making in the farm	-	-	-
A01171	Growing of leafy and stem vegetables such as: cabbage, broccoli, cauliflower, lettuce, asparagus, pechay, kangkong and other leafy or stem vegetables	6	**0**	**0.01**
A01172	Growing of fruit bearing vegetables such as: tomato, eggplant, cucumber, amplaya, squash, gourd and other fruit bearing vegetables, n.e.c.	2,159	**0.85**	**2.13**
A01185	Growing of cassava		-	-
A01187	Growing of melons and watermelons	-	-	-
A01191	Growing of orchids	6	**0.01**	**0.03**
A01192	Growing of flowers or flower buds, (except orchids)	-	-	-
A01193	Production or growing of horticultural specialties and nursery products	-	-	-
A01211	Growing of banana, cavendish	638	**0**	**0.01**
A01212	Growing of other banana	94	**0.01**	**0.02**

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A01220	Growing of pineapple	23,122	0.59	1.3
A01231	Growing of calamansi		-	-
A01232	Growing of dalandan	-	-	-
A01234	Growing of pomelo (suha)		-	-
A01240	Growing of mango		-	-
A01250	Growing of papaya	-	-	-
A01260	Growing of coconut, including copra-making, tuba gathering and coco-shell charcoal making in the farm	56	0.03	0.04
A01271	Growing of coffee	325	7.15	-8.52
A01272	Growing of cocoa	-	-	-
A01282	Growing of plants used primarily in medical/ pharmaceutical purposes such as: lagundi, banaba, ginseng, oregano, etc.	s	-	-
A01291	Growing of other tropical fruits, e.g. jackfruit, guavas, avocados, lanzones, durian, rambutan, chico, atis, mangosteen, makopa, etc.	-	-	-
A01292	Growing of perennial trees with edible nuts, e.g. pili nuts, cashew nuts, etc		-	-
A01293	Growing of rubber tree	300	0.03	0.06
A01296	Growing of oleaginous fruits except coconut	492	0.06	0.22
A01300	Plant propagation	-	-	-

Source: CPBI 2012.

The R&D for livestock and poultry markets in comparison, have yet to reach over 0.2 ratios for both measures. It should be noted that more than half of the markets under this category do not have data for 2012.

Table 21. Research & Development (R&D) Expenses for Livestock and Poultry, 2012

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A01411	Beef cattle farming (including feed lot fattening)	88	0.04	0.16
A01430	Dairy farming	-	-	-
A01442	Goat farming	s	-	-
A01450	Hog farming	3,215	0.02	0.11
A01461	Chicken production, broiler	47	0	0
A01462	Chicken production, layer		-	-
A01463	Chicken production, native	39	0	0.01
A01471	Raising of duck broiler	-	-	-
A01472	Raising of quail	-	-	-
A01475	Raising of game fowl	-	-	-
A01479	Raising of poultry (except chicken), n.e.c.	-	-	-
A01481	Chicken egg production	67	0	0.01
A01482	Duck egg production		-	-
A01489	Production of eggs, n.e.c.	-	-	-
A01492	Apiary (bee culture for the production of honey)		-	-

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A01496	Raising of semi-domesticated or wild animals including birds, reptiles, insects (e.g. butterfly) and turtles	-	-	-
A01499	Raising of other animals, n.e.c.		-	-

Source: CPBI 2012.

For markets with available data under agri-services, half have ratios of R&D expenses to value added over 1. However, none have ratios to value of output that reached 0.4.

Table 22. Research & Development (R&D) Expenses for Agri-Services, 2012

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A01511	Operation of irrigation systems through cooperatives	9	**0.03**	**0.05**
A01512	Operation of irrigation systems through non-cooperatives	-	-	-
A01531	Plowing, seeding, weeding, thinning, pruning and similar services		-	-
A01532	Fertilizer applications	218	**0.39**	**1.66**
A01533	Chemical and mechanical weed control, disease and pest control services		-	-
A01534	Services to establish crops, promote their growth and protect them from pests and diseases, n.e.c.	685	**0.09**	**1.14**
A01550	Rental of farm machinery with drivers and crew	-	-	-
A01562	Contract animal growing services on a fee basis	-	-	-
A01563	Egg-hatching, sex determination and other poultry services	-	-	-
A01564	Services to promote propagation, growth and output of animals	-	-	-
A01565	Farm management services		-	-
A01571	Preparation of crops for primary markets, i.e. cleaning, trimming, grading, disinfecting; threshing, bailing and related services	2	**0**	**0**

Source: CPBI 2012.

For forestry markets, only one of four have data in 2012. The operation of forest tree nurseries did not have a ratio over 0.3 for both measures.

Table 23. Research & Development (R&D) Expenses for Forestry, 2012

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A02110	Growing of timber forest species (e.g. gemelina, eucalyptus, etc.), planting, replanting, transplanting, thinning and conserving of forest and timber tracts	-	-	-
A02120	Operation of forest tree nurseries	30	**0.07**	**0.28**
A02201	Production of roundwood for forest-based manufacturing industries	-	-	-
A02400	Support services to forestry	-	-	-

Source: CPBI 2012.

For the fishing markets, while several have available data for their R&D expenditures, over half did no in 2012. Additionally, none have achieved a ratio of over 0.5 for either measures.

Table 24. Research & Development (R&D) Expenses for Fishing, 2012

2009 PSIC Code	Industry Description	R&D Expense (P'000)	R&D Expenses/ Value of Output (%)	R&D Expenses/ Value Added (%)
A03111	Ocean fishing, commercial (using vessels over 3 tons)	124	**0**	**0**
A03112	Coastal fishing, municipal (using vessels of less than 3 tons)	-	**-**	**-**
A03121	Catching fish, crabs and crustaceans in inland waters	s	**-**	**-**
A03130	Support service activities incidental to fishing	s	**-**	**-**
A03211	Operation of freshwater fishpond, except fish breeding farms and nurseries	949	**0.06**	**0.35**
A03212	Operation of freshwater fish pens and fish cage	15	**0**	**0.01**
A03213	Operation of freshwater fish breeding farms and nurseries		**-**	**-**
A03214	Culture of freshwater ornamental fish	19	**0.01**	**0.02**
A03221	Operation of marine fish tanks, pens, cage except fish breeding farms and nurseries in sea water	-	**-**	**-**
A03222	Operation of marine fish breeding farms and nurseries		**-**	**-**
A03224	Gathering of fry	-	**-**	**-**
A03240	Prawn culture in brackish water	864	**0.13**	**0.47**
A03251	Culture of freshwater crustaceans (except prawns), bivalves, and other mollusks	38	**0**	**0.01**
A03261	Pearl culture	-	**-**	**-**
A03271	Seaweeds farming	s	**-**	**-**

Source: CPBI 2012.

4.3. The Case of PRDP Enterprise Development Component (I-REAP)

The F2C2 has specified seven outcomes from farm consolidation, integration and expansion: (a) economies of scale in commodity production; (b) linkages to commodity markets and global value chain; (c) improved bargaining and market power of producers; (d) better access to credit, financing and investments, and access to domestic and export markets; (e) greater availability and wider utilization of agri-aqua technologies, farm mechanization, logistics and transport support, and post-harvest facilities; (f) big brother-small brother partnerships, joint ventures, and contract growing arrangements; and (g) raise overall productivity of the sector and the incomes of farmers and fishers. AFMA on the other hand, has only specified four. So, the four outcomes which are supposed to result from are established: economies of scale, negotiating power, research and hiring of professional managers.

In this section, we use a case study approach to discuss the state of consolidation and integration in the agriculture sector which the Department of Agriculture (DA) has evidently facilitated. The Philippine Rural Development Project (PRDP) is used because it is a nationwide project and is probably the only one that systematically intervened and organized farmers/fisherfolk into enterprises which promote consolidation of outputs and integration of processes on a national

scale. Before discussing these outcomes, the profiles of the enterprises are characterized in Tables 25 to 27.

4.3.1. Profiles of Enterprises

The PRDP as a program aims to accomplish the following: (a) at least five percent (5%) increase in annual real farm incomes of PRDP in household beneficiaries; (b) 30% increase in income for targeted beneficiaries of enterprise development; (c) seven percent (7%) increase in value of annual marketed output; and (d) twenty percent (20%) increase in number of farmers and fishers with improved access to DA services. It establishes micro, small and medium agriculture enterprises that cover crops, poultry and livestock, and fishery sub-sectors. The enterprises are relatively spread in 15 regions. Region 3 has the highest number of enterprises followed by Regions 7 and 8. But in terms of number of members, Region 2 has the largest total, followed by Regions 3 and 5.

In terms of number established, most of the enterprises were established in 2015, and correspondingly the highest number of members. PRDP appears to wind down in 2019-2020 with decreasing number of enterprises established.

The distribution of enterprises across the commodity groups shows that in terms of number of enterprises, 42% cover crops but account for 53% of total 148,000 members. Poultry and livestock enterprises cover 20% of total and 18% of the members. Fishery comprises 14% of total enterprises but only 8% of total members. The agricultural services account for 18% of total enterprises and 17% of the members.

Table 25. Enterprises by Size, 2013-2020

Key Commodity Sector	Micro Enterprises		Small Enterprises		Medium Enterprises		Total No. of Enterprises	Total No. of Members
	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members		
Palay	2	169	6	1,106			8	1,275
Palay/land prep	39	9,592			1	411	40	10,003
Coconut	29	1,783	58	6,988	13	4,831	100	13,602
Corn	7	960					7	960
Pineapple			1	60	1	9,140	2	9,200
Banana	5	554	15	3,909			20	4,463
Cacao/tablea/ chocolate	3	153	43	3,140	15	1,358	61	4,651
Coffee	3	331	41	6,490	7	556	51	7,377
Calamansi			2	741			2	741
Mango	1	64	10	972	1	-	12	1,036
Cashew/pili/peanut	3	508	4	2,036	1	116	8	2,660
Rubber			6	416	3	778	9	1,194
Abaca	5	214	17	1,658	13	4,591	35	6,463
Cassava	2	71	15	1,312	5	250	22	1,633
Mungbean	1	1,173	5	3,555	1	407	7	5,135
Onion	1	242	4	1,306	1	121	6	1,669
Tomato	3	1,186	3	104			6	1,290

Key Commodity Sector	Micro Enterprises		Small Enterprises		Medium Enterprises		Total No. of Enterprises	Total No. of Members
	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members		
Rootcrop	15	730	6	488			21	1,218
Vegetables	19	2,534	9	963			28	3,497
Poultry	25	1,112	35	2,066			60	3,178
Livestock	66	3,605	65	9,427	22	10,394	153	23,426
Fish/milkfish/grouper	15	2,227	10	1,187	1	1,876	26	5,290
Crab	4	162	5	228			9	390
Seaweeds	37	2,214	36	1,591	23	1,931	96	5,736
Shellfish	14	192					14	192
Machinery services	136	19,862					136	19,862
Custom service	39	3,574	4	1,537	1	179	44	5,290
Irrigation facilities	4	150					4	150
Postharvest facility	2	208	1	40			3	248
All other	46	4,651	5	875	19	650	70	6,176
TOTAL	526	58,221	406	52,195	128	37,589	1,060	148,005

Source: PRDP I-REAP 2021.

In terms of type of projects, it is interesting to note that 42% of the projects benefiting enterprises are for restoration/rehabilitation, while 30% are start-up. What is promising is that 25% of the enterprise projects are already for upgrading/expansion. The largest number of enterprises requiring restoration/rehabilitation are those doing machinery services, Among the start-ups, the largest number of enterprises are in seaweeds. Far second are those engaged in coconut, poultry, livestock, and cacao/tablea/chocolate. Interesting to note that enterprises in livestock top the list for upgrading/expansion.

Table 26. Enterprises by Type of Sub Project (SP)

Key Commodity Sector	Global Environmental Facility (GEF)		Restoration / Rehabilitation		Start-up		Upgrading / Expansion		Grand Total	
	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members
Palay			2	169	1	25	5	1,081	8	1,275
Palay/land prep			39	9,592			1	411	40	10,003
Coconut			28	1,699	39	7,665	33	4,238	100	13,602
Corn			7	960					7	960
Pineapple					1	60	1	9,140	2	9,200
Banana			1	106	13	3,859	6	498	20	4,463
Cacao/tablea/chocolate					34	2,945	27	1,706	61	4,651
Coffee					13	2,914	38	4,463	51	7,377
Calamansi					1	432	1	309	2	741
Mango					10	841	2	195	12	1,036
Cashew/pili/peanut			2	278	5	1,872	1	510	8	2,660
Rubber					6	416	3	778	9	1,194
Abaca			1	46	17	5,098	17	1,319	35	6,463
Cassava			2	71	15	1,312	5	250	22	1,633
Mungbean			1	1,173	5	3,555	1	407	7	5,135
Onion					4	621	2	1,048	6	1,669
Tomato			2	174	1	53	3	1,063	6	1,290
Rootcrop			14	756	2	155	5	307	21	1,218
Vegetables			19	2,534	9	963			28	3,497
Poultry			25	1,112	35	2,066			60	3,178
Livestock			55	3,319	35	7,460	63	12,647	153	23,426

Key Commodity Sector	Global Environmental Facility (GEF)		Restoration / Rehabilitation		Start-up		Upgrading / Expansion		Grand Total	
	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members	No. of Enterprises	No. of Members
Fish/milkfish/ grouper	7	340	7	1,840	2	384	10	2,726	26	5,290
Crab	1	50	3	112	5	228			9	390
Seaweeds	23	1,326	7	484	61	3,647	5	279	96	5,736
Shellfish			2	109			12	83	14	192
Machinery services			136	19,862					136	19,862
Custom service			39	3,574	3	1,506	2	210	44	5,290
Irrigation facilities			4	150					4	150
Postharvest facility			2	208	1	40			3	248
All other			46	4,651	5	431	19	1,094	70	6,176
Grand Total	**31**	**1,716**	**444**	**52,979**	**323**	**48,548**	**262**	**44,762**	**1,060**	**148,005**

Source: PRDP I-REAP 2021.

As indicated above, 2015 and 2016 were the years with the largest number of enterprises benefited by PRDP projects. In 2015, the livestock enterprises were the top beneficiaries. They were followed by palay/land preparation enterprises, and custom services. By 2016, of the 265 enterprises which benefitted from PRDP projects, 44% were engaged in machinery services. Seaweed enterprises were the top beneficiaries in 2017. In 2018, the PRDP focused went to poultry and coconut enterprises while in 2019 and 2020, coconut and seaweeds enterprises.

Table 27. Enterprises by Commodity Group, by Year

Key Commodity Sector	2013		2014		2015		2016		2017		2018		2019		2020		Total No. of Ent.	Total No. of Mbrs.
	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.		
Palay					1	53	2	270	4	653			1	299			8	1,275
Palay/land prep					**37**	9,520	2	72	1	411							40	10,003
Coconut			33	6,482	29	4,086	6	1,152			17	850	9	581	6	451	100	13,602
Corn					6	895	1	65									7	960
Pineapple					1	9,140					1	60					2	9,200
Banana			1	29	1	26	5	748	4	464	6	748	3	2,448			20	4,463
Cacao/tablea/chocolate					32	1,649	7	264	10	1,171	5	938	7	629			61	4,651
Coffee			20	3,905	10	808	1	442	10	1,002	8	740	2	480			51	7,377
Calamansi	1	432									1	309					2	741
Mango			2	92	2	195			3	509	1	96	4	144			12	1,036
Cashew/pili/peanut			1	116	3	508	3	1,526	1	510							8	2,660
Rubber			5	291	2	338	1	125			1	440					9	1,194
Abaca			6	784	7	3,853	4	1,043	9	377	3	185	6	221			35	6,463
Cassava			6	302			14	1,185					2	146			22	1,633
Mungbean					1	1,173	1	407	5	3,555							7	5,135
Onion			2	153	2	1,169			1	226					1	121	6	1,669
Tomato					2	174			3	104	1	1,012					6	1,290
Rootcrop			4	236	4	184	6	298	2	150	4	213	1	137			21	1,218
Vegetables			7	879	13	1,522	5	686	3	410							28	3,497
Poultry			6	147	15	708	7	317	6	504	24	1,313	2	189			60	3,178
Livestock			47	4,070	**48**	4,003	17	3,664	21	6,551	12	3,643	2	1,344	6	151	153	23,426
Fish/milkfish/grouper			5	181	2	1,521	8	498	5	619	5	595	1	1,876			26	5,290
Crab			2	86	2	76	1	132							4	96	9	390
Seaweeds					20	1,045	31	2,737	25	937	6	452	4	222	10	343	96	5,736
Shellfish			14	192													14	192
Machinery services					20	4,602	**116**	15,260									136	19,862
Custom service			2	1,444	**36**	3,394	3	180	1	131	1	31	1	110			44	5,290
Irrigation facilities					1	35	3	115									4	150
Postharvest facility							2	208	1	40							3	248
All other			6	554	27	3,119	19	1,999	15	283	3	221					70	6,176

Key Commodity Sector	2013		2014		2015		2016		2017		2018		2019		2020		Total No. of Ent.	Total No. of Mbrs.
	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.		
Total	1	432	169	19,943	324	53,796	265	33,393	130	18,607	99	11,846	45	8,826	27	1,162	1,060	148,005

Source: PRDP I-REAP (2021).

The distribution of the enterprises by commodity groups by size and year shows that 73% of the coconut and all the coffee in 2014 are small enterprises. In 2015, all enterprises engaged in palay/land preparation and coconut, fall under micro enterprises.

The highest number of memberships was registered in 2017 with 7,055 members in 27 enterprises, or an average of over 260 members per enterprise. This could be due to the unusually high membership in just 2 medium livestock enterprises with a total of 4,123 individuals, or an average of 2,061 members. For the same year, there are 2,295 members in 14 small livestock enterprises or an average of just 164 members per enterprise. There is also a very erratic trend in the number of enterprises across the period in small livestock enterprises from 31 in 2014, down to 10 in 2015, just 1 in 2016, up to 14 in 2017, down to 5 in 2018, and 2 in 2019 and 2020. On the other hand, membership in the small livestock enterprises averaged at 1,416 across the same time period, from a low of 1,107 to a high of 1,774, except for 2017 and 2020. As to poultry, 2018 recorded the highest membership of 1,313 in 504 enterprises, all of which are small enterprises.

The medium fish/milkfish/grouper enterprise has the highest membership in 2019 with 1,876 members. Membership in micro fish/milkfish/grouper enterprise substantially grew from 131 in 2014 to 1,521 in 2015, went down to 498 in 2016, and 77 in 2017. Meanwhile membership in small fish/milkfish/grouper enterprises slightly grew from 542 in 2017 to 595 in 2018.

Micro seaweed enterprises appear to be getting smaller with gradual decreasing memberships from 915 in 2015, to 778 in 2016, 459 in 2017 and 62 in 2019. The same trend appears to be true in all types of seaweed enterprises. Figures for all crab and shellfish enterprises are too negligible to establish a pattern.

Machinery services, which are all micro-enterprises, have the most members of 15,260 in 116 enterprises, or 131 members for each enterprise, in 2016. This number of memberships is almost four times higher the previous year at 4,602 individuals in 20 enterprises. In contrast, custom service enterprises had 1,444 members in 2 enterprises in 2014, which rose to 3,394 in 2015, but drastically decreased to 180 in 2016, 131 in 2017, 31 in 2018, and rose to 110 in 2019.

Irrigation facilities, which are all micro enterprises, had 35 members in 2015 in one enterprise and 115 members in 3 enterprises in 2016. For all other enterprises, membership peaked to 3,119 in 2015 but steadily decreased to 1,999 in 2016, 283 in 2017, and 221 in 2018.

4.3.2. Consolidation/Integration Outcomes

Out of the 1,060 enterprises with over 148,000 members listed, for the outcomes, 23 projects/enterprises featured in PRDP reports are used (see Appendix Table 3 for details).

Table 28. List of PDRP cases

No.	Coop Name	Enterprise	PRDP Intervention
1	Hojap Multi-Purpose Cooprative (HMPC)	Ifugao coffee farmers' cooperative	Php 13.98 million worth coffee enterprise
2	Benguet Arabica Coffee Enterprise (BACE)	Benguet coffee farmers	Php 4. 13-M worth coffee trading center
3	Kinabugawan Farmers Producers Cooperative (KIFAPCO)	Banana Farming Plants Hope for Progress in Veruela	
4	Maragusan Multipurpose Cooperative (MAMPCO)	Cacao Enterprise Expands Maragusan Coop Operations	Tablea processing center
5	San Isidro Upland Farmers Multi-purpose Cooperative (SIUFMULCO)	Harvesting money in Abaca	Hauling trucks
6	Nabunturan Farmers Multipurpose Cooperative (NAFAMCO)	PRDP Project to boost dairy Industry in Davao de Oro	Initial stock of dairy cattle; harvest milk
7	Bonifacio Multipurpose Cooperative	Consolidation and marketing of Goats with Multiplier Farm and Contract Growing Subproject	Transport, marketing facilities and farm equipment amounting to P2.6 million; livestock trading post
8	Northern Mindanao Federation of Dairy Cooperatives (NMFDC)	Boost dairy production in Mindanao	Upgrade production equipment to extend product shelf life; P69-M PRDP fund to boost dairy production in Mindanao
9	Yakap at Halik Multipurpose Cooperative Quezon 2 (Yakap at Halik)	Grouper enterprise benefits Padre Burgos fisherfolks	
10	Multiple enterprises	AF2 with EU Grant to further implement interventions benefitting farmers and fisherfolk affected by the pandemic	PhP13.4-B rural infrastructure and PhP2.3-B rural enterprise subprojects are in the pipeline that aim to benefit 324,000 farmers and fisher households
11	Sabang Seaweed Growers Association (SSGA),	Sibunag Seaweed Production and Marketing Enterprise takes off through GEF support	Provided with production inputs such as seedlings, ropes and posts
12	San Agustin Dairy Cooperative (SADACO)	Dairy Carabao Enterprise of Isabela" -processing of raw carabao (buffalo)	Technical support provided by PRDP in the form of dairy processing equipment

No.	Coop Name	Enterprise	PRDP Intervention
		milk into various dairy products	
13	Kalinga Coffee Cluster Agricultural Cooperative (KCCAC).	Revitalizing Kalinga's coffee industry - Kalinga Integrated Coffee Processing and Marketing Enterprise	Bulanao to Amlao Farm-to-Market Road (FMR) is a 15.8-kilometer rural access road covering barangays Malin-awa, Balawag, Amlao, Suyang, and Lucog
14	Hundred Islands Farmpreneurs Association (HIFA) in Alaminos, Pangasinan,	Tomato consolidation facility	Total project cost of Php1.9 million, the consolidation facility is expected to increase the income of salad tomato growers by reducing postharvest losses and help stabilize the price of tomato in the market
15	Rural Improvement Club (RIC) Federation of Kape Maramag	Women charting of Mindanao's coffee industry	Coffee processing
16	Calumpang Corn Growers Association (CCGA)	Tayabas corn association becomes self-sufficient	Facilitate access to good quality seeds
17	Cabugao Mango Farmers and Multi-Purpose Association (CMFMPA)	Mango Packaging Center in Ilocos Sur	Mango Packaging Center intended to reduce postharvest losses and to provide a multi-purpose area for mango farmers to conduct pre-marketing activities (i.e. sorting, grading, and packing) for the production of high quality mangoes to access and cater export markets.
18	Apayao's seven municipalities. Luna town, the provincial capitol and main commercial center		Eight warehouses worth P86.63-million in Apayao to boost farmer-market link
19	Sindangan Farmers Cooperative & Marketing Association (Sindangan-FACOMA)	Cacao project in Zamboanga del Norte to help satisfy demand for sikwate	Php13.4 million startup enterprise covering input provision for increased production under the first package to be operated by Sindangan Farmers Cooperative & Marketing Association (Sindangan-FACOMA). Second package will include consolidation of wet beans from farmers for fermenting and drying, packaging, and delivery to buyers.
20	Naguilian Christian Multi-purpose Cooperative (NCMPC)	Mechanization boosts Cagayan Valley farm efficiency	Mechanization support
21	Naujan Farmers' Association (***NaFA***)	*Mindoro calamansi farmers'*	Trading center

No.	Coop Name	Enterprise	PRDP Intervention
22	Dupligan farmers Multipurpose Cooperative (DUFAMCO),	Coffee processing and marketing	The P14.8 million funding assistance intended for the Kalinga Integrated Coffee Processing and Marketing Enterprise sub project is expected to improve the production of coffee beans in this part of the Cordillera highlands
23	Pinoy Lingap-Damayan Multipurpose Cooperative (PLDC),	Boosts commercial value of abaca	A P25.4-million worth of enterprise development assistance package from PRDP

Source: PRDP (2021)

a. Economies of Scale

As shown in Appendix Table 3, there are indications that the establishment of enterprises which required farmers/fisherfolk to organize through the PRDP may have resulted in some economies of scale with reports of increased volumes of outputs. The PRDP enterprises include consolidation, processing and marketing activities. These activities increased capacities to produce and to meet certain output volume requirements of institutional or big buyers. The improved volumes were deemed to have contributed to higher incomes for the enterprise members. While the reports were positive, there is no evidence that the enterprises benefited from economies of scale, i.e., decreasing unit cost of production as quantity of output is increased.

b. Negotiating Power

In terms of negotiating powers, the compiled PRDP "success stories" had even fewer mentions of improved prices for outputs indicating that the enterprises were in better negotiating positions. Some PRDP reports indicate increased prices of products of enterprises. Among the enterprises featured not all explicitly cited the improvements in output prices. Hardly ever mentioned was the access of beneficiaries to bulk prices for inputs. There were however, mentions of access to better quality inputs like seeds.

c. Research

Research is probably used as a measure of potential to remain in business and be sustainable. When enterprises are able to spend and carry out research, this may indicate capacity for continuous improvement in product and/or process(es), both will contribute to sustaining the enterprise operations. It is apparent that most enterprises are really in their early stages of operations. To expect them to be thinking beyond the immediate goals of producing and processing enough volumes of outputs, and finding markets, is probably asking too much. There was actually nothing in the reports that suggest enterprises are already in a position to carry out and spend for research.

d. Evidence of Hiring Managers

While Appendix Table 3 is not fully filled out under hiring of professional managers, it appears that the set up as designed by PRDP was meant for enterprises to hire one to help ensure success in operations.

4.4. The Case of ARBO-AVA

A second case study is a project by the Department of Agrarian Reform for its beneficiaries. Like the PRDP, this is another agriculture project which explicitly promotes and implements consolidation and integration. This part heavily draws from Pantoja, et al (2017).

4.4.1. Profiles of Enterprises

Cooperative respondents for each commodity have investor counterparts. For Pineapple, only one (Dole Philippines, Inc.) is the investor counterpart of two cooperative respondents (Table 29). For sugarcane, the investors take the form of government financial institutions extending loans.

Table 29. List of cooperative and investor-respondents by crop

Crop	Cooperative	Investor	Location of Cooperative/ARB
Banana	Wadecor Employees Agrarian Reform Beneficiaries Multi-Purpose Cooperative (WEARBEMPCO) officials & members	Tagum Agricultural Development Co., Inc. (TADECO)	Minda, Carmen, Davao del Norte
	Alberto M. Soriano Employees Fresh Fruits Producers Cooperative (AMSEFPCO) officials & members		Sampao, Kapalong, Davao Del Norte
	Tagnanan CARP Beneficiaries Cooperative (TCBC) officials & members	UNIFRUTTI, Philippines, Inc.	Tagnanan, Mabini, Compostela Valley
	Laak farmers of Compostela Valley	SUMIFRU - Philippines, Corp.	Barangay Laak, Compostela Valley
Pineapple	DOLEFIL Agrarian Reform Beneficiaries Cooperative (DARBC) officials & members	DOLE-Philippines, Inc. (DOLEFIL)	Polomolok, South Cotabato
	Farmers from various barangays of Polomolok, South Cotabato	DOLE-Philippines, Inc. (DOLEFIL)	Polomolok, South Cotabato
Sugarcane	KAMAHARI Agri-Based Multi-Purpose Cooperative officials & members	No investor but Philippine Sugar Corporation (PHILSUCOR) is the source of loan	Camp Abejar, Lumbangan, Nasugbu, Batangas
	Taludtod Multi-Purpose Cooperative officials & members	No investor but Land Bank of the	Brgy. Taludtod, Balayan, Batangas

Crop	Cooperative	Investor	Location of Cooperative/ARB
		Philippines (LBP) is the source of loan	
	Lucban Multi-Purpose Cooperative officials & members	No investor but PHILSUCOR is the source of loan	Brgy. Lucban, Balayan, Batangas

Source: Pantoja, et al (2017)

The most prevalent type of agribusiness venture agreement is lease at 77%, while growerships are far second at 20%. Other lesser known arrangements include joint ventures, marketing with incentives, contract of development, management contracts and rice retailing.

Table 30. Number and area covered by type of Agribusiness Venture Arrangement (AVA), 2015

Type of Agribusiness Venture Arrangement	Number of AVAs	Percent to Total AVAs	Area Covered (Has.)	Percent to Total Area
Lease Agreements	**334**	***77.14***	**33,016.93**	***63.16***
Lease agreement	*222*	51.27	22,015.11	42.12
Lease contract	*90*	20.79	6,570.63	12.57
Leaseback agreement	*22*	5.08	4,431.19	8.48
Growership Agreements	**88**	***20.32***	**12,605.26**	***24.12***
Marketing contract	*4*	0.92	4,458.00	8.53
Growership	*33*	7.62	4,391.82	8.40
Growership/contract growing	*37*	8.55	940.12	1.80
Growership/contract growing (agro-forestry)	*1*	0.23	272.00	0.52
Contract growing	9	2.08	1,246.60	2.38
Banana production purchase agreement	*1*	0.23	27.00	0.05
Banana supply and marketing agreement	*3*	0.69	1,269.72	2.43
Other Agreements	**11**	***2.54***	**6,649.09**	***12.72***
Joint venture agreement	*4*	0.92	5,602.44	10.72
Marketing with incentives	*2*	0.46	846.00	1.62
Contract of development agreement	*1*	0.23	57.40	0.11
Management contract	*2*	0.46	54.25	0.10
Rice retailing	*1*	0.23	30.00	0.06
Not indicated	*1*	0.23	59.00	0.11
Total	**433**	**100.00**	**52,271.28**	**100.00**

Source: Pantoja, et al (2017)

Close to forty-five thousand four hundred ARBs holding over 52,000 hectares entered into various agribusiness agreements as of October 2015, or an average of one hectare per ARB. Banana is grown in 28% of total area by close to 15,000 ARBs. Pineapple follows at 27% of total area, with the ARBs holding an average farm size of 0.7 hectare. Oil Palm is third in use at 24% of total area with the ARBs holding on average a much bigger farm size of 3 hectares.

Table 31. Area and number of ARBs covered under the Agribusiness Venture Agreement as of October 2015

Crop	Area (Ha)	Number of ARBs
All Banana	14,501.07	14,866
Banana	*10,452.67*	*11,726*
Banana (Cavendish)	*3,993.80*	*3,054*
Banana (Bongolan, Organic)	*54.60*	*86*
Oil Palm	12,453.57	4,019
Pineapple	14,185.15	19,864
Pomelo	92.41	552
Sugarcane	3,777.20	2,619
Cacao	1,327.71	888
Other Crops (Rubber, HVCs, Papaya, Rice, Fruit Tees, etc.)	5,934.16	2,591
Total	**52,271.28**	**45,399**

Source: Pantoja, et al (2017)

In 2012, there were 6 operational Block Farms, 4 of which were in Batangas, and only one outside Luzon. Twenty-two were added in 2013, 15 in Visayas and one in Mindanao.

Table 32. Operational Block Farms as of 2014

Year	No.	Location	Name of Organization
2012	1	Magalang, Pampanga	Binhi ni Abraham
	2	Balayan, Batangas	Lucban MPC
	3	Nasugbu, Batangas	Kamahari
	4	Nasugbu, Batangas	Damba
	5	Lian, Batangas	Prenza
	6	Pontevedra, Negros Occ.	Kauswagan & Gen. Malvar
2013	7	Magalang, Pampanga	PASAMA
	8	Pili, Camarines Sur	Had. Salamat
	9	Tampalon, Kabankalan City, Negros Occidental	Minaba MPC
	10	Capiz, Iloilo	Vizcaya ARB MPC and Lantagan ARB, MPC
	11	Sta. Catalina, Negros Oriental	Manggolod Farmers Mpc
	12	Canlaon City, Negros Occidental	Ramrod Agricultural Multi-Purpose Coop. (RAMPUCO)
	13	Caputatan, Medellin, Cebu	ANARBA
	14	Ormoc, Kananga, Leyte	Boroc Agricultural Producers MPC
	15	Quezon, Bukidnon	J.A. Agro Employees Farmers Beneficiaries Livelihood Association
	16	Paniqui, Moncada, Ramos, Anao, Gerona, Tarlac	Northern Cluster Producers Coop (NCPC)
	17	Lauan, Patnongon, and Bugasong, Antique	GMJ ARB Coop and ASSMMSA

Year	No.	Location	Name of Organization
	18	Passi, San Enrique, Iloilo	JAGUIMITAN-JARBEMCO and MAPILI-CATUBAY
	19	Escalante, Negros Occidental	Don Esteban ARB (DEARBA) and Had. Bongco Farmers Ass'n (HABFA)
	20	Cadiz City, Negros Occidental	PARAISO Food Workers ARB (El Sansi ARB)
	21	Cadiz City	Hacienda Bernardita
	22	Talisay City, Negros Occidental	CASA MPC
	23	La Carlota, Negros Occidental	NARC
	24	Manjuyod, Negros Occidental	SYCIP Plantation Farm Workers
	25	Tanjay, Negros Oriental	San Julio Farm Workers MPC
	26	Mabinay, Negros Oriental	SAMAC (SUFARMFUCO)
	27	Bais City, Negros Occidental	KASFARBECO
	28	Bayawan, Negros Oriental	LAPAY (LARBEMCO)

Source: Pantoja, et al (2017)

Of the 9 respondents, 3 adopted block farming, 2 growership, 2 lease, one leaseback and one combination of leaseback and growership. Six of the respondents are collectively managed and two are managed individually.

Table 33. Schemes adopted by respondents, type of CLOA and type of management

Name of Coop	Scheme	Type of CLOA	Type of Management
Tagnanan CARP Beneficiaries Cooperative (TCBC)	Growership	Collective (but started to issue individual CLOAs)	Collective Management
AMS Employees Fresh Fruits Producers Cooperative (AMSEFPCO)	Growership	Collective	Individually Managed
DOLEFIL Agrarian Reform Beneficiaries Cooperative (DARBC)	Leaseback and Growership	Collective	Collective Management
Wadecor Employees Agrarian Reform MPC (WEARBEMPCO)	Leaseback	Collective	Collective Management
ARBs/farmers of Brgy. Laak, Compostela Valley	Lease	Individual	Collective Management
ARBs/farmers from various barangays of Polomolok, South Cotabato	Lease	Individual	Collective Management
KAMAHARI Agri-Based Multi-Purpose Cooperative (KAMAHARI MPC)	Sugarcane Block Farming	Collective	Collective Management
Taludtod Multi-Purpose Cooperative	Sugarcane Block Farming	Individual	Individually Managed
Lucban Multi-Purpose Cooperative	Sugarcane Block Farming	Collective CLOA initially given;	Collective Management

	have started issuing individual CLOAs

Source: Pantoja, et al (2017)

4.4.2. Consolidation/integration Outcomes

a. Economies of Scale

The contract growing arrangements must have resulted in consolidation of outputs. There are indications that the AVA farmers were able to access inputs and therefore produce more per hectare.

b. Negotiating Power

The conditions common to AVA arrangements are fixed rental rate per hectare per year, but some have automatic increase or lease renewal after certain rental period. Other notable but not common conditions include additional productivity incentives, investor's contribution to retirement relief fund, employment preference, hospitalization and burial assistance to ARBs.

As indicated in Tables 34 to 35, the ARBs who were members of cooperatives were able to negotiate better than individual farmers.

Table 34. Terms and conditions of ARBS/ARBOs and investors

Contracting Parties/Item	Terms and Conditions in Contract
Coop: Wadecor Employees ARB MPC (WEARBEMPCO) Investor: Tagum Agricultural Development Co., Inc. (TADECO)	
Amount of Lease Rental	Php 8,000/ha/yr with Php1,000/ha/yr increment every 5 years 5 years (to be reviewed after 5 years)
Terms on payment of land amortization	Amt. of Amortization: Php 3,066.67/yr. deducted on lease rental
Other terms (e.g., assured employment of another household member upon retirement, guarantee payment, hospitalization, etc.)	**Economic Benefits:** 1**) Beneficiary Livelihood Support Program** - Php8,000/ha/yr**; 2) Retirement Relief Fund**-Php0.70/box for the first 2 years, Php0.80/box for the second two years, and Php0.90/box for the last year prior to the next review, which provides the individual retired ARB with an average Php7,000/year; **3) Coop share** from the sales of production waste and recyclable materials-Php 1.00/kl.; **4) Productivity Incentive Program** (PIP)- average of Php19,145.82/employed ARB/year; **5) Quality Incentive Program** (QIP)-Php14,571.48/employed ARB/year; **Employment Security**: 1) preference of ARBs in Manpower reduction; and 2) preference of ARBs and their dependents in employment; 3) employment of dependent as replacement of retired ARBs; **Cooperative Ventures Livelihood Activities**: 1) money-lending; 2) job contracting; 3) trucking services; 4) consumer store; 5) Homelots; 6) Hospitalization(retirees); 7) Cash Gifts

Contracting Parties/Item	Terms and Conditions in Contract
Coop: AMS Employees Fresh Fruits Producers Cooperative(AMSEFPCO) Investor: DOLE-STANFILCO	
Terms of price of banana/pineapple	Assumption - 4,000 boxes/ha/yr; ARB pay for 3,000 boxes at $0.75/ARB/yr. Buying Price - $3.15/box Total cost/box Php 110.00 98% income goes to ARB and 2% share to coop
Terms on payment of land amortization	Php 5,000/ha/yr deducted by AMSEFPCO from ARB's proceeds
Other terms	DOLE (Investor) gives subsidy to ARBs: fertilizer (Php48,000/yr.); drainage rehabilitation and maintenance (Php21,000/yr); harvesting (Php10/bunch) and labor (Php12.00/box-deducted to ARB) while ARBs in charge of farm operation. ARB receives total subsidy from DOLE amounting to P135,000/year for banana production.
Coop: Tagnanan CARP Beneficiaries Cooperative (TCBC) Investor: UNIFRUTTI	
Terms of price of banana/pineapple	Class A (hand pack) - $3.88/box; Cluster pack - $4.88/box; Small Hand $2.20@13.5 kilos/box; $0.35/box - deductible as development cost and this is paid thru UNIFRUTTI; reviewed every two years
Terms on payment of land amortization	None
Other terms	Conducts economic review every two years; provides Php15,000 cash advance/ARB payable within 1 year; trucking services; inputs; hospitalization (Php200,000/yr/ARB); financial assistance and relief goods (principle 7); burial assistance; patronage refund and dividend
Coop: DOLEFIL Agrarian Reform Beneficiaries Cooperative (DARBC) Investor: DOLE Philippines, Inc.	
Amount of Lease Rental (for lease arrangement)	**Before (1998)**: rental started at **Php 8,000/ha/yr**. and a production bonus of P500/ha/yr. with 7% escalation rate per annum **Present (2017)**: **Php 24,250/ha/yr**. (combined rent and production bonus) at 3% annual escalation paid annually in advance
Terms of price of banana/pineapple (for growership arrangement)	DOLEFIL guaranteed a net income of Php 50,000.00/ha/yr. Deductible expenses are: labor expenses and farm materials/supplies for farm activities undertaken by both parties; expenses for farm inputs incurred by the investor; rental and related expenses trucking services undertaken by the coop; rental and other related expenses for utilization of the investor's equipment and machineries in the grower area and expenses for security services as incurred by the investor.
Terms on payment of land amortization	Php 8,000/ha/yr - paid by DARBC and then deducted to ARB's land rental fee/income
Other terms	o DOLEFIL undertakes or performs the farming activities and other related activities effectively and efficiently in accordance

Contracting Parties/Item	Terms and Conditions in Contract
	with the previously agreed farm plan and sound agricultural practices o DOLEFIL hires farmworkers to undertake farming and related activities from DARBC's partner cooperative or, at DARBC's option o DOLEFIL regularly utilizes DARB's spraying equipment and trucks in their other operational areas and will pay DARBC based on its prevailing contract rates
Individual farmers from brgy. Amor Cruz, Laak, Compostela Valley; Investor - SUMIFRU (PHILS.) CORP.	
Amount of Lease Rental (for lease arrangement)	Php 15,000/ha/year in lumpsum for 5 years and given upon the signing of the lease contract and submission of supporting documents. An additional PhP500/ha/for every two years of the contract until its termination (25 years).
Terms on payment of land amortization	
Other terms	The investor pays advance land rental in case of hospitalization and burial of the lessor. Employment for lessor's relative who will be hired thru the cooperative manpower services.
Individual farmers from various barangays in Polomolok, South Cotabato; Investor: DOLE Philippines, Inc.	
Amount of Lease Rental (for lease arrangement)	Php 30,000/ha/year plus 5 years advance rental and 1 year signing bonus at 10% escalation every 5 years.
Terms on payment of land amortization	Php 1,300/ha/year - deducted by DOLEFIL from ARB's lease rental
Other terms	The rental shall be adjusted and increased on the sixth year from the anniversary date at the rate of 10% of the previous rental for every 5 years, *subject to 5% withholding tax.* Escalation will take effect on the 6th, 11th, 16th and 21st year only; DOLEFIL shall pay the lessor an amount equivalent to five (5) years of the Lease Contract, as advance payment, including the remaining quarterly land rental due for 2017; DOLEFIL shall pay to the lessor a one-time goodwill signing bonus equivalent to one (1) year land rental; The rental shall be paid annually after the fifth year. The cash advances incurred by the lessor before the execution of this contract shall be deductible from the proceeds of the five-year advance payment.

Source: Pantoja, et al (2017)

Table 35 provides some anecdotal evidence on the incomes of ARBs before and during AVAs/SBF. For one ARB respondent, his/her current annual Php12,000 per hectare pineapple lease payment is hardly an improvement from his/her 1999 figure of Php8,000/hectare/year plus Php1,050 monthly allowance, before AVA.

Table 35. Income of ARBs before and during AVAs/SBF

Crop	Income Per ARB	
	Before AVAs	**During AVAs/SBF**
Banana	WEARBEMPCO:	
	a) Employee: Salary	Salary with benefits
	Supervisory: (can't recall)	315,348.96/yr.
	Non-Supervisory: (can't recall)	208,085.78/yr.
	b) ARB: PhP0	46,536.24/yr.
	TCBC	
	a) Employee: Php216,000/annum	
	b) ARB: Php0	**Php480,000/yr**
	AMSEFPCO	
	a) Employee: Salary	
	Supervisory: Php 72,000/yr.	
	Non-Supervisory: Php42,000/yr	
	b) ARB: Php0	**Php720,000/yr.**
	Laak Farmers (**Individual Lease**)	**Php15,000/ha/yr. with Php500 increase** every 2 years
Pineapple	DARBC	
	Leaseback	
	a) Employee: Salary	*Salary*
	b) ARB:	50,000/ha./yr.
	Individual Lease	
	1980's PhP3,000/ha/yr	**Php12,000/ha/yr.** with 10% every 5 years
	1999 - PhP8,000/ha.yr +1,050 monthly allowance	
Sugarcane	Cannot remember exactly but most often incurred losses since they were unable to apply the recommended inputs due to lack of capital	PhP42,100/yr

Source: Pantoja, et al (2017)

Table 36 shows that on average, a non-AVA ARB earns Php47,827 or 67% higher than an AVA ARB. This is largely because their on-farm income is higher by 93% and their off-farm income is higher by 77% than their AVAs ARBs counterparts.

Table 36. Average household income by source, AVAs and non-AVAs ARBs, 2015

Income	AVAs ARBs		Non-AVAs ARBs	
Source of income	Amount (Php)	Percent	Amount (Php)	Percent
Non-Farm Income	10,294.76	35.95	10,480.33	21.91
On-Farm Income	8,459.53	29.54	16,376.95	34.24
Off-Farm Income	5,550.58	19.38	9,830.83	20.55
Remittances	4,333.33	15.13	11,138.89	23.29
Total Income Plus Remittances	28,638.20	100.00	47,827.00	100.00

c. Research

Pantoja, et al. (2017) does not say anything on whether research is part of the AVA activities.

d. Hiring of Professional Managers

It is not apparent anywhere in the report whether the ARBs' AVA had to hire professional managers.

4.5. Analysis of Results

A major limitation of this assessment is that no systematic data have been generated and compiled in connection with AFMA Objective 4. So, the ASPBI, CPBI and Input-Output tables from PSA were used to characterize the state of the horizontal and vertical integration in the agriculture sector. To assess impact, the defined outcomes of integration, consolidation and expansion in Objective 4 were used. This has been a big challenge given the difficulty even in establishing what AFMA interventions were made and whether they included some consolidation of lands and outputs, integration and expansion.

The agriculture sector horizontal integration measures indicate that most crops, livestock, fishing and agricultural services markets are highly concentrated. The high concentration can be indicative of intensity of competition with market shares being concentrated between a small number of firms. The growth of large firms with high market shares may drive up profits, limit innovation and productivity, and increase inequality. Equally important to note is that while the concentrations are high, most crops markets have decreasing trends. For livestock and poultry, five markets have clear increasing trends while 4, with decreasing trends. But for agricultural services, six markets have decreasing trends indicative of increasing competition. For fishing, five markets have increasing concentrations indicating potentially decreasing competition. Farmers/fisherfolk on the wrong end market power can be hurt by high levels of agribusiness concentrations/consolidations.

As to vertical integration, most of agriculture markets are partially integrated and only two sub-sectors each in crops and fishing are highly integrated. This is in stark contrast to poultry and livestock, where almost all markets are highly vertically integrated except for livestock farming. Vertical integration coordinates the use of inputs and outputs to lower costs and reduce risks. It is reflective of the application of management control rather than market forces. At the firm level, it describes the strategy of exercising ownership control in the production of outputs used as inputs by others. Thus, a firm may use vertical integration to increase profitability or decrease risk.

While most of the agriculture sectors are only (weakly) partially vertically integrated, it is interesting to note that for 12 crops markets, almost all poultry and livestock, and fishing markets, the trend is increasing. This observation may suggest that the increase in the number of firms that integrate vertically may be due to the goal of lowering costs and reducing risks.

Vertically integrated enterprises tend to rely on large farms for contract production and maybe less willing to work with small or medium-sized farms which provide less output volume. But since most of remaining small farmers/fishers are unorganized, they will not be able to benefit from the economies of scale, improved negotiating power, and capacities to sustain operations through research and hiring of professional managers.

AFMA Outcomes and Cases

The two cases were selected because they have some elements of integration and consolidation through agriculture enterprises, and data on some outcomes.
In the two cases, the government through DA and DAR developed agriculture enterprises to enable farmers and fisherfolk to benefit from economies of scale, have some negotiating power, focused, efficient and appropriate R&D, and hire professional managers.

In the PRPD enterprises, various interventions which included horizontal and vertical integrations were implemented across 16 regions, commodity groups, type of project, and size of investment. While 39% of the enterprises are in Regions 3, 7 and 8, most of the other regions comprise 3 to 9% of total with the exception of Regions 9 and ARMM with less than 2%. The commodities covered were relatively spread with 20% poultry and livestock, 15% palay/corn/coconut, 14% poultry and livestock, 27% high value crops, and 18% machinery services. The type of projects are varied include 30% start up, upgrading/expansion 24.7%, and 42% restoration/rehabilitation. The fact is that close to 88% are micro and small in terms of investment size. Also, if we consider the total farmers/fisherfolk (8,600,000), the 148,000 member beneficiaries of the 1,060 I-REAP enterprises is about 1.7% of total.
The quick outcome assessment of 23 PRDP enterprises in terms of the four outcomes/outputs suggests that some economies of scale, negotiating power and hiring of professional managers may have been accomplished but there was not a single mention on R&D.

The ARBO AVA case presents models of land consolidation aimed in promoting interests of agrarian reform beneficiaries. The case however, unlike PRDP covers only a few high-value crops such as banana, pineapple, oil palm, and sugarcane mostly in lease and growership agreements. Using the same four outcomes indicators for consolidation, the results of Pantoja, et al. (2017) suggest that the AVAs may be delivering some of the relevant outcomes. However, there is no mention or evidence of research activities nor the hiring of professional managers.

5. Conclusions and recommendations

The piloting of F2C2 is well on its way and perhaps monitoring reports and initial evaluations may be available already. It may however be too early to show clear outcomes and impacts. In this study, we have not included any update nor assessments of F2C2 projects and activities. Note however, that from strategy to program focus, to program guidelines, support and assistance programs, infrastructure support, special complementary programs and projects, incentives, to technical support team and institutional adjustments, the F2C2 appears to take into account already most key elements of a successful clustering program.

This paper reviewed the literature on integration, consolidation and clustering and presented some key characteristics and elements for success. Many of the studies on this topic were conducted in mid 1990s to 2000 and presented the experiences of developed economies. There are not too many recent studies or evaluations for Asia or the Philippines. While clusters tend to form by themselves and evolve over decades, they have common initial stimuli which include availability of raw materials, soil and climatic conditions, proximity to markets, tradition, history and culture.

The theory of change (TOC) framework used in this study largely follows the intents of AFMA Objective 4, tracing linkages from AFMA interventions to outcomes and impacts and applying the TOC in evaluating the extent to which horizontal and vertical integration, consolidation and expansion of agriculture and fisheries activities have increased, using evidence and relevant indicators. Four outcomes were identified: benefit from economies of scale, stronger negotiating position, pursuit of research and development, and hiring of professional managers.

This assessment has been challenging in multiple fronts. First, the AFMA activities/programs meant to achieve Objective 4 have not been clearly defined and identified. Second, AFMA did not have an M&E system with baseline data. Third, the assessment carried out did not have the appropriate data. Nonetheless, the estimated measures of horizontal and vertical integration seem to suggest that most of the agriculture sectors are highly concentrated but only (weakly) partially vertically integrated. These findings have implications on the state of competition for each market and profitability of the industries.

<u>Recommendations</u>

If the results can be validated, this study suggests that there are opportunities to achieve Objective 4 and improve the outcomes for the agriculture, livestock and fishing markets.

- Cluster Development
  While A.O. 27 s2020 on F2C2 appears to be quite extensive in scope and coverage, development of clusters entails policy, infrastructure, and scale challenges. Boxes #1 and #3 present areas for improvement based on the lessons from experiences of developed and developing economies. Looking at entry/exit barriers in industries and regulatory burdens that present efficient functioning will provide better understanding of the state of vertical and horizontal integration. The R&D requirements of clusters need to be addressed by tapping academic and research institutions and systematically linking their them to the

clusters. Cluster projects are supposed to focus on actively engaging both private and public sector stakeholders throughout the process, from cluster selection to strategy formulation and policy implementation. In addition, one-stop shops for dissemination of public information on products and markets can be established.

- M&E System
  An M&E system will help in future planning and fine tuning of consolidation and integration initiatives. In the PRDP cases, an existing Monitoring & Evaluation (M&E) System made possible this quick assessment. The F2C2 has some monitoring and reporting incorporated in the AO 27 which can be improved by taking off from the online M&E system of PRDP. Such system should clearly define and measure all desired outcomes and the corresponding key indicators. For example, aside from the number of clusters supported and number of member companies, it can include the range of cluster activities, sales and exports of all cluster companies, employment and annual change, R&D expenditure (% of sales), R&D project contracts with universities, cluster budget and cluster staff, among others. More importantly, such M&E system should include baseline data for the identified indicators.

- Government Role & Institutional structure
  The essential role of government is to enable – whether through direct access to funds or through less direct means such as the development of enabling policy frameworks, strategic action plans, and well-trained and motivated public servants. The PRDP platform and the F2C2 administrative order are a good starting point. In the current cases, the DA and DAR appear to be working separately yet the success of clustering entails DA, DTI, DOST and the academe, LGUs and private sector systematically working together and collaborating and mainstreamed in the key government agencies.
  As presented in Box 3, the government's role spans from laying the foundation of support, to creating policies which support and encourage not prevent and discourage, promote collaboration and cooperation among networks. For clustering to work, government may need to re-organize government services delivery structures and information delivery services. It will need to create technology centers, allocate resources and investments to maximize impact and send signals, invest in cluster-based R&D and promote the use of incubators, create enabling financing vehicles, among others. There are already

- Horizontal and Vertical Integration.
  The results may be of practical interest in better understanding the state of competition in the different agricultural markets. However, follow up studies can be conducted to focus on some key markets to explain in depth the implications on competition, entry and exit barriers, incentive structures, profitability and sustainability of the small farmers and fisherfolk operations.

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Appendix

Appendix Table 1. Market Concentration (HHI and CR4), 2010-2015

PSIC	Description	HHI 2010	CR4 2010	HH2012	CR4 2012	HHI 2013	CR4 2013	HHI 2014	CR4 2014	HHI 2015	CR4 2015
A01113	Growing of oil seeds (except ground nuts) such as soya beans,sunflower and growing of other oil seeds, n.e.c.	5,889	98								
A01121	Growing of paddy rice, lowland, irrigated	1,925	80	3,251	84	4,683	96	5,978	99	4,655	95
A01122	Growing of paddy rice, lowland, rainfed			10,000	100						
A01130	Growing of corn, except young corn (vegetable)	9,347	100	3,050	98	3,570	99	3,537	99	5,439	100
A01140	Growing of sugarcane including muscovado sugar-making in the farm	132	11	99	12	460	33	158	14	534	38
A01161	Growing of abaca	10,000	100					10,000	100	10,000	100
A01171	Growing of leafy and stem vegetables such as : cabbage, broccoli, cauliflower, lettuce, asparagus, pechay, kangkong and other leafy or stem vegetables	7,865	98	6,580	94	8,820	99	8,124	97	4,443	94
A01172	Growing of fruit bearing vegetables such as: tomato, eggplant, cucumber, amplaya, squash, gourd and other fruit bearing vegetables, n.e.c.	10,000	100	3,423	89	3,636	96	3,314	93	3,076	92
A01181	Growing of onion	10,000	100					10,000	100	10,000	100
A01185	Growing of cassava	8,775	100	10,000	100	10,000	100	8,500	100	8,818	100
A01187	Growing of melons and watermelons			4,411	100	6,762	100	5,171	100	5,633	100
A01189	Growing of other roots, bulbs, tuberous crops and vegetables					10,000	100			10,000	100
A01191	Growing of orchids	6,911	100	1,862	78	2,938	86	2,153	77	2,176	81
A01192	Growing of flowers or flower buds, (except orchids)	5,105	100	2,919	90	2,327	82	2,910	89	2,915	88
A01193	Production or growing of horticultural specialties and nursery products	2,281	85	3,007	93	2,863	84	1,654	73	2,166	84
A01194	Growing of plant materials used chiefly in medicinal/ pharmaceutical or for insecticidal, fungicidal or similar purposes	10,000	100								
A01211	Growing of banana, cavendish	679	45	586	42	516	39	529	39	636	44
A01212	Growing of other banana	3,498	94	2,535	89	2,224	88	2,381	84	2,478	89
A01220	Growing of pineapple	1,390	69	1,078	58	2,695	67	5,633	85	5,357	84
A01231	Growing of calamansi	10,000	100	10,000	100	10,000	100	10,000	100	10,000	100
A01232	Growing of dalandan			10,000	100	10,000	100	10,000	100		
A01234	Growing of pomelo (suha)	10,000	100	9,816	100	8,134	100	8,398	100	8,425	100
A01235	Growing of citrus fruits, n.e.c.	10,000	100								
A01240	Growing of mango	1,459	63	4,173	100	8,622	100	3,175	97	5,819	98
A01250	Growing of papaya			10,000	100			10,000	100		
A01260	Growing of coconut, including copra-making, tuba gathering and coco-shell charcoal making in the farm	2,842	78	914	49	1,665	72	1,517	69	1,876	74
A01271	Growing of coffee	10,000	100	4,591	100	3,837	100	5,205	100	7,759	100
A01272	Growing of cocoa	6,199	100	7,070	100	7,431	100	6,979	97	7,945	100
A01273	Growing of tea	10,000	100								
A01281	Growing of perrenial spices and aromatic crops such as: ginger, pepper, chile, achuete, laurel, etc.					10,000	100	10,000	100	10,000	100
A01282	Growing of plants used primarily in medical/ pharmaceutical purposes such as : lagundi, banaba, ginseng, oregano, etc.			10,000	100	10,000	100	10,000	100	10,000	100

PSIC	Description	HHI 2010	CR4 2010	HH2012	CR4 2012	HHI 2013	CR4 2013	HHI 2014	CR4 2014	HHI 2015	CR4 2015
A01291	Growing of other tropical fruits, e.g. jackfruit, guavas, avocados, lanzones, durian, rambutan, chico, atis, mangosteen, makopa, etc.	6,308	100	3,377	96	5,919	100	2,166	81	2,123	80
A01292	Growing of perennial trees with edible nuts, e.g. pili nuts, cashew nuts, etc			10,000	100	10,000	100	10,000	100	10,000	100
A01293	Growing of rubber tree	1,010	52	1,097	58	882	45	1,621	66	1,355	58
A01296	Growing of oleaginous fruits except coconut			4,555	83	2,987	90	3,096	94	4,315	92
A01299	Growing of other fruits and perennial crops, n.e.c.							10,000	100	10,000	100
A01300	Plant propagation			3,296	89	5,732	100	3,576	98	10,000	100
A01411	Beef cattle farming (including feed lot fattening)	1,477	61	875	47	1,035	52	3,787	87	2,625	81
A01420	Raising of horses and other equines									10,000	100
A01430	Dairy farming			1,385	61	2,195	80	2,336	81	4,169	96
A01441	Sheep farming including sheep shearing by the owner							10,000	100	10,000	100
A01442	Goat farming			9,976	100			4,789	100		
A01450	Hog farming	300	25	365	27	290	24	547	35	417	32
A01461	Chicken production, broiler	2,179	65	547	32	927	49	1,252	55	1,992	61
A01462	Chicken production, layer	5,471	97	330	29	1,069	57	754	44	1,089	58
A01463	Chicken production, native			10,000	100			10,000	100	10,000	100
A01471	Raising of duck broiler			3,798	100	6,660	100	6,453	100	5,018	100
A01472	Raising of quail			2,705	99	5,000	100	5,451	100	7,742	100
A01475	Raising of game fowl			5,585	100	3,096	94	4,687	98		
A01479	Raising of poultry (except chicken), n.e.c.			2,385	76	6,294	99	3,133	96	1,983	85
A01481	Chicken egg production	558	37	1,083	49	870	53	1,233	63	1,572	63
A01482	Duck egg production			5,000	100	10,000	100	10,000	100	10,000	100
A01489	Production of eggs, n.e.c.			10,000	100						
A01491	Sericulture (silkworm culture for the production of cocoon)	10,000	100								
A01492	Apiary (bee culture for the production of honey)			10,000	100	10,000	100	10,000	100	10,000	100
A01493	Vermiculture					10,000	100				
A01496	Raising of semi-domesticated or wild animals including birds, reptiles, insects (e.g. butterfly) and turtles			7,931	100	8,330	100	6,337	100	7,213	100
A01498	Game propagation and breeding activities							10,000	100	10,000	100
A01499	Raising of other animals, n.e.c.			5,000	100			10,000	100	6,400	100
A01511	Operation of irrigation systems through cooperatives	4,378	94	539	34	1,707	75	2,348	85	2,350	82
A01512	Operation of irrigation systems through non-cooperatives	9,984	100	9,968	100	9,998	100	9,996	100	10,000	100
A01520	Planting, transplanting and other related activities	10,000	100			10,000	100	10,000	100		
A01531	Plowing, seeding, weeding, thinning, pruning and similar services	10,000	100	4,570	100	8,571	100	9,019	100	9,867	100
A01532	Fertilizer applications			10,000	100						
A01533	Chemical and mechanical weed control, disease and pest control services	5,050	100	10,000	100	5,078	100	6,311	100	9,615	100
A01534	Services to establish crops, promote their growth and protect them from pests and diseases, n.e.c.	4,953	100	3,471	100	4,692	100	4,399	100	4,436	100
A01550	Rental of farm machinery with drivers and crew	8,648	100	8,184	99	6,803	99	4,746	99	5,074	100
A01561	Artificial insemination services	10,000	100								
A01562	Contract animal growing services on a fee basis	1,159	58	157	17	541	36	602	40	618	40

PSIC	Description	HHI 2010	CR4 2010	HH2012	CR4 2012	HHI 2013	CR4 2013	HHI 2014	CR4 2014	HHI 2015	CR4 2015
A01563	Egg-hatching, sex determination a nd other poultry services	3,029	90	730	44	1,046	49	898	52	2,415	68
A01564	Services to promote propagation, growth and output of animals	10,000	100	10,000	100	8,530	100	10,000	100	10,000	100
A01565	Farm management services			6,800	100	5,400	100	3,478	100	4,679	100
A01569	Other support activities for animal production, n.e.c.									10,000	100
A01571	Preparation of crops for primary markets, i.e. cleaning, trimming, grading, disinfecting; threshing, grading, bailing and related services	9,785	100	8,169	98	3,842	98	4,909	99	4,941	100
A01581	Growing of paddy rice for seed purposes									6,401	100
A01582	Growing of seedlings for reforestation									5,065	100
A02110	Growing of timber forest species (e.g. gemelina, eucalyptus, etc.), planting, replanting, transplanting, thinning and conserving of forest and timber tracts	4,049	100	4,127	92	4,485	100	3,668	99	4,987	99
A02120	Operation of forest tree nurseries	7,166	100	4,319	94	5,888	100	3,526	100	6,990	100
A02201	Production of roundwood for forest-based manufacturing industries	10,000	100	7,631	100	10,000	100	10,000	100	10,000	100
A02400	Support services to forestry			2,596	96	6,684	100	4,916	100	7,775	100
A03111	Ocean fishing, commercial (using vessels over 3 tons)	824	50	605	44	647	43	642	43	614	42
A03112	Coastal fishing, municipal (using vessels of less than 3 tons)	4,054	96	722	45	3,306	82	3,924	85	5,878	87
A03113	Fish corral fishing	10,000	100								
A03121	Catching fish, crabs and crustaceans in inland waters	5,267	100	7,732	100	3,223	100	5,462	100	10,000	100
A03130	Support service activities incidental to fishing	10,000	100	10,000	100	9,977	100	9,989	100	10,000	100
A03211	Operation of freshwater fishpond, except fish breeding farms and nurseries	3,370	90	3,008	69	3,703	79	4,462	85	3,279	86
A03212	Operation of freshwater fish pens and fish cage	6,931	96	1,957	74	1,699	76	2,143	88	2,164	91
A03213	Operation of f reshwater fish breeding farms and nurseries	4,293	100	4,208	86	5,382	95	3,743	96	4,693	97
A03214	Culture of freshwater ornamental fish			10,000	100	10,000	100	10,000	100		
A03221	Operation of marine fish tanks, pens, cage except fish breeding farms and nurseries in sea water	10,000	100	2,388	97	6,009	100	5,002	100	5,038	100
A03222	Operation of marine fish breeding farms and nurseries			7,348	100	10,000	100	10,000	100	10,000	100
A03224	Gathering of fry			9,100	100	8,687	100	8,354	100	10,000	100
A03240	Prawn culture in brackish water	1,744	70	783	48	2,590	81	1,619	70	1,573	66
A03251	Culture of freshwater crustaceans (except prawns), bivalves, and other mollusks			4,292	97	6,359	100	8,819	100		
A03261	Pearl culture	3,203	97	2,919	97	2,372	90	2,116	86	1,950	85
A03271	Seaweeds farming	10,000	100	10,000	100	9,474	100	5,854	100	8,615	100
A03280	Support service activities incidental to aquaculture	10,000	100								

Sources: Author's Calculation

Appendix Table 2. Number of Enterprises and Members by Enterprise Category

Key Commodity Sector	CATEGORY	2013		2014		2015		2016		2017		2018		2019		2020		Total No. of Ent.	Total No. of Mbrs.
		No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.		
Palay	Micro Enterprise					1	53	1	116									2	169
	Small Enterprise							1	154	4	653			1	299			6	1,106
	Subtotal					1	53	2	270	4	653			1	299			8	1,275
Palay/Land Prep	Medium Enterprise									1	411							1	411
	Micro Enterprise					37	9,520	2	72									39	9,592
	Subtotal					37	9,520	2	72	1	411							40	10,003
Coconut	Medium Enterprise			8	2,874	4	1,785					1	172					13	4,831
	Micro Enterprise			1	34	24	1,481	4	268									29	1,783
	Small Enterprise			24	3,574	1	820	2	884			16	678	9	581	6	451	58	6,988
	Subtotal			33	6,482	29	4,086	6	1,152			17	850	9	581	6	451	100	13,602
Corn	Micro Enterprise					6	895	1	65									7	960
	Subtotal					6	895	1	65									7	960
Pineapple	Medium Enterprise					1	9,140											1	9,140
	Small Enterprise											1	60					1	60
	Subtotal					1	9,140					1	60					2	9,200
Banana	Micro Enterprise							2	225	2	219			1	110			5	554
	Small Enterprise			1	29	1	26	3	523	2	245	6	748	2	2,338			15	3,909
	Subtotal			1	29	1	26	5	748	4	464	6	748	3	2,448			20	4,463
Cacao/Tablea/ Chocolate	Medium Enterprise					14	1,208							1	150			15	1,358
	Micro Enterprise					1	70			1	45			1	38			3	153
	Small Enterprise					17	371	7	264	9	1,126	5	938	5	441			43	3,140
	Subtotal					32	1,649	7	264	10	1,171	5	938	7	629			61	4,651
Coffee	Medium Enterprise					6	100							1	456			7	556
	Micro Enterprise									2	266	1	65					3	331
	Small Enterprise			20	3,905	4	708	1	442	8	736	7	675	1	24			41	6,490
	Subtotal			20	3,905	10	808	1	442	10	1,002	8	740	2	480			51	7,377

Key Commodity Sector	CATEGORY	2013		2014		2015		2016		2017		2018		2019		2020		Total No. of Ent.	Total No. of Mbrs.
		No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.		
Calamansi	Small Enterprise	1	432									1	309					2	741
	Subtotal	1	432									1	309					2	741
Mango	Medium Enterprise													1	-			1	-
	Micro Enterprise									1	64							1	64
	Small Enterprise			2	92	2	195			2	445	1	96	3	144			10	972
	Subtotal			2	92	2	195			3	509	1	96	4	144			12	1,036
Cashew/Pili/Peanut	Medium Enterprise			1	116													1	116
	Micro Enterprise					3	508											3	508
	Small Enterprise							3	1,526	1	510							4	2,036
	Subtotal			1	116	3	508	3	1,526	1	510							8	2,660
Rubber	Medium Enterprise					2	338					1	440					3	778
	Small Enterprise			5	291			1	125									6	416
	Subtotal			5	291	2	338	1	125			1	440					9	1,194
Abaca	Medium Enterprise			5	738	7	3,853							1	-			13	4,591
	Micro Enterprise			1	46					1	35	1	50	2	83			5	214
	Small Enterprise							4	1,043	8	342	2	135	3	138			17	1,658
	Subtotal			6	784	7	3,853	4	1,043	9	377	3	185	6	221			35	6,463
Cassava	Medium Enterprise			5	250													5	250
	Micro Enterprise			1	52			1	19									2	71
	Small Enterprise							13	1,166					2	146			15	1,312
	Subtotal			6	302			14	1,185					2	146			22	1,633
Mungbean	Medium Enterprise							1	407									1	407
	Micro Enterprise					1	1,173											1	1,173
	Small Enterprise									5	3,555							5	3,555
	Subtotal					1	1,173	1	407	5	3,555							7	5,135
Onion	Medium Enterprise															1	121	1	121
	Micro Enterprise					1	242											1	242
	Small Enterprise			2	153	1	927			1	226							4	1,306

Key Commodity Sector	CATEGORY	2013		2014		2015		2016		2017		2018		2019		2020		Total No. of Ent.	Total No. of Mbrs.
		No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.		
	Subtotal			2	153	2	1,169			1	226					1	121	6	1,669
Tomato	Micro Enterprise					2	174					1	1,012					3	1,186
	Small Enterprise									3	104							3	104
	Subtotal					2	174			3	104	1	1,012					6	1,290
Rootcrop	Micro Enterprise			4	236	4	184	5	235			2	75					15	730
	Small Enterprise							1	63	2	150	2	138	1	137			6	488
	Subtotal			4	236	4	184	6	298	2	150	4	213	1	137			21	1,218
Vegetables	Micro Enterprise			1	326	13	1,522	5	686									19	2,534
	Small Enterprise			6	553					3	410							9	963
	Subtotal			7	879	13	1,522	5	686	3	410							28	3,497
Poultry	Micro Enterprise			3	87	15	708	7	317									25	1,112
	Small Enterprise			3	60					6	504	24	1,313	2	189			35	2,066
	Subtotal			6	147	15	708	7	317	6	504	24	1,313	2	189			60	3,178
Livestock	Medium Enterprise			4	2,455	9	1,008	2	904	2	4,123	5	1,904					22	10,394
	Micro Enterprise			12	508	29	1,825	14	986	5	133	2	53			4	100	66	3,605
	Small Enterprise			31	1,107	10	1,170	1	1,774	14	2,295	5	1,686	2	1,344	2	51	65	9,427
	Subtotal			47	4,070	48	4,003	17	3,664	21	6,551	12	3,643	2	1,344	6	151	153	23,426
Fish/Milkfish/Grouper	Medium Enterprise													1	1,876			1	1,876
	Micro Enterprise			3	131	2	1,521	8	498	2	77							15	2,227
	Small Enterprise			2	50					3	542	5	595					10	1,187
	Subtotal			5	181	2	1,521	8	498	5	619	5	595	1	1,876			26	5,290
Crab	Micro Enterprise			2	86	2	76											4	162
	Small Enterprise							1	132							4	96	5	228
	Subtotal			2	86	2	76	1	132							4	96	9	390
Seaweeds	Medium Enterprise							19	1,653			4	278					23	1,931
	Micro Enterprise					17	915	10	778	9	459			1	62			37	2,214
	Small Enterprise					3	130	2	306	16	478	2	174	3	160	10	343	36	1,591
	Subtotal					20	1,045	31	2,737	25	937	6	452	4	222	10	343	96	5,736
Shellfish	Micro Enterprise			14	192													14	192

Key Commodity Sector	CATEGORY	2013		2014		2015		2016		2017		2018		2019		2020		Total No. of Ent.	Total No. of Mbrs.
		No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.	No. of Ent.	No. of Mbrs.		
	Subtotal			14	192													14	192
Machinery Services	Micro Enterprise					20	4,602	116	15,260									136	19,862
	Subtotal					20	4,602	116	15,260									136	19,862
Custom Service	Medium Enterprise			1	179													1	179
	Micro Enterprise					36	3,394	3	180									39	3,574
	Small Enterprise			1	1,265					1	131	1	31	1	110			4	1,537
	Subtotal			2	1,444	36	3,394	3	180	1	131	1	31	1	110			44	5,290
Irrigation Facilities	Micro Enterprise					1	35	3	115									4	150
	Subtotal					1	35	3	115									4	150
Postharvest Facility	Micro Enterprise							2	208									2	208
	Small Enterprise									1	40							1	40
	Subtotal							2	208	1	40							3	248
All Other	Medium Enterprise			1	146			2	156	15	283	1	65					19	650
	Micro Enterprise			5	408	26	2,559	15	1,684									46	4,651
	Small Enterprise					1	560	2	159			2	156					5	875
	Subtotal			6	554	27	3,119	19	1,999	15	283	3	221					70	6,176
Total		**1**	**432**	**169**	**19,943**	**324**	**53,796**	**265**	**33,393**	**130**	**18,607**	**99**	**11,846**	**45**	**8,826**	**27**	**1,162**	**1,060**	**148,005**

Source: PRDP I-REAP 2021

Appendix Table 3. Outcomes of PRDP Enterprise Development Component (I-REAP), 2013-2020

Project/ Enterprise	Benefit from economies of scale	Afford stronger negotiating position	Pursue more focused, efficient and appropriate R and D	Enable then to hire professional managers
1. Ifugao Farmers' cooperative receives PHP 13.98 million worth coffee enterprise from DA-PRDP *Source: Philippine Rural Development Project. (August 2,2021). Retrieved from http://prdp.da.gov.ph/ifugao-farmers-cooperative-receives-php13-98-million-worth-coffee-enterprise-from-da-prdp/*	● The Hojap Multi-Purpose Cooprative (HMPC) moved one step closer to expanding its coffee business, following the inauguration and turnover of the improved PhP4.49 million worth coffee consolidation and processing center on July 23, 2021 in Asipulo, Ifugao ● Also included in the improvement of the enterprise subproject are the addition of two satellite buying stations, with a total cost of PhP3.55 million. The buying stations, located at Barangays Pula and Camandag, will facilitate easier consolidation of coffee, especially from the distant barangays of Asipulo. ● "We now have 1,500 members and a total asset of PhP131 million. This processing center and all the other facilities and equipment will surely help in the realization of the goals of this enterprise project to increase farm productivity and income of coffee growers, improve the Ifugao coffee competitiveness, and strengthen and develop a viable robusta coffee enterprise,"HMPC manager Shirley Tagtag said. ● Tagtag further said that they were able to consolidate around 50 kilograms of dried robusta coffee berries that are currently stored at their postharvest facility and at the buying stations.	DA-CAR Regional Technical Director and PRDP Regional Deputy Project Director Danilo P. Daguio, in his message, congratulated the HMPC for the inauguration of their enterprise subproject after six years since the submission and approval of their proposal. "With the completion of this project, and turnover of the facilities to the HOJAP MPC, the living conditions of farmers here are seen to improve as their coffee products will now be processed and marketed properly."Director Daguio said.		The HMPC cooperative were able to hire a professional manager.
2. Benguet farmers get Php4. 13-M worth coffee trading center from DA-PRDP *Source: Philippine Rural Development Project. (August 2,2021). Retrieved from http://prdp.da.gov.ph/benguet-farmers-get-p4-13-m-worth-coffee-trading-center-from-da-prdp/*	● With a project cost of PhP4.13 million, the trading center was established to support the operations of the Benguet Arabica Coffee Enterprise (BACE) for its coffee consolidation and trading activities. ● The entire subproject has a total cost of PhP13.91 million, shared by the World Bank (60%), the DA (20%), and the PLGU of Benguet (20%) including another 20 percent equity (in cash/kind) from the Proponent groups (PGs).			
3.Banana Farming Plants Hope for	● The project allowed the Kinabugawan Farmers	● The microenterprise		

Progress in Veruela *Source: Philippine Rural Development Project. (June 14,2021). Retrieved from http://prdp.da.gov.ph/banana-farming-plants-hope-for-progress-in-veruela/*	Producers Cooperative (KIFAPCO) to expand its economic activities on buying and selling bananas thereby generating income for the coop. ● In 2018, DA-PRDP funded KIFAPCO with P928,000 for two interventions: the establishment of a 2-hectare (ha) lakatan plantation as an expansion to the existing 13-ha Lakatan area of KIFAPCO and provision for the buying station, weighing scale, and operational funds for their banana production and trading business. The interventions from DA-PRDP gave boosted the operations of KIFAPCO allowing them to expand their plantation area from the original 2-hectares to 5. The coop also accumulated assets worth P3M. ● "My banana area was just 1-hectare before. With PRDP's training on proper planting, I was encouraged to expand my plantation to 7-hectares. My income increased from Php10,000 to Php30,000 per month depending on the market price." – Bautista, a coop member	members and banana growers were guaranteed a sure market for their produce since KIFAPCO consolidates and sells it to their contracted buyer. ● On top of the income from their lakatan production, a P0.25/kg additional income was added to their cooperative. ● Farmers get a fair market price, which increased their income up to 5%.		
4. Cacao Enterprise Expands Maragusan Coop Operations *Source: Philippine Rural Development Project. (June 7,2021). Retrieved from http://prdp.da.gov.ph/cacao-enterprise-expands-maragusan-coop-operations/*	● Almost three years since the completion of the subproject, the beneficiaries from the Maragusan Multipurpose Cooperative (MAMPCO) said that the tablea processing center has made a big impact to their cooperative when it comes to value adding of cacao beans, and generating additional income for their farmer members. ● MAMPCO is currently producing 3,800 kgs. of fermented cacao beans per month. Its institutional buyer, Kennemer Foods International Inc., gets 70% of their produce while the remaining 30% goes to their tablea processing. From this, they can make an average of 800kgs of chocolate tablets per month. ● To date, they are already **distributing their tablea nationwide through local couriers** at a cash-on-delivery basis.	● Engrasio Detomal Jr, one of the farmer members of MAMPCO, said that the **buying price for cacao really increased** and many farmers were motivated to go back into farming because **MAMPCO acted as a sure buyer** of **cacao wet beans**.		● The cooperative also hired additional production technicians to supervise their farmers in increasing their harvest and to reach their target of 2000 kilograms of dried beans per hectare. (Joy M. Montecalvo, PSO Min)
5. Harvesting Money in Abaca *Source: Philippine Rural Development Project. (October 12,2020). Retrieved from http://prdp.da.gov.ph/18788-2/*	● **San Isidro, Santiago, Agusan del Norte** | San Isidro Upland Farmers Multi-purpose Cooperative (SIUFMULCO) started in 1998 with only 23 members contributing a total capital of PhP3,200. It has now grown into a multimillion-peso cooperative with 349 members. ● SIUFMULCO now starts to reap the benefits of the DA- PRDP **interventions with a marked increase in volume of their production and income**. From its			● SIUFMULCO was able to hire a professional manager. ● "SIUFMULCO's General Manager Leonora Mila

	previous production of **one (1) metric ton per month**, their current volume of production is now **250 metric tons per month**. Because of the hauling trucks that PRDP provided and the additional truck from DAR, it can deliver to its buyer in Leyte more than four times a week. ● From its small capital, SIUFMULCO is now earning around P17 million per month for its **abaca enterprise** alone, and out of this, 2 to 3 % is the net income which it considers a huge amount. Before PRDP support, the largest money the cooperative had was only Php50,000. ● Under the IREAP's enterprise subproject, they also received two (2) units of hauling trucks with 18.3 tons capacity each; one (1) unit forklift with 3 tons capacity; and 30 stripping machines where 10 of these are stationary, 10 fixed, five (5) mobile, and five (5) collapsible. Part of the enterprise support is the establishment of abaca nurseries which include planting materials, and organic fertilizers with a 50-hectare expansion area which DA-PRDP funded. ● Rolando Layham who is working as warehouse supervisor said that they can now have more deliveries to their supplier because of faster hauling with the help of forklift and truck from PRDP.			said that with the help of DA-PRDP, they were able to address one their cooperative's biggest challenges."
6.PRDP Project to boost **dairy Industry** in Davao de Oro *Source: Philippine Rural Development Project. (October 10,2020). Retrieved from http://prdp.da.gov.ph/prdp-project-to-boost-dairy-industry-in-davao-de-oro/*	● The **Nabunturan Farmers Multipurpose Cooperative** (NAFAMCO) is gearing up for the start of the implementation of the "Cow's Milk Processing and Marketing Enterprise" subproject which is implemented under the I-REAP component of DA-PRDP. ● The dairy project is in parallel with the national milk feeding program of the Department of Education, the "Masustansyang Pagkain Para sa Batang Pilipino Act" which provides a sure market for the milk harvested by the cooperative. ● With the cooperation of the PLGU of Davao de Oro, and the coordination with national governments like the NDA and DA, they were able to get an initial stock of 50 heads of dairy cattle which were imported from Australia and eventually transported to the communal farm to begin the dairy project with NAFAMCO who were chosen to as the lead proponent group for their identified capacity to manage the cattle as well as handle the marketing of the harvested milk.			● The coop was able to hire a professional manager.

	● "Right now, we are able to **harvest around 400-500 liters** of milk from just 34 milk-in-line cows," said Eden Vallidor, general manager of NAFAMCO. ● Vallido says their supply is sufficient for the needs of Davao de Oro but notes that with the processing facilities, they can not only increase the amount of milk harvested but also improve on the quality and taste. ● For now, the Coop has to sell some of the raw milk because it still **does not have the equipment necessary to process and distribute the milk**. Vallidor says that their current income is at P7500 a day but with the processing facilities they could get an income of up to Php20,000 per day. ● The enterprise subproject already received the no-objection 1 or NOL 1 status and is awaiting the signing of the investment management agreement (IMA) with the province so they can proceed with the procurement process for the needed facilities. (Joseph John Palarca | PSO Mindanao)			
7. Consolidation and marketing of Goats with Multiplier Farm and Contract Growing Subproject *Source: Philippine Rural Development Project. (August 17,2020). Retrieved from http://prdp.da.gov.ph/p2-6-m-farm-equipment-distributed-under-da-prdp/*	● **Cuyapo, NUEVA ECIJA –** The Department of Agriculture – Philippine Rural Development Project (DA-PRDP) through the I-REAP Component distributed some transport, marketing facilities and farm equipment amounting to P2.6 million to the consolidation and marketing of Goats with Multiplier Farm and Contract Growing Subproject of the Bonifacio Multipurpose Cooperative ● The subproject focuses on production, consolidation, upgrading and marketing of native and mestizo goats and the production of F1 and F2 goat breeders. ● Consolidation and marketing enterprise through a **livestock trading post** is intended to buy and sell native goats for consumption. ● There is a 20% increase in the number of goat farmers with improved access to DA services and support to the livelihood of some 192 farmer-beneficiaries.		● The distributed items include a 6-wheeler truck, motorcycle with kolong-kolong, water tank, pressurized water tank, grass cutter (2 units), mechanical weighing scale and electronic cash register to be utilized under the said subproject. With the brand-new equipment, it is seen to **provide the latest production technologies** for member and non-member goat raisers to produce quality and upgraded goats.	
8.P69-M PRDP fund to boost **dairy production** in Mindanao *Source: Philippine Rural Development Project. (May*	● The country produces less than one percent of its total annual dairy requirement and imports the rest. Data from the NDA showed that local milk production (from cattle, carabao, and goats) was **21,160 metric tons** (MT) in 2016, up from **20,390 MT** in 2015		● Dairy Technology -currently, there are three technologies that could extended the shelf life of milk. These technologies are designed to improve product safety, quality and in many cases, availability.	

13,2020). Retrieved from http://prdp.da.gov.ph/care-for-milk-anyone-p69-m-prdp-fund-boosts-dairy-production-in-mindanao/	● The Northern Mindanao Federation of Dairy Cooperatives (NMFDC) is operating a processing plant and own the brand known as Highland Fresh Dairy Products. They are the only secondary dairy producing cooperative in Northern Mindanao operating its own milk processing plant and directly marketing its finished products. Aside from milk, they also produce yogurt, white cheese, gouda cheese and pure butter. The federation has a total of 13 cattle dairy farmers cooperative members coming from Bukidnon, Misamis Oriental and Cagayan de Oro City.Other factors contributing to the long-term trend of strong growth in dairy consumption are expanding cold chain capacity, an increasing number of supermarkets, and a blossoming food processing industry.		● Ultra-pasteurization is the most common and widely known technology used to extend shelf life using high heat treatment. Another one is by microfiltration system that reduces the microbiological load. And lastly, bactofugation, where pasteurized product goes through a centrifuge, where the high-speed rotation generates the centrifugal force needed to separate some of the bacteria from the rest of the milk. ● The Php22 million funds from PRDP will be used in upgrading production equipment to extend their products' shelf life of up to 30 days from the current production with shelf life of 7-9 days only. The amount will also cover transport facilities. "If we can increase our product's shelf life from 20 to 30 days, dealers can purchase more and they would only need to transport it once. That would mean lesser overhead costs," Edwin I. Dael, NMFDC Vice Chairman added.	
9.Grouper enterprise benefits Padre Burgos fisherfolks *Source: Philippine Rural Development Project. (October 21,2020). Retrieved from http://prdp.da.gov.ph/grouper-enterprise-benefits-padre-burgos-fisherfolks/*	● Yakap at Halik Multipurpose Cooperative Quezon 2 (Yakap at Halik) is creating new opportunities for its members through the grouper production enterprise, it partnered with the Philippine Rural Development Project and the municipal government of Padre Burgos, Quezon. Enrico Derama, general manager for the grouper enterprise, said that they have a high mortality rate in the beginning. During their first harvest in January 2018, they were only able to harvest groupers worth P22,623. ● It is fortunate that they were able to talk with some producers in Zamboanga who taught them various techniques to decrease mortality and lessen the impact of bad weather. Through their hard work and perseverance, the association harvested worth P119,032 in July 2019, which is almost five times higher than their first produce. ● The net profit from the enterprise is vdivided into 40 percent for the cooperative and 60 percent for the cage operators. In one instance, Angeles was able to harvest 58 groupers in his cages; for that, he was			● They were able to hire a professional manager -- "Enrico Derama, general manager for the grouper enterprise"

	able to earn P6,000. ● This enterprise allows 28 members of the cooperative, out of the 1,432 total members, to work in the development of their grouper or lapu-lapu enterprise. Their production site is located in the Ipil river in the said municipality where traders from Lucena City buy fish to sell in Metro Manila, particularly to Chinese restaurants.			
10.DA-PRDP secures AF2 with EU Grant to further implement interventions benefitting farmers and fisherfolk affected by the pandemic *Source: Philippine Rural Development Project. (April, 2021). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2021/05/PRDP-InFocus-PRDP-NPCO-Newsletter-April-2021-Issue.pdf*	● The AF2-EU has a total project cost of PhP19.175 billion (B), with funding assistance through a loan from the World Bank, and grant fund from the European Union. The said cost consists of PhP14-B ($280-M) from the World Bank Loan Amount, PhP1.006-B (EUR18.3-M) from the EU Grant, PhP2.424 billion from the GOP-DA Counterpart, and PhP1.745-B for the Local Government Unit (LGU) and Proponent Groups. ● Around PhP13.4-B rural infrastructure and PhP2.3-B rural enterprise subprojects are in the pipeline that aim to benefit 324,000 farmers and fisher households. With these projects, around 76,400 jobs are estimated to be created towards food production and marketing			
11.Sibunag Seaweed Production and Marketing Enterprise takes off through GEF support *Source: Philippine Rural Development Project. (October, 2020). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-October-2018.pdf*	● The enterprise started operations on June 17, 2017 with a cost of P4,533,200.00 (net of PG equity). Steering the enterprise and focusing on marketing is the Sabang Seaweed Growers Association (SSGA), the lead proponent group (PG,) with Barangays Sebaste and San Isidro as cluster members. ● The increase in farm area is translated to an increment in **production volume from 60** or 80 **sack**s before the project to **100 or 130 sacks** of Raw Dried Seaweeds (RDS), or 45% average increase per farmer after the subproject's first year of operation. ● Through the subproject, 130 seaweed growers have been provided with production inputs such as seedlings, ropes and posts. The first batch of direct beneficiaries used to expand their seaweed plantation from .5 to 1 hectare, or 100% increase in farm area, as targeted in the Business Plan of the enterprise subproject.	● Another notable change that the project beneficiaries had highlighted is the **increase in farm gate price by almost 100%.** Before the subproject, buying price set by the trader was **Php28 per kilo**, but never exceeding **Php30 per kilogram of RDS**. With the PG now trading directly to manufacturers in Cebu City, farm gate price now ranges from **Php40 to 60 per kilogram of RDS.** Trading capital was provided by the Project		● SSGA was able to hire a professional manager.

12. PRDP complements DA-PCCs Support to the Dairy Carabao Industry *Source: Philippine Rural Development Project. (October, 2020). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-October-2018.pdf*	• The San Agustin Dairy Cooperative (SADACO) based in Masaya Centro, specializes in the processing of raw carabao (buffalo) milk into various dairy products. Despite being an active player in the dairy subsector, SADACO's capacity to produce dairy products is not sufficient and only covers 17% of the annual demand for dairy products. • On value chain marketing segment, the volume of milk **procured daily increased by about 56% from 80 liters to 125 liters due to improved efficiency** in raw milk collection using the refrigerated van. The increase in volume of milk collected was also **due to the increase in the SADACO buying price of raw milk from Php40/liter to Php50/liter**. • The dairy subsector of San Agustin got an added boost with technical support provided by the PRDP in the form of dairy processing equipment. SADACO with its "Dairy Carabao Enterprise of Isabela" subproject, was the recipient of various equipment under I-REAP component, which includes: a) stainless milk tanks; b) stainless steel candy maker machine; c) upright chiller; d) soft ice cream maker with freezer; e) milking machine; f) refrigerated van, among others.	• SADACO was also able to set **higher prices for its dairy products** due to improved quality of raw carabao milk collected using the refrigerated van.		
13.Revitalizing Kalinga's coffee industry with PRDP - a legacy worth keeping *Source: Philippine Rural Development Project. (September, 2018). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-September-2018.pdf*	• The Bulanao to Amlao Farm-to-Market Road (FMR) is a 15.8-kilometer rural access road covering barangays Malin-awa, Balawag, Amlao, Suyang, and Lucog. Rice, corn, coffee, banana, root crops, and other vegetables thrive along the area and at the end of the subproject sits a coffee forested hillside. In connection to the FMR, an enterprise development subproject was also initiated to boost the Kalinga coffee industry. This is the Kalinga Integrated Coffee Processing and Marketing Enterprise that is managed by the Kalinga Coffee Cluster Agricultural Cooperative (KCCAC). • It was conceptualized in response to the need for alternative buyers and market expansion that will give higher income to coffee grower members and Kalinga Coffee Cluster affiliates.The concreting of the road has improved the situation before and has opened opportunities for business establishments and traders as well.			

14.PRDP- funded ice plant in Mariveles starts operations *Source: Philippine Rural Development Project. (September, 2018). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-September-2018.pdf*	● Fisherfolk and fish processors in Batangas II, Mariveles, Bataan can now avail of accessible, cheaper and adequate supply of block ice with the Ice Plant and Cold Storage subproject under the DA-PRDP. Managed by Kaizen Multipurpose Cooperative, the project targets block ice retailers and members of Batangas II Small Fisherfolks Association (BASFA), Batangas II Fishermen Association (BAFA) and DUGSO Fisherfolk Cooperative. ● A cold storage has also completed construction and is now open for rent to prolong the freshness of fishermen's produce, particularly sardines. ● The Establishment of Ice Plant and Cold Storage is an I-REAP subproject with an enterprise cost of P9,300,928 and civil works cost of P8,776,204.98.	● With target market: about 60% of the produced ice will be sold to fisherfolk while 40% will be sold to block ice retailers.		
15.Tomato consolidation facility inaugurated *Source: Philippine Rural Development Project. (August, 2018). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-August-2018.pdf*	● The Hundred Islands Farmpreneurs Association (HIFA) in Alaminos, Pangasinan, with a total project cost of Php1.9 million, the consolidation facility is expected to increase the income of salad tomato growers by reducing postharvest losses and help stabilize the price of tomato in the market. ● The consolidation facility can hold 175 crates or 3.5 MT of salad tomatoes with a floor area of 66 m2. The facility will serve tomato growers during the harvest season of salad tomatoes from January to May. For the rest of the year, the consolidation facility will serve as flatbed dryer for rice farmers. ● Including the consolidation facility, the Salad Tomato Production and Marketing Enterprise has a total project cost of Php6,406,519.50 with the proponent group equity. ● During the groundbreaking ceremony, 57 packs of tomato seeds and plastic crates were also distributed to the members of the HIFA. The tomato seeds are part of the production inputs provided for the salad tomato enterprise. ● The HIFA will also receive a Php2.1-million delivery truck, Php418,740 trading capital, plastic mulch, seedling trays, potting medium, and nylon wires.		●	

16.Women charting of Mindanao's coffee industry *Source: Philippine Rural Development Project. (August, 2018). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-August-2018.pdf*	• Rural Improvement Club (RIC) Federation of Kape Maramag started its coffee processing and marketing which changed the coffee industry including the lives of the town's farmers. "We started with 1,050 members from 20 barangays of Municipality of Maramag" RIC President Imelda Mendoza said. • It processes 10,000 metric tons of coffee beans per year but hopes to have additional capital so they could accommodate all the farmers who sell their coffee to the association.	• As of now RIC Federation of Kape Maramag has already a fast production of coffee and **has reached the international market** through the **Amazon store** (an online shopping store), although under a different brand name," said RIC President Imelda Mendoza		
17.Tayabas corn association becomes self-sufficient with PRDP enterprise *Source: Philippine Rural Development Project. (August, 2018). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/11/PRDP-InFocus-PRDP-NPCO-Newsletter-August-2018.pdf*	• TAYABAS CITY, QUEZON – Ever since Erwin Medallada started planting corn in his rented land, he depends on lenders for his capital. When he sells his harvest, majority of his profit goes to loan payment; what is left is just enough for the education of his five children. Other members of the Calumpang Corn Growers Association (CCGA) experience the same situation. • According to Medallada, he was able to earn **P93,960 from his one hectare** land in April 2018. He attributed the **higher income to the good quality seeds** provided by the association. • CCGA provides planting materials through the enterprise; the farmers no longer worry about their capital for the next cropping seasons.		•	• CCGA was able to hire a professional manager.
18.Mango Packaging Center in Ilocos Sur, a dream come true for farmers *Source: Philippine Rural Development Project. (February, 2018). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2018/05/PRDP-InFocus-PRDP-NPCO-Newsletter-February-2018.pdf*	• The Cabugao Mango Farmers and Multi-Purpose Association (CMFMPA) proposed for a Production and Marketing of Fresh Carabao Mangoes under the Philippine Rural Development Project (PRDP) in 2015. The enterprise which has a total worth of Php 13,100,971.14 includes the construction of a Mango Packaging Center in the Municipality of Cabugao, Ilocos Sur. • The Mango Packaging Center is targeted to reduce postharvest losses and to provide a multi-purpose area for mango farmers to conduct pre-marketing activities (i.e. sorting, grading, and packing) for the production of high quality mangoes to access and cater export markets.			CMFMPA was able to hire aprofessional manager.
19. P86.63-million Apayao warehouses to boost farmer-	• Eight warehouses worth P86.63-million due for construction in Apayao through the Department of	• The construction of the warehouses seeks to		

market link *Source: Philippine Rural Development Project. (August, 2017). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2017/10/PRDP-InFocus-PRDP-NPCO-Newsletter-August-2017.pdf*	Agriculture's Philippine Rural Development Project (DA-PRDP) are seen to help improve the connectivity of farmers to markets. • The eight warehouses, according to Bosing, will be erected in strategic locations-carefully selected With a set of prioritization criteria — in each of Apayao's seven municipalities. Luna town, the provincial capitol and main commercial center, however , will have two warehouses. costing between P9.85 million to P12 million.	increase the income of **farmers as buying prices are increased to about 50%** and losses and product deterioration are reduced from about 25 to 10%.		
20.Cacao project in Zamboanga to help satisfy demand for sikwate *Source: Philippine Rural Development Project. (April, 2017). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2017/10/PRDP-InFocus-PRDP-NPCO-Newsletter-August-2017.pdf*	• A stable demand for a local delicacy particularly popular in Mindanao called sikwate (thick chocolate drink) is one of the main reasons why a **local farmers cooperative in Zamboanga Del Norte** decided to expand their production of the cow beans with the help of the Department of Agriculture Philippine Rural Development Project (DA-PRDP). • Php13.4 million startup enterprise covering input provision for increased production under the first package to be operated by Sindangan Farmers Cooperative & Marketing Association (Sindangan-FACOMA). • Second package will include consolidation of wet beans from farmers for fermenting and drying, packaging, and delivery to buyers.			
21.Mechanization boosts Cagayan Valley farm efficiency *Source: Philippine Rural Development Project. (March, 2017). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2017/05/PRDP-InFocus-PRDP-NPCO-Newsletter-March-2017.pdf*	• William Bacuyan of the Naguilian Christian Multi-purpose Cooperative (NCMPC) in Lallo Cagayan, Farmer cooperatives in the provinces of Cagayan and Isabela have noted increased efficiency in their farms with the land preparation machineries received through the PRDP	•		
22.PRDP subproject doubles Mindoro calamansi farmers'	• A group of calamansi farmers in Calapan, Oriental Mindoro, as improve their incomes by as much as	• According to Jourvin Barrera, he explained	.	The farmers were able to

incomes *Source: Philippine Rural Development Project. (February, 2017). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2017/03/PRDP-InFocus-PRDP-NPCO-Newsletter-February-2017.pdf*	115% , after they started selling their produce to a trading center established under the Department of Agriculture Philippine Rural Development Project (DA-PRDP). The farmers reported that prior to the operation of the trading center , their **average annual income was Php10,984**. For the entire 2016 however, when the center started operating, the farmers income had increased up to **Php23,583**. • According to Leila Custodio, a new calamansi farmer and a new member of the Naujan Farmers Association (**NaFa**), the trading center has helped them manage the peak-season marketing of calamansi , a large percentage of which would usually go to waste because of overproduction.	that the increase in income can be associated with a short market for the farmers produced , **increase in farm gate price** , and decrease and spoilage with the steady market being offered by the enterprise especially during peak season. • Farmers now prefer supplying calamansi fruits to the enterprise over bodega owners as NaFa offers more stable and competitive pricing		hire a professional manager.
23. PRDP subproject advances coffee farmer's livelihood and production method *Source: Philippine Rural Development Project. (October 2016). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2016/11/PRDP-InFocus-PRDP-NPCO-Newsletter-October-2016.pdf*	• The Php14.8 million funding assistance intended for the Kalinga Integrated Coffee Processing and Marketing Enterprise sub project is expected to improve the production of coffee beans in this part of the Cordillera highlands. • To date , members can **produce 315 metric tons** of fresh beans annually, but according to Maximo Wallis, chair of the Dupligan farmers Multipurpose Cooperative (DUFAMCO), the funding will definitely encourage the members to improve the quality and volume of the production.	• Under the proposed enterprise , green coffee beans will be sold by farmers to the cooperative at Php83 and Php86 per kilogram, for dry process and modified process beans, respectively. Meanwhile, wet-process it will be sold at Php92.50 per kilogram. • After processing , it may be sold to the trading center at Php93 (dried) Php105 (modified) and Php115 (wet) per kilo.		• The Kalinga coffee farmers were able to hire professional managers.
24.Farmers' co-op boosts commercial value of abaca *Source: Philippine Rural Development Project. (September, 2016). Retrieved from http://prdp.da.gov.ph/wp-content/uploads/2016/10/PRDP-InFocus-PRDP-NPCO-Newsletter-*	• The Catanduanes-based Pinoy Lingap-Damayan Multipurpose Cooperative (PLDC), which was recently awarded a Php25.4-million worth of enterprise development assistance package from PRDP. • According to the cooperative's top official, the test run allowed them to realize their capacity to collect as much as **25 tons of abaca fiber every week**. • The PLDC is shelving Php9.2 million from its own coffers as counterpart to complete P25.4 million required funding for the project. • The components of the enterprise project include a main warehouse for the raw and semi-processed	• Several buyers are already waiting for the PLDC's much improved volume capacity that will come from the release of the approved funds. (Alladin S. Diega, NPCO) infoFACE Unit). • Coop has already demonstrated its capacity to improve the livelihoods of their members as it set the selling price of Abaca	•	• PLDC was able to hire professional manager.

September-2016.pdf	fibers, several trucks and forklift for delivery, tools and equipment, and a working capital for one month operating expenses and cash for buying materials.	from **Php55 to Pph75 per kilogram** in the province.		

Appendix Box 1. World Bank (2020) Recommendations on Consolidation

1) Land consolidation

In the context of (formerly) rice mono-cropped irrigation schemes different models can be employed. 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 Appendix Box 2:

a) 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

b) 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.

c) 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 prorata to their shareholding. The cooperative would facilitate the formation of a water user association within the farm area.

d) **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.

2) Aggregation and collective action for coordinated and inclusive value chains

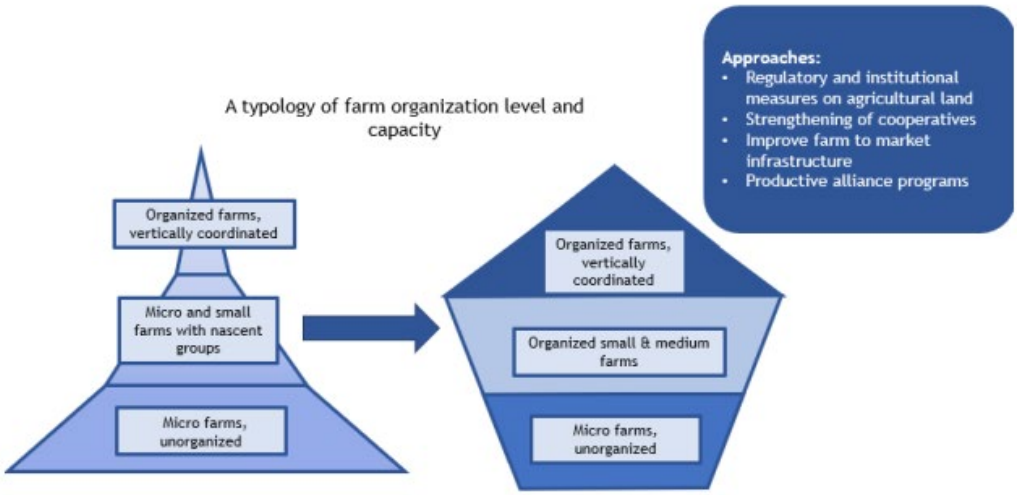
Contract farming is not widely applied in the Philippines, although this arrangement has been used to link farmers and agribusiness companies in the tobacco, poultry, and banana industries. Variants of contract farming, including contract farming under so-called productive alliances, are being supported through a number of projects, such as the World Bank–supported PRDP. Lessons from this experience can inform future initiatives. The agenda should be geared toward fostering a different farm organization pyramid structure, as illustrated in Appendix Box 3.

Lifted in full from World Bank (2020, p.81–82).

Appendix Box 2. A Better Farm Organization Pyramid Structure

An important part of the ***process of institutionalizing 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. 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 the figure below. 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 . Fostering better structured farming and efficient, inclusive value chains



Lifted in full from World Bank (2020, p.82)

Appendix Box 3. What is Needed to Establish Agro-Based Clusters and Why It is Important

Synergistically linking processors with producers in Agro-Based Clusters (ABCs) through farmers' groups holds the key to achieving this transformation of agriculture from its heavy dependence on staple crops to an increased production of High Value Products (HVPs) that can meet the quality requirements of supermarkets and export markets.

To establish quality-conscious ABCs with robust processing and value addition components, the government, in addition to supplying technologies and building rural infrastructure, must: (1) ***mobilize stakeholders along the whole value chain*** into various groups such as farmers' cooperatives and agro-processors' associations; (2) ***train stakeholders in the value chain*** through these groups; (3) ***promote their collective actions***; and (4) set up an ***appropriate regulatory framework*** to implement quality standards. This authors particularly emphasize the critical importance of training not only for farmers, seed companies, and nursery operators but also for agro-processors and marketing agents.

To establish small-scale processing firms in rural areas, ***liquidity to run processing units*** is observed to be the major constraint, which can also be overcome by private financial institutions along with ***incentives*** provided by the government through farmers' groups.
The study proposes to enhance the **innovative capacity** of ABCs by promoting cooperatives of smallholder farmers and associations of agro-processors, by mobilizing collective actions for innovations and facilitate training through these groups. Since the needs and potentials of ABCs vary from cluster to cluster, the government has to adopt appropriate cluster-based approaches.

Finally, given the need for coordination of diverse stakeholders in the development of ABCs, the authors recommend the **establishment of a PMU headed by the government planning and development agency** with proper representation of all stakeholders responsible for designing and monitoring training programs, promoting activities of *farmers' cooperatives* and *agro-processors' associations*, and coordinating the interests of diverse stakeholders

Source: Lifted from Otsuka and Ali (2020, p.6).