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Compilation and Synthesis of Major Agricultural Value Chain Analysis in the Philippines

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Compilation and Synthesis of Major Agricultural Value Chain Analysis in the Philippines

Roehlano M. Briones

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COMPILATION AND SYNTHESIS OF MAJOR AGRICULTURAL VALUE CHAIN ANALYSIS IN THE PHILIPPINES

WORLD BANK GROUP

COMPILATION AND SYNTHESIS OF MAJOR AGRICULTURAL VALUE CHAIN ANALYSIS

PHILIPPINES

April 2013

Roehlano M. Briones

Research Fellow

Philippine Institute for Development Studies

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EXECUTIVE SUMMARY

This report is an output of a stock-taking of value chain studies and gap analysis for major agricultural commodities. This involves reviewing and synthesizing existing studies, particularly the ones recently completed, as well as the available road maps and master plans, for the strategic commodities relevant for selected ARC (Agrarian Reform Community) clusters.

Recently the agricultural sector in the Philippines has enjoyed robust growth driven by rapid price increases in key sub-sectors, namely rubber, sugarcane, and coconut. The largest sub-sectors however, namely rice and corn, relatively slower growth; moreover they exhibit low competitiveness based on indicators such as domestic resource cost, or relative profitability, i.e. in comparison to high value crops such as fruits and vegetables.

The stock-taking reveals that the type of information most readily available is financial analysis at the farm level. The type of information that is least readily available is financial analysis for either upstream- or downstream-linked activities. To some extent disaggregation is possible at the level of region, province, and even ARC cluster, although the resulting matrix is patchy. The value chain studies can be broadly summarized as follows:

- Opportunities seem to be well substantiated for export-oriented crops, such as banana cardava, pineapple, coconut, cocoa, rubber, and the associated activities in the value chain (respectively: banana chips, pina fiber, coco coir, tablea processing, crumb rubber production);

- The sites suitable for these value chains are those in which primary production and marketing systems are fairly well established;

- The value chain studies also take note that risks (e.g. price volatility) and entry barriers (lack of market access) do pose challenges towards agri-enterprises even in the high-opportunity areas;

- Value chain activities or niche products may also be found even for the less competitive, import-competing products, e.g. organic rice, corn feed production, muscovado sugar, etc.;

- A more comprehensive financial projection is probably needed for a more positive assessment of these linked activities or niche products.

1. AIMS AND SCOPE

This study is part of a programmatic analytical and advisory assistance (AAA) on agribusiness in the Philippines supported by the World Bank.[1] It focuses on value chains of relevance provinces being identified by the Department of Agrarian Reform (DAR) for Agrarian Reform Communities (ARC) clusters development, under the Gearing Up for Rural Wealth Creation (GROWTH) project, a planned collaborative undertaking between Government of the Philippines and the World Bank. This AAA study conducts a stock-taking of value chain studies and gap analysis for major agricultural commodities in identified provinces (Table 1). The regions in which these provinces are located will serve as the focal regions for this review, though all the regions will be covered. The stock-taking examines a range of issues of relevance for ARC development, including: the role of partnerships, market linkages, farmer organizations and farm modernization, with a view towards informing design of strategies and interventions.

The rest of this paper is organized as follows: Section 2 presents the framework and describes the method of data gathering. Section 3 discusses the value chains from a national perspective. Section 4 presents a regional and ARC cluster perspective, covering the nine focal regions separately, followed by the remaining regions of the country. Section 5 identifies basic gap in available information regarding promising agricultural value chains for ARCs in the Philippines, and concludes.

2. FRAMEWORK AND METHOD

1.1. The value chain perspective

Kaplinsky and Morris (2000) define a value chain as follows: "The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use." The value chain perspective looks at the economic system surrounding the generation of value added associated with a product or process.

Interventions targeted on just one link of the value chain, while ignoring the rest, may fail in their goal of improved livelihood. An oft-cited problem is the introduction of new product that has been profitable in other locations, but thereafter abandoned as traders in the new location show little interest in marketing the new product.

The perspective is also helpful for identifying opportunities and constraints for value creation along the chain, by upgrading products and processes along the links. Agricultural development in a middle income country (such as the Philippines) needs to progress to a stage of diversification and value addition that engages farmers and other rural-based households (World Bank, 2007). As proposed in da Silva and de Souza Filho (2007):

> Chain analysis... should indicate technological, economic and institutional bottlenecks that negatively affect overall performance. It should also identify the strong points that might be promoting performance and that need to be reinforced or sustained. The identification of these strengths and weaknesses will provide the basis for the design of policy proposals and firms' strategies towards enhanced chain performance. Proposals may also point out the need for further analyses and investigations.

[1] Opinions, errors, and omissions in this paper are solely the responsibility of the author and are not to be attributed to any institution or organization involved in the study.

Closely related is the industry cluster approach, which may be seen as underscoring the geographic dimension of the value chain. According to the Philippine Development Plan (PDP, p. 97): "Industry Clusters are geographic concentrations of competing, collaborating and interdependent businesses, working on a similar regional infrastructure ...It fosters the transfer and adoption of new technologies, creates risk capital, and attracts foreign investment." Clusters group firms in a location vertically – exemplifying a value chain – as well as horizontally – to promote economies of scale, and as focal points of government intervention.

Table 1: Candidate provinces and ARC clusters for the GROWTH project, as of 21 February 2013

Bicol Region	Camarines Sur	1	Baao-Bula ARC Cluster
Bicol Region	Albay	2	Albay Tres ARC Cluster
Bicol Region	Albay		Malinao-Tiwi ARC Cluster
Cagayan Valley	Isabela	3	Kapagayan ARC Cluster
Cagayan Valley	Isabela		Hybrid Rice Prodn ARC Cluster
Cagayan Valley	Isabela		Livestock Prodn & Dairy Processing Cluster
Cagayan Valley	Isabela		Upland Crop Devt Cluster
CALABARZON	Quezon II	4	Bondoc Peninsula Coconut ARC Cluster
Central Luzon	Nueva Ecija-North	5	Singkaw ng Buhay ARC Cluster
Central Luzon	Nueva Ecija-North		Daloy ng Buhay ARC Cluster
Central Luzon	Tarlac	6	MoncAnao Cluster
Central Luzon	Tarlac		Sta. Ignacia ARC Cluster
Central Luzon	Tarlac		Concepcion ARC Cluster
Central Visayas	Negros Oriental	7	MATABA ARC Cluster
Central Visayas	Negros Oriental		BAYBASTAC ARC Cluster
Davao Region	Davao del Norte	8	Davao del Norte ARC Cluster I
Davao Region	Davao del Norte		IGaCoS ARC Cluster
Davao Region	Davao Oriental	9	Davao Oriental ARC Cluster
Eastern Visayas	Leyte	10	Leyte Dist. I ARC Cluster
Eastern Visayas	Leyte		VISITA ARC Cluster
Eastern Visayas	Leyte		Leyte Dist. 5 ARC Cluster
Eastern Visayas	Eastern Samar	11	Sinirangan ARC Cluster
MIMAROPA	Palawan	12	Central Grains ARC Cluster
MIMAROPA	Masbate	13	Masbate Western Corridor ARC Cluster
Western Visayas	Negros Occidental	14	HIMABINAISA
Cagayan Valley	Cagayan	15	Cagayan North ARC Cluster
Central Visayas	Bohol	16	APC-SSD ARC Cluster
Central Visayas	Bohol		Cabatuan ARC Cluster
Central Visayas	Bohol		UTTA ARC Cluster
Central Visayas	Bohol		BIBADILL ARC Cluster
Central Visayas	Aklan	17	Aklan Abaca ARC Cluster
Central Visayas	Aklan		Rice ARC Cluster

Note: Provinces 15, 16, and 17 are listed as "Other provinces as additional sites".

Source: DAR-Bureau of Agrarian Reform Beneficiaries Development.

Lastly, in the Philippine context, state participation in industrial development (via value chain or cluster approach) is predicated on engagement of small and medium enterprises (SMEs). In contrast, large private sector actors are deemed mature and endowed with capital and know-how, and therefore are not in need of government assistance; they may of course play an important role as a supplier to or buyer of goods and services from SMEs.

1.2. Value chain initiatives in the Philippines

The value chain and related approaches has been widely adopted in national government initiatives, civil society organizations, increasingly by local governments. The PDP Chapter on Competitive and Sustainable Agriculture identifies Strategy 1.2. as increase investments and employment across an efficient value chain. The PDP also adopts industry clustering. The DAR, together with DA and Department of Environment and Natural Resources (DENR), collaborate on a national convergence initiative (NCI), of which Agro-Enterprise Development and Agribusiness is identified as a key component. Specific outputs under this component are:

- Establishment of agro-enterprise clusters in each province;
- Agro-enterprise cluster model developed;
- Planning and management tools to facilitate agro-enterprise cluster development introduced (value chain, cluster management).

The champion of industrial development via value chain upgrading and industry clustering is the DTI, whose value chain model, adapted from Pilarca (2008), may be represented as in

Figure 1:

Figure 1: Basic functions (chain links)

Source: DTI.

Operators along each link are as follows:

- Specific input providers
- Primary producers
- Logistics centers, industry
- Traders
- Final sales point/retailer

The DTI is currently preparing a Manufacturing Industry Road Map, a consolidation of sectoral road maps. It is also implementing a project on National Industry Cluster Capacity Enhancement Program (NICCEP) with support from the Japan International Cooperation Agency (JICA).

1.3. Sources of information

This study will draw on various sources of information related to agricultural value chains and/or strategies for upgrading along these chains, viz.: i) official data from the Bureau of Agricultural Statistics (BAS) and other sources; ii) Publications in books and journals; iii) Official documents or working documents adopted by agencies, both national and local, i.e. in the form of road maps, industry plans, industry cluster plans, value chain studies, and similar literature; iv) Other papers, presentations, and conference proceedings. Many of available studies would be in the form of "gray" literature, i.e. sources iii) and iv). Detailed citation of these sources is found in the Bibliography.

3. VALUE CHAINS IN AGRICULTURE: NATIONAL PERSPECTIVE

1.4. Overview of agriculture

This study focuses on land-based agriculture.[2] The entire crops sector produced output worth 804 billion pesos in 2011 (Table 2). Close to two-thirds of output was generated by traditional crops; palay alone accounts for 32% of output, followed by coconut at 15%.

Table 2: Value of output of crops, Philippines, 2011 (in millions of pesos)

	Value of output	Share in total, 2011 (%)	Growth (%), 2009 - 2011	Output component	Price component
CROPS	**804,089**	**100.0**	**11.7**		
Traditional crops	**519,038**	64.5	12.8		
Palay	254,265	31.6	3.3	1.3	2.1
Corn	87,698	10.9	7.4	-0.4	7.8
Coconut	120,890	15.0	36.4	-1.4	37.7
Sugarcane	56,186	7.0	39.4	11.2	28.2
Selected fruits	**139,897**	**17.4**	**7.0**		
Banana	102,557	12.8	7.3	0.8	6.5
Pineapple	14,335	1.8	11.2	1.1	10.1
Mango	18,599	2.3	1.2	1.1	0.2
Calamansi	4,407	0.5	13.9	-2.5	16.5
Selected vegetables	**37,405**	**4.7**	**9.9**		
Peanut	930	0.1	4.9	-2.0	6.9
Mongo	1,766	0.2	28.3	9.1	19.2
Cassava	14,142	1.8	9.0	4.0	5.1
Camote	5,886	0.7	6.1	-4.0	10.1
Tomato	2,543	0.3	3.0	1.2	1.8
Garlic	916	0.1	7.0	-6.9	13.9

[2] ARC clusters will most likely undertake projects involving crops, livestock, poultry, and forest products. In some ARCs located in marine or freshwater systems, fisheries value chains may offer viable livelihood opportunities.

	Value of output	Share in total, 2011 (%)	Growth (%), 2009 - 2011	Output component	Price component
Onion	4,753	0.6	15.3	0.5	14.8
Cabbage	2,252	0.3	6.4	0.2	6.1
Eggplant	4,216	0.5	15.8	1.7	14.1
Selected commercial crops	**42,560**	**5.3**	**34.5**		
Coffee	6,191	0.8	5.3	-4.2	9.5
Rubber	30,667	3.8	52.7	4.3	48.4
Tobacco	3,008	0.4	10.9	11.1	-0.3
Abaca	2,695	0.3	6.8	2.1	4.7
Others	**65,189**	**8.1**	**4.1**		

Source of basic data: CountrySTAT.

The next biggest category is selected fruits (17%), for which the dominant crop is banana (even larger than the share of sugarcane). Mango is a distant second at 3%. Among the selected commercial crops (5%), the biggest share goes to rubber (4% of the total). The itemized commodities account for the bulk of output; items lumped under "Others" account for just 8%.

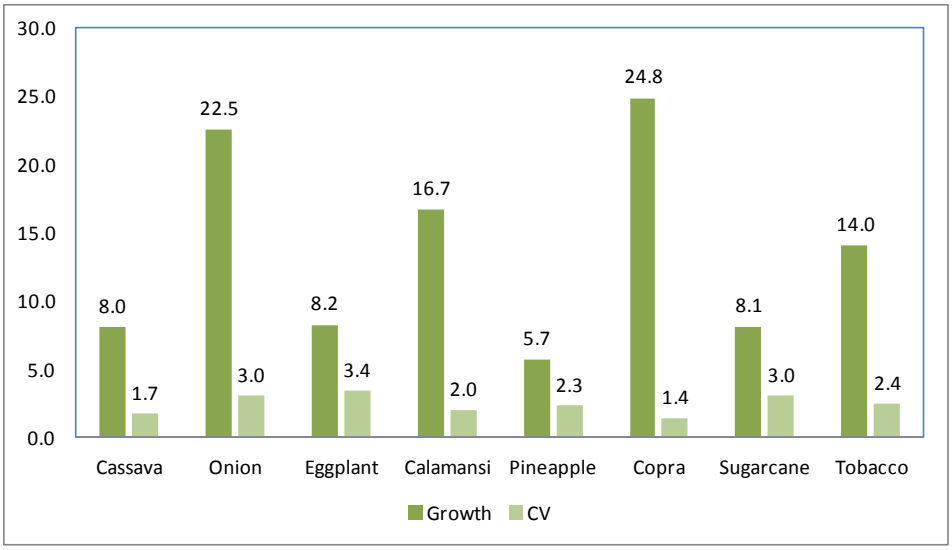
Over the past two years, value of output of crops grew 12.3%. The most striking rate of growth is observed for rubber, coconut, and sugarcane. Cassava, onion, eggplant, pineapple, calamansi, and tobacco, also exhibit rapid growth. Table 2 presents a breakdown of growth of output value into output component and price component.3 Value of output grew mostly due to price increases; note that annual CPI inflation over the period was 2.3%. The most rapid increases are exhibited by rubber, coconut, and sugarcane; in fact in the case of coconut, production had been declining over the period owing to climate conditions (BAS, 2011). The 2009 – 2011 trends is part of an overall increase in farmgate prices over the decade. Note however that prices have been subject to marked volatility throughout the 2000s, as seen in the high coefficient of variation (Figure 2).

Livestock and poultry sub-sectors combine for another 371 billion pesos (

Table 3). The biggest item is hogs, which by itself is larger than all of poultry. Cattle is a distant second (10% of livestock output); dairy, at under 500 million pesos of output, accounts for just 0.2% of livestock. Poultry is mostly chicken and chicken eggs (97%). Growth in output value and prices have not been as robust as that of crops; in fisheries, tiger prawn and tilapia have suffered declining output over the period.

[3] There is no breakdown provided for aggregate categories for which output as physical quantity is not meaningful.

Figure 2: Annual growth rates of producer prices (%), and coefficient of variation (CV), selected agricultural commodities, 2001 - 2011



Notes:
1. Annual CPI inflation over the period was 4.6%.
2. Coefficient of variation is ratio of standard deviation to the mean.

Source of basic data: CountrySTAT.

Table 3: Value of production for livestock, poultry, and selected fishery, Philippines, 2011, in millions of pesos

	Value of output,	Share in total, 2011 (%)	Growth (%), 2009 - 2011	Output component	Price component
LIVESTOCK	**212,326**	**100.0**	**4.0**		
Carabao	10,080	4.7	5.9	2.3	3.6
Cattle	21,462	10.1	6.5	2.3	4.3
Hog	172,575	81.3	3.5	1.7	1.8
Goat	7,711	3.6	6.5	0.5	6.0
Dairy	499	0.2	4.7	8.8	-4.1
POULTRY	**158,744**	**100.0**	**4.6**		
Chicken	118,334	74.5	4.6	4.3	0.3
Duck	2,455	1.5	-0.2	-3.9	3.7
Chicken eggs	35,047	22.1	5.7	4.6	1.1
Duck eggs	2,909	1.8	-0.6	-2.5	1.9
FISHERY	**158,025**	**100.0**	**0.0**		
Marine municipal	72,028	45.6	3.3		
Aquaculture	85,996	54.4	2.7		
Milkfish	30,621	19.4	3.7	3.5	0.2
Tiger prawn	18,546	11.7	0.1	-0.4	0.5
Tilapia	16,571	10.5	-4.0	-0.7	-3.3
Seaweed	11,391	7.2	9.0	2.9	6.1
Mudcrab	4,388	2.8	9.3	7.0	2.2
Others	4,480	2.8	17.2	4.9	12.3

Source: CountrySTAT

Further along the chain, Table 4 summarizes data on output of manufacturing under agro-processing. Here "agro-processing" takes on a limited definition, as Philippine Standard Industry Classification Nos. 101 to 128, 110, 120, and 221.

Table 4: Value agro-processing output by type of activity, in millions of pesos, 2010

	Value	Share (%)
Total, agro-processing	760,311,197	100.0
Processing and preserving of meat	36,096,134	4.7
Processing and preserving of fish products	36,380,018	4.8
Processing and preserving of fruits and vegetables	74,070,249	9.7
Manufacture of vegetable and animal oils and fats	77,161,596	10.1
Manufacture of grain mill products	59,720,147	7.9
Manufacture of other food products	151,491,288	19.9
Manufacture of animal feeds	57,627,364	7.6
Manufacture of beverages	155,893,830	20.5
Manufacture of tobacco products	88,395,566	11.6
Manufacture of rubber products	23,475,005	3.1

Source: NSO.

Agro-processing accounts for 760.3 billion pesos or 22% of all manufacturing. Processing and preservation of animal and plant products account for nearly twenty percent of agro-processing; processing of fruits and vegetables account for another ten percent. Larger scale activities, namely manufacture of oils and fats as well as manufacture of beverages, account for nearly thirty percent. By value added, agro processing together with primary agricultural production and allied activities account for 32% of GDP (Balisacan et al, 2012).

1.5. Priority commodities

The DA has identified the following priority commodities: under traditional crops - rice, corn, coconut, and sugarcane; and under livestock and poultry - chicken and hogs. Other commodities are incorporated under high value crops and fisheries. These are broadly consistent with the output shares shown above.

Under the PDP, the DTI has a more specific list associated with regions, as follows:

- Coffee (Cordillera Autonomous Region or CAR)
- Milkfish (Ilocos Region)
- Dairy and dairy products (Cagayan Valley)
- Bamboo (Central Luzon)
- Food (all regions in the Visayas)
- Banana, Mango, Seaweed, and Coconut (all regions in Mindanao).

This is further elaborated in terms of a DTI value chain matrix entitled: "Priority Industry Clusters for National Convergence", envisioned to coordinate various sectoral agency initiatives. This DTI matrix will be covered in Section 4.

Profitability indicators for the priority commodities are available from BAS (Table 5).

"Vegetables" averages: onion bulb, onion native, cabbage, carrots, cauliflower, eggplant, garlic, habitchuelas, potato, stringbeans, and tomato for vegetables; "Fruits" averages calamansi, durian, mango, papaya, pineapple, and watermelon. Palay and corn show the lowest net returns, followed by coffee; fruits exhibits relatively high net returns, with vegetables posting the highest. Note that comparison is not straightforward: for instance, palay and corn are annual crops, whereas fruits and coffee are long gestating perennials. Vegetable production, while typically involving annual crops, may face high working capital requirements, limited marketing outlet, and high price variability. That is, there are barriers to movement of land and labor from low returns to high returns activities, and therefore great rewards to farmers who succeed in making the transition.

One reason for differences in profitability is the differences in gross returns per ha, which supports the designation of "high value crops"; in the case of vegetables the difference can be seen in the farmgate price, while in fruits the difference is due to yield. Moreover, there appears to be greater employment generation in the high value crops, given the much higher labor cost per ha compared to cereals.

Table 5: Cost and returns data for selected crop categories, Philippines, 2011

Crop	Farmgate price (pesos/kg)	Gross returns (pesos/ha)	Net returns (pesos/ha)	Labor cost (pesos/ha)
Palay	14.36	55,795	14,616	10,901
Corn	13.18	34,825	8,886	9,425
Vegetables (average)	29.54	286,055	163,351	36,703
Fruits (average)	15.12	174,004	96,828	27,940
Coffee	65.70	47,025	16,341	15,844

Source: BAS.

From cost and returns information (together with data on border prices), one may estimate indicators of competitiveness of domestic production, i.e. domestic resource cost (DRC) and import price parity ratio. Table 6 presents estimates by Gergeley (2011) for some of the major commodities. Rice and swine are uncompetitive based on the DRC criterion; in 2010 domestic rice was 43% more expensive than imported rice, while swine was 37% more expensive. Meanwhile based on the price comparison, sugar is also uncompetitive (domestic price is 28% higher than the world price). As a practical matter, as long as trade barriers prevail, domestic production can still expand even with low competitiveness indicators; however they are vulnerable to reduction of trade barriers due to trade agreements and lobby by affected groups (i.e. downstream processors).

Meanwhile the exported crops, namely banana, mango, and coconut, are competitive, as expected. Surprisingly Yellow corn, which is import-competing, has DRC < 0; this is similarly the case for broiler, which competes against imported chicken meat. There may be some idiosyncrasies of data source and year in which data was sampled which are driving the somewhat counter-intuitive results.

Table 6: Indicators of efficiency of domestic production, selected agricultural commodities

Commodity	DRC	Import parity price (1)	Domestic price (2)	Ratio (1)/(2)
Rice (2010)	2.60	21.8	31.2	1.43
Yellow corn (2010)	0.92			
Sugar (2010)	0.78	16.01	20.44	1.28
Banana (2008)	0.86			
Pineapple (2009)	0.19			
Swine (2010)	1.10	104	142.7	1.37
Broiler (2010)	0.51			
Mango (2009)	0.41			
Coconut (2009)	0.70			

Source: Gergeley (2011)

1.6. Traditional crops

Rice and corn

The most abundant crop in the country is rice. A comprehensive discussion of the rice supply chain and major players is ADB (2011), Dawe (2007), and Dawe et al (2007). High cost at both production and marketing level have driven up the domestic price of rice above world market levels. At the marketing stage in particular, the presence of "too many traders" is seen as an important factor behind high marketing margins (Dawe et al, 2007). This suggests barriers or disincentives to entry of larger scale investments that would have led to consolidation.

The country's strategy for the rice sector is apparently not directed against these constraints, but rather at expanding production, diversifying food staples consumption (to white corn, cassava, sweet potato, and the like), and reducing postharvest losses. This strategy, contained in the Food Staples Sufficiency Program (FSSP), aims to achieve 100% self-sufficiency in rice production and utilization. Within the FSSP the self-sufficiency target is not however translated into income gains of farmers, hence the relevance of FSSP to the value chain opportunities reviewed here is unclear.[4]

Under FSSP interventions target individual links in the value chain, i.e. at the farm level (yield increasing technology, irrigation) or postharvest phase (e.g. mill upgrading). One exception is the Food Supply Chain Program (FSCP) of the Land Bank of the Philippines (LBP). Projects receiving support include integrated rice production, and integrated corn production and hog fattening. According to LBP (2011): "The program is designed to provide financial assistance to key players in the food chain such as agricultural producers, service providers, processors and various market players; market linkages between agricultural producers and processors; and capacity building support to strengthen farmers organizations and enable them to meet product requirements of anchor firms."

Other than supply chain integration, value adding for rice may also involve production in new and higher value rice products. This includes organic rice and/or indigenous rice varieties. Concepcion et al (2007) conduct a case study in which an organic farmer cooperative in Bicol region partnered with a nongovernmental organization (NGO), to sell organic or "healthy"

[4] Farm household income targeting is said to be incorporated in the Agriculture and Fisheries Modernization Plan of the Department of Agriculture; copies of this plan are not yet made public.

rice in supermarket outlets. The case study demonstrates that smallholders can be successfully linked with premium markets; however there must be a marketing and quality control arm with extensive knowledge of the market and production environment. The producer and marketing arm must be willing to invest a significant amount of time and money for business incubation.

The next most important cereal crop is corn. Corn production for food however for just one-third of the country's corn output. The rest is in the form of yellow corn for feed. According to Clarete (2012), about 70% of feed for hogs, broilers, and layers is domestically produced yellow corn. Imports of yellow corn are minimal, due to high tariffs (40%) and imposition of an import permit system by DA. Instead, feed producers turn to feed wheat; in 2009 feed wheat imports reached 1.4 million tons as a substitute for yellow corn imports.

The Corn Industry Development Roadmap (DA, 2011) focuses on yellow (feed) corn production and expansion of white corn production as an alternative to rice. By 2016 the government targets a sufficiency level of 102% (corresponding to 100% for white corn and 103% for rice). This entails a production level of 9.562 million tons, up from 2012 output of 7.41 million tons. The road map assumes "good market price" and favorable weather to achieve these targets. Strategies are production-oriented and focus on:

- Cultivation of idle and new lands suitable for corn production - about 200 thousand ha available according to the Bureau of Soil and Water Management;
- Promote intercropping of corn to coconut and cassava growers;
- Planting of improved varieties, namely open pollen (in place of traditional varieties) and hybrid corn (in place of open pollen varieties).

Traditional exports: coconut and sugar

For coconut, a diverse range of products have been targeted for development under the Coconut Industry Development Roadmap (PCA, 2012). The traditional system is based on crude coconut oil (CNO) extracted from copra. CNO can be processed further into cooking oil, oleochemicals, coco methyl ester (biodiesel); the copra by-product can be made into livestock feed. Aside from CNO there are numerous opportunities for value addition:

- The sap or toddy can be made into sugar, vinegar, and wine.
- Vinegar and wine can be made from the coconut water, from which coco juice and nata de coco (coco jelly).
- The shell can be made into charcoal, activated carbon, and be used as raw material for handicrafts.

The Road Map identifies a program on Strategic R&D towards integrated coconut R&D enhancement, and involving market research and promotion, development of new high value products, and of existing and new markets. About 200 million pesos are needed under the Road Map for this program over the period 2011 – 2016.

Coconut coir is an interesting case: over the past ten years, coconut coir production has been growing rapidly, due to large local demand by construction companies for geotextiles (for erosion control), and for export (with China being a major destination). Coir dust and peat have also gained attention from the domestic plant garden industry. While coconut is grown

widely all over the country, coir production is concentrated in Laguna, Quezon, (both in CALABARZON) and Albay (Bicol Region); due to high export demand in recent years, coir production has expanded to Mindanao and the Visayas (Davao del Sur, Davao Oriental, Davao del Norte, Sarangani, Compostela Valley, Leyte, Samar, and Aklan). In 2010, there were 20 licensed establishments nationwide doing coir decortication using local supplies of husk. There are four processors which convert coir into geotextiles, logs, coco pads, and fibercraft items (FIDA, 2012a). According to SAIS-BC (n.d), the rate of return for investment in a decorticating plant is 32%, with a payback period of two years.

Lastly for sugar, the Master Plan for the Sugar Industry (SMPFI, 2010) as well as the Sugar Industry Road Map (Bautista-Martin, 2012) of the Sugar Regulatory Administration (SRA) primarily focuses on increasing yield of traditional centrifugal raw sugar as a means to promote competitiveness of the industry . One of the key strategies is "block farming" involving collective schemes for farm production, mechanization, and management, under the National Convergence Initiative.

The Master Plan does identify a Program for promoting value added products and by-products from sugarcane. These include: muscovado, molasses, bagasse, crop waste, filter mud, furnace ash, and protein (from cane juice). The Master Plan proposes support to value addition through marketing study, as well as information campaign for co-products and by-products. In addition, bioethanol and co-generation are mentioned in the Road Map as additional value addition and by-products of the sugarcane and allied processing sector.

1.7. Fruits and vegetables

The fruit for which relatively comprehensive information is available is *mango*; it is the third largest fruit export next to Cavendish banana and pineapple. Marketing cost has been studied by BAS (2002); a description of the value chain is in Digal (2005). Briones (2013) observes that in the case of processed mango, there is strong demand from processors; they typically operate at excess capacity and are unable to meet all the purchase orders of importers. The main constraint is adequacy of quality supply of fresh mango, as production has consistently fallen below the peak level (about 1 billion kg) achieved in 2007.

For *Banana cardava*, The DTI has prepared a value chain study for banana processing (DTI-RODG, 2012). The Mindanao banana chip industry exports up to 80% of its output, and is the main market for thousands of cardava banana producers. There is high demand overseas and the main constraint cited by the industry is lack of supply. A processing plant can generate a net income of up to 4.8 million after an capital cost (both fixed and working) of 2.9 million pesos. To date there are about 41 banana chip processors in the country, of which 6 are in Metro Manila, 4 are in the Visayas (Metro Cebu), 2 are in Cagayan de Oro, 1 in South Cotabato, 1 in Zamboanga City, and the rest (27) are in Davao Region.

Calamansi, which falls under "high value crop" classification, has been the subject of a value chain assessment (AsiaDHRRA, 2008). At the primary level, BAS data already indicate net returns per ha of P141,000. However even the high value calamansi is dwarfed by output generated along the value chain. The share of raw calamansi in gross value by node of the chain is itemized as follows:

Product	Price in pesos per kg	Fresh calamansi input cost as a ratio of price per kg (%)
Fresh calamansi	12	100
Calamansi extract, manual	79	46
Calamansi extract, mechanical	79	22
Calamansi concentrate	138	9
Calamansi powder	7,072	2

A comprehensive value chain analysis is available for pineapple (REF), for production of fiber, with pineapple pulp as a by-product (SAIS-BC, n.d.). Profit margins along major nodes in the chain are highest for the fiber production stage. In the case of *vegetables*, Digal and Montemayor (2007) describe two types of value chains: the traditional retail chain which ends in the wet market; and the modern retail chain including supermarkets, fast food outlets, hotels, and restaurants. The latter accounts for only 25% of all vegetable production, but this share has been increasing over time, and is expected to rise further with shifting consumer preferences.

A prototypical case of small growers upgrading to the high value chain is Normin Veggies (Concepcion, Digal, and Uy, 2007). Normin Veggies is organized as non-stock, non-profit corporation, involving ranging from small farmers to some fairly large vegetable producers. They also received support from donor agencies, nongovernmental organizations, local government, and DA. Key to their entrance into this chain is the marketing service provided by a business partner, Normincorp, a private for-profit corporation incorporated mostly by some owners of the large farms (seven incorporators in all). Clustering has become a widely accepted as one strategy towards accessing these high value chains (Murray-Prior et al, 2004; CRS-Philippines, 2007).

1.8. Commercial crops

The *rubber* industry is discussing a Road Map for its future development. A DAR (2002a) report estimates about 60% - 70% of natural rubber produced in the country meets local demand, mostly of the domestic automotive tire industry (accounting for 40% of domestic production). A more recent study is done by DTI-RODG (2012a). It identifies the top five producing regions are in Mindanao; Zamboanga Peninsula alone accounts for about 43% of the planted area. Most primary processors are located in Mindanao; some processing plants are operated by organized by DAR in ARCs. Liquid latex can be treated into latex concentrate. Natural rubber (cup lumps) can also be processed into solid form as sheet rubber. Rubber export products are usually in the form of sheets, and rubber-based products such as outer soles and upper slippers of footwear; other products are rubber hoses, rubber bands, tennis and squash balls; rubber lining, and rubber tires. The rate of return is 38% for crumb rubber production, though the payback period is nine years.

According to DAR (2002a), quality is identified as a big issue among local buyers; there is no national quality standard or certification for crumb rubber. Grading is done informally by traders by sight. This is echoed in the Rubber Products Road Map (Cubillas, 2012), which calls for regulatory standards and a publicly-provided testing center.

Coffee is an important crop among agrarian reform beneficiaries (ARBs). According to a DAR (2002b) report, about 16,000 ha of coffee farms are operated by 7,000 ARBs, organized into 33 ARCs (only 180 ha of coffee plantations are grown outside the ARB farms). Most production (73%) is from Mindanao. About 85% of coffee grown is of the *Robusta* variety; of

this amount, 85% is supplied as green coffee beans to one buyer, Nestle Philippines (under the Nescafe brand). Other major buyers are General Milling, Universal Robina, and Consolidated First. The end product is soluble coffee. Except for Nestle, soluble coffee makers purchase from traders, typically in minimum of 1-ton purchase orders, making it difficult for farmers to sell directly. Nestle however buys coffee beans in designated buying stations where farmers can bring their producers. The company is also active in extending technical assistance to farmers. DTI-NICCEP (2012) mentions low yield as a major constraint: whereas current yield levels are at 400 kg/ha, the potential is 800 – 1,000 kg/ha.

Another important outlet are special blends in coffee specialty shops, e.g. Gourmet, Figaro, and Starbucks. These specialty shops purchase quality green beans from trusted traders, while doing their own roasting, grinding, and packaging. The coffee is for use in their cafes, as well as to supply institutional buyers (hotels and restaurants). This is the high end market enjoying considerable margins. New products or channels mentioned in the DTI-NICCEP (2012) profile are civet coffee (coffee *alamid*), fair trade coffee, sustainable coffee, and organic coffee.

According to Nozawa (2011), *oil palm* production started in the Philippines in 1966 in Basilan in ARMM. Growth was slow however as government prioritized instead production of coconut. In the 2000s though interest in the industry picked up given rising domestic demand. Only one-fifth of demand is produced domestically necessitating large amounts of imports, opening up opportunities for domestic production. The potential for small farmer inclusion is high given the nature of the oil palm fruit and oil processing technology, which necessitates a short supply chain. In current production models, a large-scale oil mill is at the center of a cluster of oil palm farms; these farms are either rented from landowning farmers (who are also employed as plantation workers), or supply the mill under a contract scheme. Currently there are six oil mills, all of which are in Mindanao except one in the Visayas (located in Bohol).

A DAR (2002c) study on oil palm reports that Kenram in Central Mindanao is supplied by the Kenram ARC (covering 1,444 ha), under a purchase production agreement with the Kenram Industrial Development Inc. (KIDI). KIDI also sources palm oil fresh fruit bunch (FFB) from non-contract out growers and contract growers; the last category of suppliers tend to enjoy the best prices. Meanwhile Agumil (formerly Agusan Plantation Incorporated or API) and Filipinas Palm Oil Industries Incorporated (FPII) obtain in Agusan del Sur source their FFBs from leaseback with ARBs, as well as with contract growers. Agumil has been expanding its supply sources to Central Mindanao, ARMM, Bohol, and Palawan (Habito, 2012).

The *cocoa* industry is currently undergoing a resurgence (DTI RODG, 2012b). Farmers have been increasing their cultivation in response to demand both locally and abroad. Annual consumption is about 40,000 t, but domestic production is only 5,000 t. Local chocolate manufacturers include Universal Robina Corporation, Commonwealth Foods, Inc. and Goya, Inc. These are typically large scale operations. There are however small-scale enterprises in processing, such as local *tablea* manufacturers. Capital required is only a 1.5 million (both fixed and working), with a payback period of just over two years.

1.9. Livestock and poultry

The Livestock Development Council (LDC) has prepared industry road maps for Poultry, Hogs, Small Ruminants, and Dairy. These road maps however are documented only as powerpoint presentations and are devoted to summarizing recent trends and government programs related to the sub-sectors. A more detailed profile is done by Clarete (2011), which

examines backward linkages with corn industry. The three main producers are hog producers, broiler producers, and chicken egg layers; about 80% of livestock production in the country by volume is from the hog industry. The industry consists of small-scale backyard farm operators, medium scale operators, and large-scale commercial operators, to whom backyard farm operators have been ceding market share.

Big corporations integrated backwards into feed milling are the dominant players. Throughout the country there are nearly 7000 registered feed mills in the country, of which 236 are integrators, and 140 are commercial feed millers (the remainder are home mixers, including backyard livestock producers that mix their own feeds). Large integrators tend to use the latest technology to produce feeds for their own livestock production. One major issue in the industry is the high cost of corn, which is kept high due to high tariffs and import restrictions; obtaining adequate supply is also an issue for small scale feed millers.

1.10. Others

The main *root crops* of the country are cassava and sweet potato, though many other species are cultivated (arrowroot, taro, yam, etc.) Under FSSP the root crops are seen as alternative to rice as household food staple. In case of cassava another major use is for livestock feed; according to de Leon (2012), the cassava sector has formulated a roadmap for 2011-2016, with a target of increasing cassava production from 2.1 to 8.3 million tons, based on yield improvement to 20 tons/ha (from the current 9.6 tons/ha). Part of the increase would go to increased food consumption, with a target of 5 kg/yr of cassava consumption per capita, up from the current estimates of about 3 kg/yr. A comprehensive value chain study for cassava (REF) finds that cassava production can net 21,000 pesos/ha per year; processing into dried granules would net another P2,800 pesos for every 5 tons of raw material.

Organic agriculture is the subject of the National Organic Agriculture Program (NOAP), as mandated mandated by the Organic Agriculture Act (RA 10068) of 2010. NOAP aims to develop and promote organic agriculture, towards ecological sustainable farming systems, availability of safer and more nutritious food, and increased farm productivity and income of farmers. Organic farms (certified or not) account for less than one percent of farmed areas in the country; the NOAP targets at least 5% of the country's agricultural areas fall under organic farming by 2016 (NOAB, 2012). The domestic market is an exclusive niche market centered in Metro Manila, accounting for just $20 million to $30 million in sales annually. The export market accounts for another $18 million (as of 2006), centered on the US, EU, and Japan. The NOAP aims to raise the share of farmed land under organic agriculture through extension, capacity building (of certifying bodies and extension service providers), advocacy, market development (spearheaded by DA-AMAS), R&D, as well as production and technology support (i.e. product standards, quality and safety assurance, technical and marketing services).

Rattan is an important non-timber forest product (IRG, 2006); another non-timber forest product is *bamboo*, for which market opportunity is deemed significant owing to a serious crisis in the supply of wood. In the case of rattan, about 80% to 90% of rattan poles go to export furniture. The three major furniture-making areas are Metro Cebu (the largest in the country), Metro Manila, and Pampanga. The Philippines is known for manufacturing high-end, high quality furniture. The supply chain begins with gathering of rattan from the forest. The rattan is brought to a trader or local consolidator. This is sent to wholesalers and then sellers to furniture makers. The industry however faces declining supply, owing to loss of habitat from which to source the wild rattan. In the case of bamboo, the furniture industry has already been importing poles (about 10% of production) indicating lack of quality supply from domestic sources. However due to low prices of bamboo, the estimated rate of return

for bamboo plantations is just 17%, rising to 38% for both upstream (nursery) and downstream (processing) activities.

Fiber crops in the country include abaca, silk maguey, pineapple, and salago, of which the largest is abaca. According to FIDA (2012), 77% of abaca fiber production (for cordage and handicraft) goes to the domestic market. Meanwhile abaca pulp, for specialty papers, tea bags, etc., are mainly exported. Nationwide there are six abaca pulp companies (three in Luzon, two in Leyte, and one in Mindanao); another six cordage companies; and numerous fibercrafts cottage enterprises (e.g. handmade paper and handloom weaving). Other processors include manufacturers of machine-woven carpet, dartboard pads as well furniture makers. The demand outlook is positive, owing to the shift from synthetics, and towards more eco-friendly materials, and in the case of China, the move from traditional to western style of tea preparation (using tea bags).

FIDA (2012) also mentions *silk* as one of the fiber industries. However its data shows silk production has been falling steadily from 2002 at 11,000 kg, down to 3,140 kg in 2010. The industries suffers from low yield, high production cost, limited supplies of mulberry, and uncompetitive price. Local fabric and dressmaking industries mostly rely on imports.

4. VALUE CHAINS IN AGRICULTURE: REGIONAL PERSPECTIVE

1.11. Overview of the regions

Table 7 provides indicators on regional output. In recent years GDP growth has been fastest for regions surrounding the Metro Manila and Metro Cebu, namely Central Luzon, CALABARZON, and Central Visayas; Caraga has also been posting fairly rapid growth.

Table 7: Regional GDP and agricultural GVA statistics, 2009 to 2011

	Growth rates, 2009-2011		Percentage share agriculture in GDP	Per capita GDP index (2011)
	GDP	Agricultural GDP		
Philippines	5.9	1.3	11.5	1.00
CAR	4.3	-1.2	10.6	1.26
Ilocos	5.1	3.6	24.8	0.60
Cagayan Valley	2.1	0.5	39.8	0.50
Central Luzon	9.5	0.8	17.0	0.81
CALABARZON	7.0	1.8	6.2	1.24
MIMAROPA	1.8	0.7	27.7	0.62
Bicol	4.0	2.6	25.6	0.36
Western Visayas	4.7	3.1	26.7	0.53
Central Visayas	10.7	3.0	7.8	0.81
Eastern Visayas	1.9	0.2	20.5	0.58
Zamboanga Peninsula	1.9	-2.1	27.7	0.57
Northern Mindanao	4.8	4.5	28.0	0.81
Davao	4.7	0.6	18.9	0.86
SOCCSKSARGEN	3.1	-0.3	30.2	0.60
Caraga	8.9	-3.2	21.6	0.42
ARMM	0.6	-0.4	63.0	0.25

Source: NSCB

Agricultural GDP tends to grow much slower than regional GDP; in CAR and majority of Mindanao regions, agricultural GDP growth has been negative. The good news is that regions

with fastest growth of agricultural GDP would tend to have the largest shares of agriculture in regional GDP, i.e. Ilocos, Western Visayas, and Northern Mindanao (except Central Visayas). This is important for inclusive growth as regions with greater share of agriculture in GDP tend to have lower per capita GDP. The lowest per capita GDP in Luzon is for Bicol and Cagayan Valley; for Visayas is Western Visayas; and for Mindanao is ARMM and ARMM.

The regions with the most ARBs in ARC clusters (100,000 or more) are CAR, Ilocos Region, Cagayan Valley, Central Visayas, and Caraga (Table 8). Except for CAR, these are also regions with relatively lower per capita GDP and high share of agriculture in output. Regions with the least ARBs are CALABARZON, Bicol Region, and Davao Region.

Table 8: Data on ARCs and ARC clusters, as of December 2012

Region	ARCs	ARC connectivity clusters	Farmer beneficiaries in ARC clusters
CAR	53	9	165,914
Ilocos Region	48	7	103,081
Cagayan Valley	60	9	113,163
Central Luzon	66	17	95,819
CALABARZON	43	7	31,990
MIMAROPA	25	6	74,261
Bicol Region	38	8	42,165
Western Visayas	47	8	66,247
Central Visayas	57	8	129,142
Eastern Visayas	43	8	69,878
Zamboanga Peninsula	74	7	78,659
Northern Mindanao	42	7	67,480
Davao Region	47	7	51,004
SOCCSKSARGEN	20	4	84,216
Caraga	38	9	100,659
TOTAL	701	121	1,273,678

Source: DAR – BARBD.

1.12. The GROWTH regions

Cagayan Valley

Cagayan Valley has one of the highest shares of agriculture in regional GDP (second only to ARMM). Table 9 shows the main agricultural products, namely palay, corn, and banana (among the crops), as well as hog, chicken and cattle (among the livestock products). Of these the fastest growing (in terms of value of output) have been chicken, corn, and cattle.

The Regional Development Plan or RDP (NEDA Region II) proposes increased productivity levels focusing on high yielding varieties of rice, corn, as well as cultivation of mango, banana, citrus, peanut, coconut, coffee, and tomato. One strategy is to make use of idle lands for coconut, cassava, cacao, as well as livestock raising. The RDP also identifies the need to link agricultural production to agro-based industrialization such as food processing.

A listing of investment opportunities is prepared by DA-Agribusiness Marketing Assistance Service or DA-AMAS (2013), while DTI-Regional Operations Development Group (DTI-RODG, 2013) presents industry cluster priorities for agriculture, shown in Table 10. While there are some overlaps (e.g. meat), there are also contrasts in the listings of the agencies. Of

course complete uniformity cannot be expected (nor is it desirable), though it does suggest the need for critical assessment of opportunities and constraints in the area-specific value chains.

Table 9: Value of production of crops and livestock, Cagayan Valley, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	57,217	49,891	63,206	100.0	5.2
Palay	31,093	25,819	33,694	53.3	4.2
Corn	15,934	14,329	19,028	30.1	9.7
Banana	3,464	3,280	2,678	4.2	-11.3
Others	3,223	2,928	3,059	4.8	-2.6
LIVESTOCK	9,032	8,704	8,085	100.0	-5.2
Carabao	893	995	940	11.6	2.6
Cattle	928	999	1,059	13.1	7.1
Hog	6,971	6,486	5,860	72.5	-8.0
POULTRY	4,384	4,681	5,465	100.0	12.3
Chicken	2,995	3,364	4,142	75.8	19.2
Chicken Eggs	784	819	799	14.6	1.0

Source: BAS.

Table 10: Investment opportunities and industry cluster priorities, Cagayan Valley

DA-AMAS opportunities	DTI-RODG cluster priorities
Corn production and processing	Bamboo
Peanut production and processing	Wood (lead region)
Essential oils (lemon grass, patchouli, guava production and processing	Fruit crops: Banana, Mango, Pineapple, Calamansi
	Pangasius aquaculture
Sweet potato production and processing	Processed food (delicacies)
Organic fertilizer production	Meat production, Poultry
Meat processing	Cacao
Feed milling	Dairy
Integrated livestock production and processing	Coffee
Aquaculture production	Muscovado sugar
Fish product processing	Vegetable noodles
Seaweeds production and carageenan processing plant	Coco coir
	Rubber

For Cagayan Valley, the candidate province for GROWTH is Isabela, with the priority commodities already being produced in the ARC clusters being: rice, corn, mungbean, vegetables, and livestock/dairy. The ARC Agribusiness plan groups ARCs into an upland development cluster, a rice cluster, and a livestock/dairy cluster. For upland development the focal commodities are production and processing of cocoa, coffee, banana chips, and pineapple (covering chips, fiber, vinegar, candies, and so forth). For the rice cluster the agribusiness venture proposed is hybrid rice production, with possibility of marketing for export to the middle east under joint venture. For the livestock and dairy cluster the venture is dairy production for milk and dairy products.

Central Luzon

Central Luzon is known as the country's "rice bowl", with total value of output equal to 62 billion pesos in 2011, or 72% of crop output (Table 11). Other major crops are onion (2.7

billion) and mango (1.8 billion). Agriculture accounts for only 17% of GDP however (third lowest after CALABARZON and Central Visayas). Livestock (mostly hogs) and poultry (mostly chicken and chicken eggs) are respectively large sectors, accounting for 33.0 and 45.4 billion pesos, respectively; together they exceed the value of crop production.

Table 11: Value of production of crops and livestock, Central Luzon, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	59,411	59,155	62,052	100.0	2.2
Palay	44,439	45,796	44,683	72.0	0.3
Mango	1,638	1,527	1,805	2.9	5.1
Onion	2,043	1,017	2,683	4.3	15.7
Others	3,722	3,242	4,064	6.6	4.6
LIVESTOCK	29,404	32,164	33,037	100.0	6.2
Hog	26,002	28,508	29,288	88.7	6.3
POULTRY	42,009	42,430	45,402	100.0	4.0
Chicken	34,073	33,966	36,720	80.9	3.9
Chicken Eggs	6,318	6,699	6,844	15.1	4.2

Source: BAS.

The RDP for Central Luzon emphasizes extension (e.g. dissemination of soil suitability maps, capacity building for extensionists) and R&D as support for agriculture. It also proposes promotion of contract growing by developing a databank of agri-processors and producers, and establishment of common postharvest handling, storage, and service centers under control of cooperatives.

The DTI-RODG matrix highlights meat and related products (processed meat, poultry, dairy, aquaculture), as well as fruit products (banana, mango, Calamansi); Central Luzon is also seen as the lead region for bamboo (Table 12). Meanwhile DA-AMAS identifies a wide range of investment opportunities. In either list, only one product (rice hull utilization identified by DA-AMAS) relates to the main crop produced in the region, namely rice.

Table 12: Investment opportunities and industry cluster priorities, Central Luzon

DA-AMAS opportunities	DTI-RODG cluster priorities
Meat, fish, fruit processing	Bamboo (lead region)
Sugar Confectioneries	Banana
Rice Hull Utilization	Mango
Tomato, sweet potato, cucumber, onions & coffee beans	Kalamansi
Cutflower Production and Ornamentals	Milkfish
Tuba Juice from "nipa"	Pangasius
Tissue Culture for Orchids	Processed food (delicacies)
Cassava Production and Processing	Meat, fresh and processed
Essential Oil Extraction	Poultry
Mango Production and processing	Dairy
Sweet Potato Extrusion Plant	Coffee
Goat and Sheep Raising	Muscovado
Dairy Production and Processing	Organic fertilizer
Sesame Seed Production and processing	Veggie Noodles
Fruit and Vegetable Dehydration Plant	Coconut/coco coir
Sericulture	
Cucumber Production	
Dragon Fruit Production	
Fresh Water Aquarium Fish Breeding	

One ARC cluster in Central Luzon is MoncAnao Karzone with current commodities are rice, corn, sweet potato. The proposed agribusiness venture is rice productivity enhancement, anchored on new technologies such as hybrid rice, rice ratooning, integrated with rice trading (with rice trading center in the Ilang-ilang ARC).[5]

CALABARZON

According to Table 13, the top crops in CALABARZON are coconut, rice, and sugarcane. However poultry production (34.8 billion pesos) by itself exceeds the value of output of all the crops (32.0 billion pesos); livestock production (mainly hogs) also produces a sizable output (nine-tenths the size of crop production). According to the RDP, the majority of economic activities in Calabarzon remain largely agricultural, hence the need for continued growth of the agribusiness sector. On the contrary though, only 6.2% of regional GDP is from agriculture; the RDP itself recommends focusing not only on production, but also on agri-related manufacturing and logistics.

The ARC cluster is the Bondoc Peninsula Coconut ARC cluster in Quezon province. The main commodities produced in the cluster are rice, coconut, corn, banana, and vegetables. The focal commodity for the agribusiness venture coconut, based on integrated copra production and trading, coconut by-products (geo-textiles, and coco peat). This overlaps with the listing of DA-AMAS and DTI-RODG priorities namely for coconut/coir production. The listing in Table 14 includes the other major agricultural commodities, i.e. meat processing, as well as hog and poultry production, and coconut/coir production.

[5] The other ARC clusters are in Nueva Ecija. However, their agribusiness development plans are not available.

Table 13: Value of production of crops and livestock, CALABARZON, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	21,740	25,958	33,979	100.0	28.1
Palay	5,347	5,470	5,613	16.5	2.5
Coconut	4,948	7,782	13,018	38.3	81.5
Sugarcane	2,258	3,565	4,222	12.4	43.5
Banana	906	947	1,028	3.0	6.7
Pineapple	909	1,166	1,317	3.9	22.4
Mango	775	866	987	2.9	13.7
Calamansi	331	330	415	1.2	12.6
Eggplant	512	473	803	2.4	28.4
Coffee	613	490	491	1.4	-10.0
Rubber	0	1	2	0.0	303.1
Others	3,585	3,269	4,154	12.2	7.9
LIVESTOCK	29,688	30,555	31,272	100.0	2.7
Hog	26,761	27,423	28,130	90.0	2.6
POULTRY	31,047	33,319	34,770	100.0	6.0
Chicken	22,125	23,442	24,021	69.1	4.3
Chicken Eggs	8,553	9,655	10,525	30.3	11.5

Source: BAS.

Table 14: Investment opportunities and industry cluster priorities, CALABARZON

DA-AMAS opportunities	DTI-RODG cluster priorities
Vegetable Production and processing	Bamboo
Rootcrops Production and processing	Wood
Cutflowers and Ornamentals Production	Pangasius
Plant Nurseries	Processed food (delicacies)
Aquaculture production and fish processing	Meat processed
Hog, Poultry, Dairy; Meat Processing	Poultry
Abaca Production and processing	Cacao
Coffee Production and processing	Coffee
Corn Production and processing	Organic fertilizer
Integrated Coconut Production and Processing	Coconut/coir
Expansion of Pineapple Areas for Export	
Herbals / Essential Oils production and processing	

MIMAROPA

The main crop in MIMAROPA is rice, followed by coconut and calamansi (Table 15). Livestock and poultry production are small, relative to the northern Luzon regions. About 28% of regional GDP is from agriculture; according to the RDP, agricultural development requires a modernization, increases in productivity, and value added processing. MIMAROPA is identified as lead region for calamansi production by DTI-RODG, which is also reflected in the investment list of DA-AMAS (Table 16).

Table 15: Value of production of crops and livestock, MIMAROPA, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	25,784	24,703	30,709	100.0	9.6
Palay	13,979	13,377	14,480	47.2	1.8
Coconut	2,934	3,210	6,366	20.7	58.5
Banana	1,159	1,336	1,546	5.0	16.7
Calamansi	2,658	1,658	2,552	8.3	-2.0
Others	2,673	3,213	3,416	11.1	13.9
LIVESTOCK	7,128	7,891	8,045	100.0	6.4
Cattle	1,137	1,224	1,369	17.0	10.2
Hog	5,358	5,977	5,995	74.5	5.9
POULTRY	1,163	1,193	1,264	100.0	4.3
Chicken	752	758	810	64.1	3.9
Chicken Eggs	349	365	382	30.2	4.6

Source: BAS.

The ARC cluster in the region is the Central Grain Cluster located in Palawan. The major commodities in the cluster are rice, corn, coconut, oil palm (2,387 ha), and banana. The cluster agribusiness program focuses on raising palay production, including organic rice, integrated with organic fertilizer production. The NFA is identified as the primary buyer of palay. The other focal commodity is goat production with the market being the domestic market as well as potentially Malaysia. The cluster development plan contains a cost and returns analysis (p.12), although the financial analysis is highly aggregated.[6]

Table 16: Investment opportunities and industry cluster priorities, MIMAROPA

DA-AMAS opportunities	DTI-RODG cluster priorities
Mango Production and Processing	Bamboo
Rubber Production and Processing	Banana
Pam Oil Production and Processing	Mango
Corn Production and processing	Calamansi (lead region)
Calamansi Production and processing	Milkfish
Calamansi Processing Plant	Processed food (delicacies)
Banana (Saba) Production and Processing	Coco coir
Cassava Production and Processing	Rubber
Sweet Potato Production and processing	
Area Expansion for Pineapple, onions	
Coconut Production and Processing	
Abaca Production and Processing	
Poultry Production	
Meat Processing Plant	
Cattle Raising	
Goat Raising	
Seaweeds Production and Processing	
Marine / Fishery Products Processing Plant	
Agro-tourism, Flowers / Vegetable Garden	

[6] The other ARC cluster is the Masbate Western Corridor ARC Cluster. The agribusiness plan is not available.

Bicol

For Bicol region, crops with the largest production are palay and coconut, followed by corn, pineapple, and abaca. Hog and poultry production are sizable but small in comparison with crop production (Table 17). The RDP proposes agricultural development based on high yielding varieties and improved production technologies, establishment of agro-enterprise clusters engaged in processing and packaging, expansion of livestock and poultry, as well as tree farming. Large regional production of abaca, pineapple, and especially coconut reflects in the DTI-RODG cluster priorities. Abaca and pineapple are also present in the DA-AMAS list, though it places greater emphasis on specialty products such as pili nut, tiger grass, essential oils, etc (Table 18).

Table 17: Value of production of crops and livestock, Bicol region, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	28,048	30,919	35,600	100.0	13.5
Palay	13,550	14,757	14,490	40.7	3.5
Corn	2,115	1,925	2,466	6.9	8.3
Coconut	5,821	7,186	10,335	29.0	38.8
Banana	648	696	744	2.1	7.4
Pineapple	1,396	1,442	1,609	4.5	7.7
Camote	651	861	949	2.7	22.9
Abaca	674	685	1,039	2.9	27.1
Others	1,935	1,944	2,304	6.5	9.5
LIVESTOCK	11,939	13,048	12,877	100.0	3.9
Hog	9,538	10,477	10,306	80.0	4.0
POULTRY	3,507	3,923	4,107	100.0	8.6
Chicken	1,904	2,251	2,363	57.5	12.1
Chicken Eggs	1,393	1,460	1,542	37.5	5.3

Source: BAS.

Table 18: Investment opportunities and industry cluster priorities, Bicol region

DA-AMAS opportunities	DTI-RODG cluster priorities
Pili Pineapple Native chicken production Livestock production Corn, vegetable, strawberry, white potato, banana processing Tiger grass Processing Abaca expansion Agro-tourism (vegetables/fruits/flower gardens) Herbals/ Essential Oils Dairy and meat processing Meat processing Aquaculture (milkfish, tilapia)	Abaca Bamboo Pineapple Processed food (delicacies) Coconut/Coir

For the region the ARC cluster is the Albay Tres. The main commodities produced in the cluster are coconut, rice, corn, sugarcane, and abaca. The commodity focus for the agri-business venture is geotextile net production. Marketing is arranged by the PITAD Foundation, an NGO, with the local marketing arm of a Chinese importer, the Rite Management and Finance, Inc, with the product to be marketed for construction projects in China. A cost and returns analysis estimates a net profit of the decortication and weaving plant starting from year 1 onward.

Western Visayas

Western Visayas is a major producer of agricultural products, with a value of crop output of 77.8 billion, which is higher than any of the priority regions, except Davao Region (Table 19). The biggest crop is sugarcane (Negros Occidental province being the country's largest can producer); this is followed by palay. Livestock and poultry together combine for nearly 28 billion pesos. About 27% of GDP is from agriculture; among the regions of the country, agriculture has enjoyed one of the highest growth rates (3.1%) since 2009. According to the RDP, an emphasis for agricultural development is environment-friendly program of crop and fishery diversification, especially high-value and non-traditional commodities. This is combined with training and capacity building of farmers as entrepreneurs and development of grassroots enterprises.

Table 19: Value of production of crops and livestock, Western Visayas, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	61,291	62,381	77,840	100.0	13.5
Palay	30,342	25,772	29,904	38.4	-0.7
Sugarcane	15,712	20,927	30,529	39.2	47.2
Banana	3,235	3,461	3,422	4.4	2.9
Others	2,816	2,980	2,989	3.8	3.1
LIVESTOCK	17,249	17,539	17,474	100.0	0.7
Hog	14,356	14,519	14,306	81.9	-0.2
POULTRY	9,264	9,730	10,482	100.0	6.6
Chicken	6,244	6,613	7,088	67.6	6.8
Chicken Eggs	2,533	2,610	2,855	27.2	6.4

Source: BAS.

The DTI-RODG identifies Western Visayas as the lead region for Muscovado; DA-AMAS has a longlist of investment opportunities in the region, some of which are also related to sugarcane production (Table 20).

The ARC cluster is HIMABINAISA in Negros Province. The common agricultural products are sugarcane, rice, corn, coconut, fruit trees, and fish (both marine and fishpond). The agribusiness plan calls for: engagement of ARB organizations in logistics and marketing of agricultural products, as well as diversification into livestock and poultry production.

Table 20: Investment opportunities and industry cluster priorities, Western Visayas

DA-AMAS opportunities	DTI-RODG cluster priorities
Watermelon/ Honeydew Production	Abaca
Fruit and Mango Processing Plant	Bamboo
Ethanol and Muscovado Sugar Production	Mango
Integrated Coconut Production and Processing	Kalamansi
Cutflowers and Ornamental Production	Milkfish
Abaca processing into furniture / handicrafts	Seaweed
Cassava Production and Processing	Meat fresh and processed
Banana Saba Production and Processing	Dairy
Ginger Production and processing	Coffee
Coffee Production and processing	Muscovado (lead region)
Cashew Production and processing	Organic fertilizer (lead region)
Jackfruit Production and processing	
Piña Fiber Production and processing	
Seaweeds Production and processing	
Marine products processing	
Aquaculture	
Livestock /poultry production	
Feed milling	
Meat processing, dairy production and processing	
Organic fertilizer production	
Industrial Tree Plantation	
Sericulture	
Agro-tourism	

Central Visayas

Crop production reaches 24.6 billion pesos, fairly evenly distributed across rice, sugarcane, corn, coconut, fruit crops (banana and pineapple), and other crops (Table 21). Both livestock and poultry production combine for 27.1 billion pesos of output, larger than the crop sub-sector.

Table 21: Value of production of crops and livestock, Central Visayas, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	19,630	20,532	24,625	100.0	12.7
Palay	4,543	4,398	5,156	20.9	6.8
Corn	2,848	2,391	2,677	10.9	-3.0
Coconut	1,586	2,080	3,309	13.4	54.3
Sugarcane	2,565	3,205	4,984	20.2	47.1
Banana	1,358	1,395	1,507	6.1	5.5
Mango	2,076	2,266	2,148	8.7	1.7
Others	3,255	3,364	3,366	13.7	1.7
LIVESTOCK	13,963	15,691	16,303	100.0	8.4
Hog	11,713	13,202	13,631	83.6	8.2
POULTRY	9,383	10,031	10,805	100.0	7.6
Chicken	6,137	6,550	7,122	65.9	8.0
Chicken Eggs	3,204	3,435	3,637	33.7	6.8

Source: BAS.

Central Visayas, like CALABARZON, is a highly urbanized region with only a minor share (7.8%) of regional GDP from agriculture. The RDP understandably calls for product

diversification to promote value adding and boost incomes of agriculture and fishery-based households. Given the diversity of agricultural activities, DA-AMAS presents a long list of investment opportunities in the region (Table 22).

Table 22: Investment opportunities and industry cluster priorities, Central Visayas

DA-AMAS opportunities	DTI-RODG cluster priorities
Bee keeping Production	Abaca
Solar Salt Production	Bamboo
White Potato Production	Mango
Commercial crop production and processing	Kalamansi
Corn Production and processing	Processed food
Ubi Production and processing	Coffee
Peanut Production and processing	Muscovado
Cassava Production and processing	Coconut/coir
Ginger Production and processing	Rubber
Squash Production and processing	
Sweet potato Production and processing	
Red/ Green Bell Pepper Production	
Fruit/Citrus Production and processing	
Pineapple Production and processing	
Marine Products Production and processing	
Aqua culture	
Deep Sea Fishing	
Integrated Coconut Production & Processing	
Cutflower and Ornamental plants	
Industrial Tree Crops Plantation	
Sugar Mill Upgrading and Refining	
Ethanol Production	
Poultry (native chicken) Production	
Livestock Production	
Swine Fattening/ Breeding	
Meat Processing	

The ARC cluster for Central Visayas is the BAYBASTAC ARC in Negros Oriental, for which the main crops are sugarcane, coconut, rice, corn, vegetables, and rootcrops. The agro-industrial program calls for ARC organizations to integrate forward to trading activities.

Eastern Visayas

Eastern Visayas is one of the agri-based regions (with one-fifth of output from agriculture); however growth in GDP both in agriculture and in other sectors has been very slow. Crop production is concentrated in rice and coconut; the third largest crop is banana, followed by sweet potato (Table 23). The RDP observes that LGUs in the region now give importance to the processing and packaging node of the agri-business value chain. Many municipalities are part of the one town, one product program (OTOP) based on coconut and marine product processing. It also notes numerous constraints behind such value chain formation, namely: poor packaging and labeling of regional products; lack of government food safety certification; lack of market outlets for packaged and processed products (e.g. *pasalubong* centers); and high handling and transport

costs, due to poor road conditions, limited transport facilities, and inadequate handling facilities. This is indeed a challenge for realizing the long list of investment opportunities of DA-AMAS as well as the shorter list of DTI-RODG (Table 24).

Table 23: Value of production of crops and livestock, Eastern Visayas, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	30,496	31,973	38,470	100.0	13.1
Palay	13,322	13,450	13,727	35.7	1.5
Coconut	8,814	9,942	14,956	38.9	34.8
Banana	1,942	1,976	2,143	5.6	5.2
Cassava	599	599	752	2.0	12.8
Camote	1,365	1,336	1,621	4.2	9.4
Abaca	744	737	745	1.9	0.1
Others	1,662	1,862	2,082	5.4	12.6
LIVESTOCK	10,622	11,384	11,468	100.0	4.0
Hog	9,502	10,339	10,213	89.1	3.7
POULTRY	3,909	4,005	4,027	100.0	1.5
Chicken	3,419	3,565	3,553	88.2	2.0

Source: BAS.

Table 24: Investment opportunities and industry cluster priorities, Eastern Visayas

DA-AMAS opportunities	DTI-RODG cluster priorities
Sweet Potato Production and processing	Abaca
Mango Production and processing	Bamboo
Banana Production and processing	Banana
Root sap Processing	Kalamansi
Abaca Production and processing	Milkfish
Pili Nut Production and processing	Pangasius
Jackfruit Production and processing	Processed food (lead region)
Integrated Coconut Production and Processing	Veggie noodles
Coffee Production	Coconut/coir
High Value Vegetables	
Rice and Corn milling	
Aquaculture	
Fish Processing	
Seaweeds Culture	
Broiler Production	
Livestock Production	
Feed milling	
Agro-tourism Development	
Cutflower and Ornamental Production	
Herbals / Essential oils (lemon grass, citronella)	

There are two ARC clusters in the region, namely: the Sinirangan Norte ARC cluster (Eastern Samar), and the Leyte District I Cluster. The former proposes area-based rural enterprise development based on increasing palay production, integrating forward to rice milling, as well as establishment of abaca stripping facilities. The latter is anchored on high value vegetables, for sale in the wet markets and restaurants of Tacloban City, the primary urban center of the region. Farmers will undertake both production and marketing, with farmer associations dealing directly with vendors and restaurants. Production will focus on hybrid varieties for improved yield; farmers would also undergo training to ensure quality.

Davao Region

While Davao region has had a long history of agricultural development, by 2011 less than one-fifth of regional GDP was from agriculture. Nevertheless, crop output was 91.5 billion pesos, larger than in the other GROWTH regions (Table 25). The biggest crop is banana, primarily Cavendish banana for exports; the next largest crop is coconut, which alone accounts for 20.5 billion dollars. Other major crops (but relatively small shares in crop output) are coffee and rubber. The DTI-RODG list of cluster priorities is somewhat longer than for the other regions; Davao Region is identified as lead for banana and mango production (Table 26).

Table 25: Value of production of crops and livestock, Davao Region, 2009 - 2011

	In million pesos			In percent	
	2009	2010	2011	Share in total	Growth
CROPS	70,290	77,155	91,540	100.0	15.1
Coconut	10,256	12,731	20,466	22.4	49.8
Banana	41,472	46,300	49,650	54.2	9.9
Coffee	1,210	1,212	1,316	1.4	4.4
Rubber	480	889	1,187	1.3	73.6
Others	5,628	5,784	7,083	7.7	12.9
LIVESTOCK	11,698	13,182	13,865	100.0	9.3
Hog	9,887	10,991	11,617	83.8	8.7
POULTRY	7,384	7,335	7,772	100.0	2.6
Chicken	5,176	5,082	5,390	69.4	2.1
Chicken Eggs	1,984	2,019	2,141	27.5	4.0

Source: BAS.

Table 26: Investment opportunities and industry cluster priorities, Davao region

DA-AMAS opportunities	DTI-RODG cluster priorities
Fruit and vegetable production and processing	Abaca
Banana expansion area	Bamboo
Cassava Production and processing	Wood
Abaca Production and processing	Banana (lead region)
Area Expansion for rubber	Mango (lead region)
Integrated Coconut Production and Processing	Pangasius
Vacuum Dehydrated and Spray Dried Fruit Processing	Seaweed
Canned products: vegetable, fruits, fish	Processed food
Dried and smoked fish product	Poultry
Culture of crabs, pearls	Cacao
Industrial Tree Plantation	Coffee
Organic Fertilizer Production	Coconut/coir

DAR (2002b) meanwhile selects coffee as one of the priority commodities for the region. The RDP identifies agri-industrialization as a key to achieving development targets for the region, based on agri-based small and medium size rural industries supported by efficient logistics. The Regional Development Council (RDC) has developed an Industry Cluster Plan 2005 - 2010 (RDC, 2005). The priorities identified in the Plan can be summarized into a matrix (Table 27). The short list of cluster priorities are: banana, coconut, mango, seaweed, and wood. While primary production is done within the region, the Cluster Development Plan identifies the parts of the chain for development within the region, i.e. processing of banana (chips, flour, ketchup); nontraditonal products from coconut; and value adding for mango

(vapor heat treatment, dried mango, etc.)

The emphasis on coconut is echoed in the agribusiness plan of the Gulf Towns ARC Cluster, in Davao Oriental. The main product is copra; the agribusiness study notes that the six large coconut oil mills need to source their supply of copra from all over Mindanao. The agribusiness strategy is for farmers to organize marketing associations to integrate forward into marketing to these large mills.

Table 27: Regional matrix of value chain priorities, Davao Region

	Input supply	Production	Transformation/ focal commodities	Trading	Final sale
Banana (cardava)	Yes nurseries	Yes	Yes; chips	Yes; export	
Banana (Cavendish)	Yes; pallets	Yes; off-grade	Yes; flour, ketchup	Yes; domestic?	
Coconut	Yes; nurseries	Yes	Yes; non-traditional (non-copra): VCO, coir, charcoal, toddy, lumber, etc.	Yes; export	
Mango	Yes; nurseries	Yes	Yes; vapor heat treatment dried, puree, juice, powdered		
Seaweed	Yes; bamboo poles; seedlings; boats	Yes	Yes; dried carageenan[1]		
Wood	Yes; Seedlings	Yes	Yes; Lumber, Plywood, Wood chip, Furniture	Yes; Domestic & Export	

[1]Large-scale activity, capacity of about 1,000 tons of seaweed per day

1.13. Other regions

The major crops in *CAR (Cordillera Autonomous Region)* are cabbage, other crops (mostly vegetables), and coffee. According to the RDP, agricultural development is anchored on modernizing and commercializing traditional agriculture, e.g. niche products such as heirloom rice (grown in the rice terraces), organic high value crops (e.g. organic coffee), contract growing for agro-processing and fast food chains, and diversification of products (e.g. fruit trees such as lanzones, rambutan, and durian in Apayao). Nearby in *Ilocos Region* the main crops are mango, tobacco, and vegetables (tomato, onion, and eggplant). Likewise the agribusiness strategy highlights safe, healthy, as well as organically produced agricultural products.

The major crops in *Zamboanga Peninsula* are coconut, rubber, banana, and mango. The RDP proposes establishment of a network of agri-processing centers, in the Zamboanga Economic Zone, Provincial Industrial Center (in Roxas municipality), as well as in Ipil, Zamboanga Sibugay, and Zamboanga del Sur. Commodities for which the region is thought to have comparative advantage are: rubber, seaweeds, coconut, mango, banana, vegetables, and sardines.

Meanwhile in *Northern Mindanao*, the major crops are coconut, banana, pineapple, and corn. According to a DAR (2002e) report on the corn subsector, output is sold to municipal or larger traders (based in Cagayan de Oro), or for home consumption (after being custom-milled in local processors). The product is then sent to large millers based in Cebu (in case of

White corn), or for large integrated millers (who have their own livestock or poultry farms); these tend to offer a premium price. The RDP proposes cluster of small-sized farmers for enterprise development. Meanwhile for Central Mindanao or SOCCSKSARGEN, the major crops are coconut, banana, and coffee. The RDP proposes increasing palay production, together with expansion of commercial crops (pineapple, banana, coffee, coconut, sugarcane, oil palm, and rubber), as well as aquaculture farm areas (*Pangasius*, crabs, tilapia, milkfish, and prawn products).

Caraga and *ARMM* are among the poorest regions in the country. Agricultural development according to the RDP requires increasing rice production, as well as higher productivity of other crops. It also entails support to industry clusters for agricultural products and manufactured goods, including commercial crops (e.g. palm oil), abaca, and banana. The aim is for farmers' income to increase 10% from 2013 to 2016.

Lastly, in *ARMM* the major crops are coconut, banana, cassava, and rubber. Agribusiness opportunities in ARMM have been evaluated in Dy (2012), for coconut, oil palm, natural rubber, coffee, cacao, and seaweeds. His analysis points to numerous opportunities as well as constraints. In the case of coconut, the market chain is very long (as in other regions). Only one mill in ARMM, located in Sulu island; nearby oil mills are in Iligan City, Zamboanga City, and General Santos. Marketing costs are high owing to multiple layers in the chain, which is compounded by the poor state of the transport system, as well as complex tenure issues. Another potential source of expansion is oil palm. Demand is high, and the country imports 80% of its requirement, primarily for cooking oil. Farmers however are constrained from realizing high yield owing to large working capital requirement for fertilization.

A recent comprehensive analysis of value chains in ARMM is found in an IC Net (2011) report commissioned by JICA. The study describes value chains for several crop and fishery products in the region. The following are identified as High priority crops for promotion in ARMM, namely: abaca, cassava, coconut, coffee, abalone culture, mudcrab culture, seaweed, cattle, chicken, and goat.

5. GAP ANALYSIS

1.14. Summary

To recapitulate: available information by product and category of information is summarized in Table 28. A few clarifications are in order: first, information on investment opportunities and priorities is presented at the national level, as information by region is too detailed for the purpose of a compact summary. Instead information specific to regions or even ARC clusters is captured in the *Remarks* column.

Second, even a national level listing leaves a long list of commodities; to shorten the list, only commodities mentioned more than once among the information sources are included in the matrix. That is, the list only considers products for which there is independent corroboration regarding presence of investment opportunity. For instance, "Herbal oils" is mentioned repeatedly in the DA-AMAS list of priorities, but this does not appear in any other commodity profile or value chain study, and is therefore omitted. The DA-AMAS also frequently mentions "sericulture", which is corroborated in the FIDA listing of "Silk" as a fiber industry, hence Silk gets its own row.

Third, the categories of information needed for a fairly comprehensive characterization of the value chain as preparation for the GROWTH project are: *description of the chain*, i.e. at least primary production as well as forward and backward linkages; *description of key players* at

the primary level and in the backward and forward linkages; *analysis* of opportunities and constraints; and *financial analysis*. The last is divided into financial analysis of the primary level (i.e. cost and returns of the farm operation); and financial analysis along backward and/or forward linkages (e.g. processing).

The matrix shows that a few of the major commodities have comprehensive value chain information, i.e. all the row cells are marked "x", namely: rice, coconut, banana (cardava), pineapple, cassava, abaca, cocoa, rubber, rattan, and wood (only in Davao region). Among the commodities, the ones with the least information along nodes of the chain are vegetables (including legumes) and fruits, except bananas (cardava and Cavendish), even for some major commodity types (as listed in the table, e.g. Durian, Stringbean, etc).

For vegetables, even some of the information available (from Digal and Montemayor, 2005) is compiled for the subsector as a whole, which is likely to conceal heterogeneity within the subsector. Some other commodities suffering glaring gaps in information are nuts and ruminant livestock; the latter omission is significant as dairy products and goat raising have appeared in some of the ARC Cluster proposals.

By category of information, the most commonly filled up column turns out to be financial analysis at the farm level, thanks to the BAS cost and returns survey (CRS) data. The column with the least information is financial analysis for either upstream- or downstream-linked activities; the omission is glaring for two of the major agricultural commodities, i.e. sugarcane, and corn, whether for food or feed. The column cells are marked "X" for major traditional crops which are prominent among the ARC Cluster agribusiness plans, i.e. rice and copra.

Table 28: Matrix of available information related to value chains, by agricultural commodity

	Source (see Bibliography)	Product description, key players	Opportunities and constraints	Financial analysis: Primary	Financial analysis: Other	Remarks
Rice	1, 7, 9, 36, 37, 54	x	x	x	x	High costs prevalent along chain; uncompetitive; closed to imports.
White corn	7, 16, 21	x	x	x		High cost, semi-open.
Yellow corn	7, 16, 21, 54	x	x	x		High cost, semi-open.
Coconut	8, 20, 34, 46, 5056, 65, 67, 68	x	x	x	x	For export. Comprehensive value chain analysis for Davao Region.
Sugarcane	69, 70	x	x	x		High cost, semi-open
Cardava banana	7, 41, 67	x	x	x	x	Comprehensive value chain analysis for Davao Region
Mango	4, 5, 7, 40	x	x	x	x	Export (fresh and processed). Comprehensive value chain analysis for Davao Region.
Calamansi	2, 7	x	x	x	x	Value chain study available, for the domestic market
Durian	7			x		
Papaya	7			x		
Pineapple	7, 68	x	x	x	x	Comprehensive value chain study available
Watermelon	7			x		
Mangosteen	51	x	x		x	Value chain analysis available
Cassava	7, 38, 68	x	x	x	x	Comprehensive value chain study study available
Sweet potato	7, 39			x		
Mungbean	7, 39			x		
Peanut	7, 39			x		
Ampalaya	7, 39		x	x		Based on multiproduct vegetable study and BAS CRS
Onion	7, 39		x	x		
Carrots	7, 39		x	x		
Cauliflower	7, 39		x	x		
Eggplant	7, 39		x	x		
Garlic	7, 39		x	x		
Habichuelas	7, 39		x	x		
Stringbeans	7, 39		x	x		
Abaca	47, 68	x	x	x	x	Comprehensive value chain study available.
Coffee	7, 18, 44	x	x	x		Value chain analysis available
Cocoa	43	x	x	x	x	Comprehensive value chain study available
Oil palm	19, 34, 50, 64	x	x	x		Value chain analysis available.
Rubber	14, 17, 42	x	x	x	x	Comprehensive value chain study available

	Source (see Bibliography)	Product description, key players	Opportunities and constraints	Financial analysis: Primary	Financial analysis: Other	Remarks
Cashew	7			x		
Pili	7			x		
Silk	48	x	x			Declining supply, intensified import competition
Hogs	55	x	x	x		Value chain analysis available
Goat	55					ARC Cluster project for Palawan.
Cattle, dairy	55, 57	x				ARC Cluster project for Isabela.
Chicken	55	x	x	x		Value chain analysis available
Bamboo	23, 47	x	x	x	x	Financial analysis suggests low rates of return..
Rattan	53	x	x	x	x	Comprehensive value chain analysis available
Wood	67	x	x	x	x	Comprehensive value chain analysis for Davao Region

However in the case of copra, the information available pertains to coir processing; this differs from the activities being proposed in the ARC cluster plans, such as copra trading (by farmer associations). In the case of rice, financial analysis is available (Dawe et al, 2007) but the analysis indicates high level of marketing cost, relative to benchmark levels in other countries (e.g. Thailand).

The value chain studies generally imply that expansion of investments in any of the products reviewed is warranted (despite any constraints that may have been mentioned) due to the market opportunities involved. The matrix does note a couple of exceptions under the Remarks column, namely: Silk industry (negative market trends); and Bamboo (estimated rates of return are modest at the production stage). In general an unfavorable Remark about competitiveness (appearing in the Matrix) does not immediately rule out investments, but does suggest the onus of proving financial viability is greater on such products or activities.

Evaluation of the validity and quality of the individual studies reviewed here is beyond the scope of this stock-taking. The overwhelming tendency for the value chain studies to advocate investments does however raise questions about how critically these studies evaluate the opportunities and constraints. Many of the value chain studies are heavy on descriptive analysis of market size, trends, key players, and business opportunities, but light on financial analysis and related quantitative indicators for a more evidence-based assessment. This limits the usefulness of the analysis in actual programming and budgeting.

Moreover, value chain appraisal has seldom led to concerted efforts towards value chain upgrading or coordination of actors in a chain. The aforementioned lack of financial analysis is partly responsible for this state of affairs, as key actors are not encouraged to make the requisite investments in upgrading. A more important factor is the narrow sectoral focus of some agencies: for instance, DA specializes in farming, while DTI focuses in processing, with interagency coordination too weak to realize synergies. A prominent exception perhaps is the industry cluster project of DTI, initiated in Davao, but now conducted throughout the country. A key to the success of this project is the lead role Regional Development Councils based on coherent and informative industry cluster profile (effective a value chain study). This may well be a model for other value chain interventions and industry road map initiatives in the country.

1.15. Concluding remarks

This paper has taken stock of information on agricultural value chains in the Philippines studies by a review and synthesis of studies, road maps, master plans, and so on, at least for strategic commodities relevant for ARC clusters under GROWTH. The stock-taking has shown that much information is available but gaps remain as identified above. Some of the key findings are: Opportunities seem to be well substantiated for export-oriented crops. The sites suitable for the corresponding value chains are those in which primary production and marketing systems are fairly well established, e.g. coconut and its various products, crumb rubber, etc. The value chain studies also take note that risks (e.g. price volatility) and entry barriers (lack of market access) do pose challenges towards agri-enterprises even in the high-opportunity areas. On the other hand, even for the less competitive import-competing products, producers may wish to specialize in niche products, e.g. organic rice, corn feed production, muscovado sugar, etc.

One final important *caveat* is that quality of information is not considered in the gap analysis. Hence, further work is needed towards a critical assessment of the quality of the information in the value chain studies. One possibility to obtain this critical assessment is to present results to stakeholders, particularly those experienced in agribusiness, i.e. private sector players in specific areas.

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