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prepared by	Phillip Curry, Oleg Nicetic and Gomathy Palaniappan
co-authors/ contributors/ collaborators	University of the Philippines Mindanao team led by Silvia Conception, Visayas State University team led by Dr Tony Abamo and Landacare Philippines team lead by Evy Caruso
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1 Acknowledgments

This report represents the process and outcomes of extensive collaboration of researchers, local govrment officals, NGOs and farmers in Southern Philippines over a period of five years, from 2013 to 2018. The work, however, would not have been possible without the active involvement of the community memebrs at the project sites who were actively engaged in identifying their livlihoods problems, reviewing and testing solutions, and working out the actual benefits for them of the innovations tested. Over the project period they became increasingly influential in determining production and marketing options as well as shaping structure and management of their cooperatives.

In addition, the involvement of the extension and technical personnel from the various divisions of Cagayan de Oro City Agricultural Office, Ormoc Department of Agriculture, IsraAid and Energy Development Coorporation , was crucial to succesful improvement of pruduction and development of value chains. We also want to acknowladge numerouse tradres tha got engaged with the project and made their busninsses more inclusive.

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2 Executive summary

This research was initiated and funded by the Australian Centre for International Agricultural Research (ACIAR) to investigate and develop models that integrate value chains and community development in ways that enhance smallholder farming community livelihoods. Communities were purposefully selected on the basis of crop grown and existing relationships with collaborating partners in the Philippines. Whilst the project originally focused on tomatoes, eggplant, sweet pepper, bitter gourd and mangoes, communities decided to produce other vegetables because they recognised market opportunities.

Capacity development revolved around five key capitals being physical, economic, social, environmental and human. Semi-structured interviews, focus groups and surveys provided a baseline at the beginning of the research and focus groups and household surveys provided evidence of changes in each of the capitals at its completion.

Evidence of transformation from the project included improvements in diets resulting from increased income, improvements in the status of households evidenced by increased number of households with electricity and telephone and motorcycle ownership. Households also reported substantial increases in cash savings. Improvements in 'human capital' were also reported with households identifying significant changes in confidence to contribute to the operation of farms, especially by females, and confidence to meet customers and negotiate prices. New knowledge and technologies were adopted in several sites and this allowed higher quality vegetables to be produced which in turn allowed communities to access markets for premium quality vegetables which returned higher prices. Production scheduling and improved methods of production and post-harvest handling were adopted to minimise risk and increase income. Several communities commenced irrigation during the project and achieved productivity improvements as a consequence. Soil erosion measures were adopted in one community and this was significant because farms were located on very hilly land which is prone to erosion from typhoon rains. An especially significant outcome at many sites was the increased capacity, confidence and willingness of community members to establish and maintain linkages with institutions including city agricultural departments, city mayor's offices, market actors of which the communities had no prior knowledge but became customers during the project, and others that did and will continue to assist the communities to further improve the livelihoods of members into the future.

The approach to value chain integration adopted by the project was novel. Instead of identifying a single 'chain' to investigate, the project conducted a broad analysis of the entire market for vegetables of interest and mango in the regions of interest. This approach allowed investigators to identify the relative attractiveness of alternative distribution channel members as potential customers. Measures of relative attractiveness included a number of characteristics but most importantly was the capacity of the community to consistently deliver products of the required quality. The broad approach to understanding the quality and quantity requirements of alternative chains and potential customers meant that communities with lower levels of product quality could select customers whose specific requirements they could meet. The market overview also provided communities with a 'roadmap' for product quality improvement because it provided them with an understanding of the product specifications, quantities required and prices paid for vegetables and mango of all qualities and to which they could aspire. The project facilitated meetings between farming communities and prospective customers and a number of mutually-beneficial relationships were established as a consequence.

The project made an important contribution to ACIAR's Southern Philippines Horticultural Program and in so doing, developed a number of approaches that are available to be employed in other Research for Development projects.

3 Background

The Philippines, a developing country of around 94 million people with a national poverty level of 25%, is divided into 17 regions and 80 provinces. In the southern Philippines' Visayas and Mindanao island groups, Regions VIII (Eastern Visayas), X (Northern Mindanao) and XI (Davao) contain some of the poorest provinces in the country, with between 39% and 45% of the population living in poverty in these three regions (NSCB, 2009). Two thirds of the population in the southern Philippines are dependent on agriculture, where fruit and vegetable production makes a significant contribution (Arsenio, 2011). As a result, poverty levels in the region are highest among farmers and fishermen, who are among the 45 million Filipinos living on less than USD2 per day (ACIAR, 2012).

Poverty, low levels of fruit and vegetable consumption and increased incidence of disease are linked (FNRI, 2008). National fresh produce consumption of 164g per day (110g vegetables plus 54g fruit) is well below the Asian regional average of 345g per day (Concepcion and Batt, 2011) and WHO standards of 400g per day. In spite of the Government of Philippines' combined approach that includes fortification, nutrition education, dietary supplementation and diversity (Johnson, et al., 2008), vegetable consumption is lower in the southern regions of the Philippines (PhilippinesBureauofAgriculturalStatistics, 2009). This situation is compounded by a national annual vegetable production deficit estimated to be 400,000T (Digal & Concepcion, 2004).

Published literature, previous research (HORT2007/066, HORT2007/067) and a scoping study (ACIAR Value Chains/Communities-2012-158) across 10 southern Philippines locations in 5 provinces reveal that vegetables are grown in small areas (average 0.3ha in Davao and Ormoc), technology adoption is poor, productivity is low (Johnson, et al., 2008), farm-to-market losses are high (30-50%, up to 80% in wet weather) and product quality is low. There are numerous causes for poor technology adoption including market-related factors, agro-climatic conditions, and lack of information and institutional support to enhance knowledge dissemination particularly for vegetables as other sectors like rice is given priority leading to low productivity. Poor infrastructure compounded with farmers and traders focus on production rather than marketing results in low product quality (Johnson, et al., 2008).

Smallholders have little bargaining power with traders and wholesalers, receiving as little as 20-40% of the retail price of vegetables. In combination, these factors mean that farmers are poor (average income <USD1400/year), leading to poor rural communities affected by low food security, malnutrition, low levels of education and inadequate health care (UNDP, 2012; Virola, 2009).

Individual small farmers face significant disadvantages in meeting large volume and quality demands imposed by institutional buyers. Therefore, a previous ACIAR project HORT/2007/066 has made an attempt to organise small farmers into clusters to market cooperatively. According to study findings cluster marketing brings number of benefits to small farm communities (Batt et al, 2010; Digal & Concepcion, 2007; Montiflor et al, 2010). Key benefits of cluster marketing arrangements include greater access to markets, technical information, inputs and micro-finance; improved bargaining power; higher prices and lower costs. Cluster marketing also provide greater employment opportunities in land preparation, planting, harvesting and sorting, and transport; develop more close relationships with communities and create easy access to public investments in infrastructure. However, findings reveal that in the long-run, cluster marketing groups will only survive when there is an appropriate level of trust, confidence and unity; a personal commitment; active leadership; open communication; collective decision making; multiple buyers and abundant institutional support.

Also, trade related policies impact the vegetable sector largely in terms of export access and import competition articulating several challenges for the development of high value commercial industries (Digal & Concepcion, 2007).

The three most important fruit crops are banana, pineapples and mangoes. According to BAS (2011), mango ranks third in terms of volume of production after coconut and banana, but second in terms of total value of production. The mango industry contributes around 3.4% to the total value agricultural commodities. Therefore, given the significance of mango industry to the Philippines economy, the fruit component of this research focuses on the mango value chain.

According to Mindanao Development Authority (2011) Mindanao is situated outside the typhoon belt and has soils and climatic conditions suited to year-round production of mangoes, and that accounts for recent growth in production of mango in the region. On the other hand, recent climate changes including longer durations of rainfall and increasing input costs are having a negative impact on production costs and costs have increased by 37.5% in the three years to 2011. Nevertheless, Mindanao is one of the only regions in the Philippines in which mango production is increasing, registering a 4.18% increase in 2011 compared with a national decline of 2.64% in production (Mindanao Development Authority 2011).

Mango producers in the Davao region benefit by having access to exporters and processors because five of the seven processors and exporters in Mindanao operate from sites in Davao. Samal Island is in the province of Davao del Norte which is part of part of Davao Region XI. In 2013, the total production of mango in Mindanao was estimated at 247,605 tonnes which was 30% of the country's total production. Production of mango on Samal Island is approximately 3,500 tonnes per annum which means it represents less than 1.5% of Mindanao production and less than 0.5% of all Philippine production. Small number of contractors (approximately 40) produce more than 80% of the island's mangos.

Links with other research

ACIAR's Philippines Horticulture Program involved eight projects. This project benefited, and benefited from, integration with two ACIAR projects that are part of this program –, vegetable integrated crop management and postharvest management and mango integrated crop management (Figure 1).

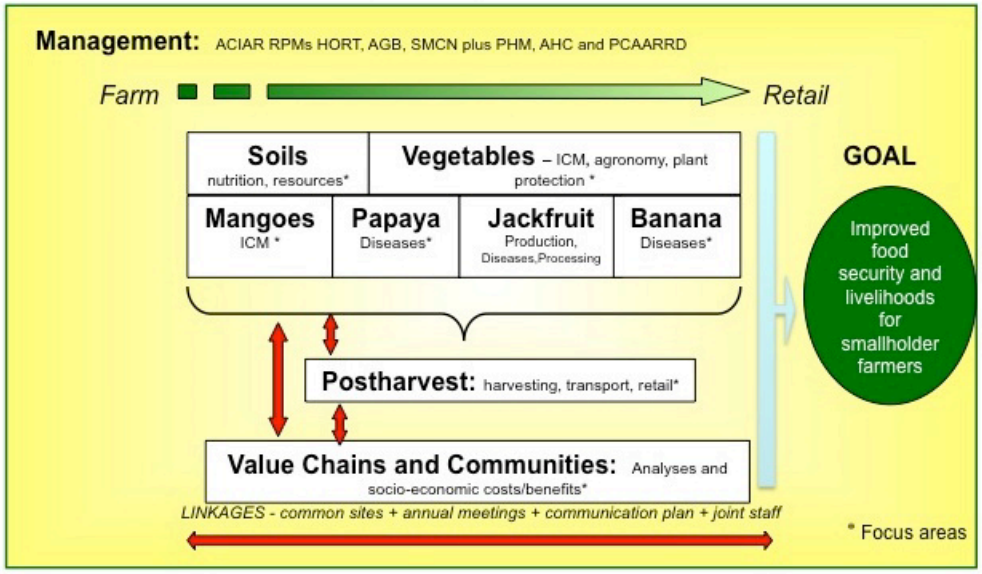


Figure 1: Southern Philippines Horticulture Program.

Main inputs from other projects were production protocols, joint farmer training and joint postharvest activities to reduce losses in developed value chains.

Research strategy

The research strategy for this project combined collaboration and participation by smallholders, communities and private sector stakeholders, with conventional data gathering methods such as literature review (external environment), objective measurement (technical chain performance, market research), semi-structured interviews (chain information and governance), focus group discussions (consumers, community stakeholders) socio-economic surveys (households) and feasibility trials (commercial trials). This approach delivered comprehensive market, consumer, value chain and community/livelihood research and analysis that combined with a stakeholder consultation process identified issues, constraints and opportunities for both community and value chain dimensions leading to well targeted interventions. Continuous monitoring, evaluation and improvement was part of learning process involving researchers and communities, with oversight and support from a junior university researcher, who frequently visited each site. This continuous participatory evaluation process ensured continues feedback. At each site research team established coordinating and advisory committee that consisted of representatives from government and non-government organisations and private sector representatives (e.g. Chamber of Commerce).

All research and development activates for vegetable component that worked with large number of smallholders were guided by sustainable livelihood framework and lot of attention was paid to development of human and social capital at all levels from farmers and value chain actors to government and non-government institutions that had enabling and supportive role in VC and community development.

In mango component project worked with contractors, major actors in the industry, with aim to a) conduct a Rapid Market Analysis to understand distribution channels and market segments for mango produced on Samal Island, and b) to establish a collaboration of Samal Island mango and value chain partners into a cohesive organisation focused on industry development.

4 Objectives

The aim of the project was to improve smallholder net income, livelihoods and community wellbeing by developing fruit and vegetable value chains integrated with community development in the southern Philippines. To achieve the aim the project team integrated community development and value chain analysis approaches to empower smallholder communities.

Specific objectives of the project were:

1. To identify opportunities for improving farmer- to -market chain performance, competitiveness and farmer net income; and associated opportunities for community development;
2. To develop value chain to improve the level and sustainability of smallholder net income and livelihoods;
3. To maximise community benefits from value chains and enhance community capacity to support value chain performance.

The project was focused around answering the following research questions:

1. What are the market-led opportunities that will improve the competitiveness of targeted smallholder vegetable and fruit enterprise?
2. What chain-building strategies will engage smallholders and their communities to take advantage of these opportunities?
3. How can farmers and their communities identify, evaluate and adopt technical and organisational innovations that improve income and livelihoods?
4. What farm system, community-based and institutional processes can facilitate the communities to which smallholders belong and the value chains in which smallholders are involved, becoming mutually supportive?
5. How can approaches that lead to mutually supportive value chains and smallholder communities be sustained and scaled up?

5 Methodology

To accommodate the wide range of technical, economic, marketing, behavioural and social factors that drive successful value chains in the community settings of this project, the research methodology was adaptive and broad-based. It was underpinned by sustainable livelihood framework (ODI, 1999) and initially by participatory market chain approach (Bernet et al., 2002) and (Collins and Dunne, 2008) but in later stage project adopted rapid market appraisal (Porter, 1980) and the agroenterprise clustering approach (CRC, 2014). Multiple methodologies are commonly used in such situations (Patton, 2002) because they can accommodate qualitative and quantitative methods, retain flexibility as circumstances change, and reflect the complexities of systems where interactions among human participants are as important to successful outcomes as are technical and economic results. The methodologies were adapted for the specific Philippines context as part of the action research process.

The details of the research methods employed are described per specific research component below.

1. **Market, social and regulatory condition analysis (Objective 1)**

Assessment of the external environment within which value chains and smallholders operate is crucial to understand how they impact on market chains, livelihoods and communities in general, and specifically to the study locations. Thus this research began with analyses of demand, seasonality of production, supply and price trends with respect to selected fruits and vegetables at national, regional and local level using primary and secondary data. Secondary data on production, imports, costs and returns and per capita consumption were used to identify trends and performance levels. This analysis was supplemented by a literature review, in particular focusing on previously completed ACIAR projects HORT2007/066 and HORT2007/067. Similarly, social and regulatory conditions were analysed through secondary data, key informant interviews and a literature review. The impacts of market, social and regulatory conditions on farmer-to-market chains, and how these influence smallholder communities, were identified.

2. **Analysis of consumer value and market potential (Objectives 1, 2)**

Consumer studies play a key role in value chain analysis as they enable the identification of attributes of fruit and vegetables as valued by the consumer. This information is used in identifying improvement opportunities that meet specific consumer needs. Intercept surveys of consumers were carried out in major outlets to identify value attributes of conventional and organic fruit and vegetables and willingness-to-pay (WTP) for organic fruit and vegetables. Survey locations and sampling procedures were confirmed in consultation with Filipino partners. Hierarchical cluster analysis was used to identify market segments for conventional and organic fruit and vegetables. Kruskal-Wallis and one-way ANOVA was used to compare market segments. Market potential and WTP was established using a multinomial logit modelling approach.

3. **Rapid Market Appraisal (Objectives 1, 2)**

Primary data collection was by way of semi-structured interviews. The use of semi-structured interviews was important because this provided the researcher with more control than unstructured interviews and allowed interviewees to provide a wider range of responses than using closed-ended questions. The use of semi-structured interviews also provided the opportunity for interviewees to discuss broadly the issues and then, with probing and prompting from the researcher, for example, “how? why?” The use of a mailed survey questionnaire was deemed inappropriate because of the research team’s previous experience of low return rates and because the investigators wanted to obtain answers to ‘why and how’ type questions which are difficult to obtain from written questionnaires.

Participants to be interviewed were purposefully selected based on the following criteria:

1. Their business activities formed part of the value chain of vegetables in regions of interest to the project. Different business models employed by businesses were noted and grouped together. By taking this approach it was found that a number of different business models were identified that traditionally may have been referred to as 'wholesalers'. However, because the research was focused on identifying similar business practices for each node, they were classified separately.
2. Their businesses were larger than average. Whilst our preference was to interview the three largest businesses within each discrete group (node) this was not always possible.

It was agreed to interview just three businesses from each node and, as long as they were larger than average businesses, (preferably the largest three), and the information obtained was consistent, it was accepted that the data obtained was representative of the group of businesses represented by the interviewees. It should be noted that this research is not being represented as statistically valid quantitative research. Its purpose was to identify themes which represent opportunities and challenges for smallholder farmers which was why a qualitative approach was selected.

Semi-structured interviews were guided by an interview guide which was developed by project personnel based on an understanding of the factors that would be important to the project and prior knowledge of vegetable distribution practices in the region.

The interview guide provided to interviewers is included below. It was developed through a process of workshops and tested before being adopted for use across all regions.

Table 1: Semi-structured interview guide

Topics for Discussion	Rationale and what we're really seeking
1. Could you please provide us with an overview of the market for vegetables in this region including, for example: a. Main areas of supply. b. Principle markets including local, wider domestic, export, processing. c. Seasonality issues including availability, quality and price variations. d. Main supply channels. e. Imports from other parts of Philippines or other countries. f. Who buys the various grades of vegetables, the factors that influence the grading, the prices received by farmers for each grade and approximate % of the total supply that might go into each grade. (draw a value chain diagram and populate it with detail)	What we are looking for here is a detailed overview of vegetable flows, distribution channels into and out of the region plus within the region. A diagram if possible. Probe for quantities or % of the total crop that flows through the various channels. We need to understand the markets for all grades of vegetables from the very best to the very worst.
2. How is the vegetable industry in Mindanao and the Philippines changing, if it is?	Trends that are important in our evaluation of alternative marketing strategies.

3. Could you please explain your business and its use of vegetables?	Probe to identify the relative size of this interviewee compared with others in their category. Try to obtain details of the quantity of vegetable they handle.
4. Can you please tell us if your business is seeing increase or reduction in supply or demand for vegetables? a. How much? b. Why do you think that is?	Consumption trends. Probe for detail.
5. Could you please tell us what 'quality' means to you? a. In other words, what are the characteristics of vegetables that are important for your use? b. How important is it that suppliers of vegetables provide 'quality' consistently? c. If they do not include any of the following, ask specifically whether they are important, how and why each would apply to them and how they measure each characteristic: i. organic production ii. no chemical residues iii. physical damage from handling, transport and packaging iv. consistency of ripeness v. consistency of size vi. consistency of colour vii. shape viii. taste. ix. shelf life	This is a very important question and we need to fully understand the characteristics of vegetables that are used to differentiate between grades. Probe to identify the market value (price) advantage of 'better' quality. Ask for copies of specifications if they exist. Take photos where you can.
6. Have you seen any evidence that consumers or anyone in the supply chain for vegetables is concerned about chemical residues or are actively seeking what might be called 'safe' vegetables? Probe further: a. Do you think consumers perceive a difference in safety of vegetables purchased in the supermarket compared with the wet market? b. Please tell me what you believe different types of consumers or commercial users (restaurants etc) might think in relation to vegetable safety.	Genuine concerns being expressed anywhere in the market (producers, distributors, retailers consumers) about chemical residues, unhygienic handling or any other practices that may vegetable safety.
7. What supply challenges does your organisation experience? In relation to the items listed above, or to consistency of quality or availability, seasonality or anything else. a. How do you manage those issues?	Any problems encountered by their organisation that prevents them from sourcing what they need or being able to deliver what their customers are seeking.
8. How are purchase decisions for vegetables made? a. Can you please describe the process of who makes the decision of what to purchase and who makes the decision about where and from whom to source?	A detailed understanding of how they made decisions about what to purchase, from whom and when.

b. On what basis are vegetable purchase decisions made (if necessary, prompt with size, colour, freshness, shape, packaging, price, other)
c. How are orders placed?
d. How frequently are they placed?
e. How much lead time is required before they are filled?

Interviewees established appointments in advance and visited interviewees in pairs; one to engage the interviewee I the discussion and the other to ensure recording devices worked and to check off discussion items.

The number of interviews completed in each region are shown in the following tables.

Table 2: Number of interviews Davao

Node	Number of Interviews In Davao
Assembler-Collectors	3
Collector-Wholesalers	3
Viajedors	2
Specialised Wholesalers	2
Producer Wholesalers	1
Small-scale Wholesalers	3
Concessionaires	3
Purveyors	3
Shippers	3
Supermarkets AB	1
Supermarket C	1
Hotels and Restaurants (4 and 5 star)	3
Budget Hotels and Restaurants	2
Institutions	4
Wet Market Retailers	2
Industry Specialists	1
Total	37

Table 3: Number of interviews Leyte

Node	Number of Interviews In Leyte
Collectors	2
Viajedor	1
Purveyor Wholesalers	1
Viajedor Wholesalers	2
Wet Market Retailers	2

Supermarkets	1
Institutions	2
Total	11

Table 4: Number of interviews Cebu

Node	Number of Interviews In Cebu
General Wholesaler	4
Specialised Wholesaler	3
Class A Wholesalers	3
Wet Market Retailers	2
Concessionaires	4
Supermarkets	5
Budget Hotels	1
Premium Hotels and Resorts	6
Restaurants (Fast food, casual dining, buffet)	4
Total	33

As data was collected and analysed it was used to assess relative attractiveness of each buyer group. The characteristics used to make this assessment of relative attractiveness is shown in the following table.

Table 5: Characteristics analysed to assess attractiveness

Characteristic	Why Important
Consumer and intermediary (eg. processor, wholesaler, distributor, exporter, supermarket, restaurant) trends, desires, unmet and emerging needs.	Ultimately consumer and intermediary requirements drive demand upstream and by knowing consumer concerns, trends and desires, farmer groups can use that knowledge to guide their product selection, quality standards and value chain partners.
Quality characteristics sought but not being delivered consistently.	Identifying quality characteristics and product specifications that are sought but not being delivered, but that can economically be delivered by farmer groups is a very important possible source of competitive advantage.
Prices and value-add opportunities.	By knowing the buying and selling prices and estimating the costs of any value-adding that occurs at each node, farmer groups will be able to map out a strategy for their own value-adding which may develop progressively as they gain experience and resources.
Stage of product life cycle.	Selecting market opportunities and / or supply chains that are in a growth stage will provide better opportunities for farmer groups because it is usually easier to establish a position in a growing market than it is in a market that is mature or in decline as these are usually fiercely held by existing suppliers

	on the basis of long term relationships (which are normally impossible to break).
Sources and strength of competition.	Establishing and sustaining a profitable position requires that the farmer groups need to understand, predict and respond to all sources of competition including existing rivals, threat of new entrants, power of suppliers, power of customers and substitutes.
Willingness and capacity to provide support to farmer groups including finance for inputs, agronomic advice, market intelligence, other.	Willingness of supply chain partners to collaborate with farmer groups is especially important in the early stages of development because farmer groups have very limited resources and this will limit the marketing decisions they can make.
Volume of commodity traded.	Both the specific tonnages and relative scale of different supply chains compared with existing and future predicted supply capacity is important because matching the current and future production capacity of farmer groups with particular nodes / supply chains may be important so they are focused on the ones in which they can secure and defend a long term profitable position.

4. Participatory Value Chain Analysis – Mapping the current state, identifying VC interventions and measuring performance (Objectives 1, 2, 3)

Value Chain Analysis (VCA) was used to map the current state of supply chains that involved farmers and their organisation on each site. VCA involved the systems-based study of actors, processes and practices at each level of a chain from input supplier to consumer. In this study, VCA was conducted using participatory approaches to identify product, information and financial flows as well as relationships.

5. Financial/Economic assessments (Objectives 1, 2)

Financial data was collected from major interventions (mainly for operation of CALCOA cooperative) and gross margins, benefit cost ratios and other indicators were calculated.

6. Community assessment (Objectives 1, 3)

Communities were initially engaged through one to one meetings with key community members, representatives and organisations. Rapid community appraisal (RCA) were conducted to identify community characteristics, issues and development opportunities related to value chains. RCA involved a coordinated implementation of series of established qualitative and quantitative methods including personal interviews, informed person feedback, small group discussions, and the collation of secondary data. This was conducted by a small team of researchers over 2-3 days in each community together with local researchers. It developed a baseline for criteria such as income, social connection, skills etc. These were then available for comparing later with the effects of improved value chains.

These methods were also used to identify relationships between these elements of capacity and the performance characteristics of value chains. For example, if communities with relatively high degrees of leadership are consistently associated with more effective value chains, this may indicate that leadership contributes to improved value chains.

7. Assessing links between value chains and community capacity (Objectives 2, 3)

Community benefits from value chains, and community support for value chain development, were assessed using three well established methods:

- interviews with key informants and value chain participants.
- a household survey was conducted at each study site to benchmark criteria including level and source of income, family characteristics, participation in community, key expenditure, attitude to value chains etc.
- social network analysis. This method used information from individuals to map local networks including the strength and direction of communication and social relationships. This identified “hub” organisations and individuals and opportunities to enhance engagement and communication.

The development of value chains as a whole contributed to the development of community capacity through community participation in value chains and with community benefits being derived from enhanced value chains. The cyclic process of capacity building is likely to lead to improvements in community capacity including the function of community organisations, the level of leadership and increased income.

Specific criteria and indicators to assess community capacity were developed at the project inception workshop and they were categorised follow five community capitals defined in sustainable livelihood framework (**Error! Reference source not found.**) (Kretzman and McKnight, 2003; Flora et al., 2003).

Table 6: Criteria and Indicators used to Assess Community Capacity

Assessment Criteria	Potential Indicator
Physical Capital	
Infrastructure - smallholder	Smallholder investment in private infrastructure such as farm or transport equipment.
Infrastructure - community	The extent of any changes to community infrastructure such as roads.
Services - community	The extent of any changes to community services such as health and education services
Economic Capital	
Income - smallholder	The level and source of smallholder income benchmarked to identify changes in income
Costs - household	The level and source household costs
Employment - community	Employment that has changed as a result of vegetable production and marketing
Investment of income - community	The way in which income is spent or invested in the community or outside
Social Capital	
The level of collaboration between stakeholders involved in value chains	Numbers of people and organisations involved such as local organisations, Barangay government, collectors, smallholders, transporters etc.; degrees of collaboration between actors;; and extent of cooperation between community stakeholders
Communication between value chain actors, and between community stakeholders	Frequency of communication, value of communication to stakeholders
Relationships and networks	The extent of new relationships formed, changes to existing relationships, changes to levels of trust, links with “outside” organisations
Leadership - community	The extent of leadership developed within value chains and within communities
Organisation - community	Changes to the formation, function and activity of smallholder and community organisations, particularly Barangay Development Committees
Family/household function	Contribution of improved value chains to family cohesion and function

Environmental Capital	
Practices to enhance the environment	The extent to which smallholders and other community members have changed practices towards the environment
Organic production	Changes in the adoption of organic production methods or marketing as a result of the development of value chains
Human Capital	
Food and Nutrition	Changes to nutrition – volume and quality of diet – from value chain improvements
Participation in education - community	The level of school attendance
	Participation in training/education activities
Value Chain Skills – smallholders	Participation is specific training on value chains
	Levels of confidence and skills in participating in value chains
Health status	Changes to healthcare or health status such as vaccination rates, access to medical care and medication etc.
Housing	Investment or improvements in housing
Sanitation	Investment or improvements to sanitation or hygiene
Well-being	The extent of feelings of well-being

Social network analysis was conducted for all farmers groups to map and measure relationships and flows between members of the community with other communities and institutions. The analysis of social network provided insights on the communities' network, who they are aware of and who they would reach. Small groups of community members developed collaboration charts and/or described the social links in the community.

Field diaries recorded by field researchers were also a source for secondary data as all observations on events were recorded chronologically by junior researchers.

Qualitative data was analysed using narrative analysis and the identification of themes. The number of households to be sampled per chain was determined using purposive sampling.

This approach provided an understanding of the processes through which community benefits can be derived from improved value chains and how community capacity can support value chain development. This allowed opportunities and strategies to enhance this interaction and support improved community capacity to be identified.

8. Community Capacity Building (Objective 3)

The capacity of communities (such as leadership, skills, cooperation etc.) to support value chains was improved by training workshops, contributions to FFS and follow up in the field by researchers. Training workshops about value chain development were held with communities at appropriate intervals to explain research results, develop opportunities to enhance value chains and improve local skills, motivation and organisation. Learning areas covered at the workshops included:

- market and value chain concepts
- information systems and relationship management
- chain assessment and analysis – 'walking the chain' activity
- quality management – process and product innovation
- strategies to access support services
- post-launch monitoring and evaluation

The FBS concept, initially developed by ACIAR Project /2006/115 in Indonesia and then adapted to the Philippine vegetable industry context by CIP was an important outreach tool adopted in this project to build capacity among farmers and research partners. FBS were conducted in every chain in consultation with Filipino partners, researchers and NGOs depending on the production and marketing cycles of target crops.

A maximum of 20 participants were trained in each FBS at each site, the aim of which was to develop the business skills of smallholders and VC improvement opportunities for smallholders. Learning areas covered would be

- Marketing and business concept,
- Identification and prioritisation of market opportunities, targeting and testing potential innovation
- Business planning,
- Accessing business support services,
- Launching of new businesses and post-launch support, monitoring and evaluation.

An important aspect of capacity building is supporting individual smallholders and smallholder organisations to improve the operation and competitiveness of their enterprise. This was done is several ways. First, FBS to build the skills of smallholders collectively allowing members of organisations to experience the same training and implement common ideas for improvement. Second, smallholder organisations were directly involved in actions to improve value chains giving members key experience in the processes involved. Third, these organisations were mechanisms to mobilise community participation in value chains and for transmitting benefits from value chains into the broader community. They were involved in engaging other community members, and actively followed up on community actions identified to enhance the community benefits from value chains. Local researchers engaged actively with smallholder organisations throughout the project.

The project emphasised the development of the capacity of Barangay Development Committees, as these provided very important grassroots level institutional processes for identifying and implementing funding priorities for community development. These organisations were specifically invited to FBS and will be actively engaged in community development activities in the project.

The project team could not participate in all FFS conducted by related projects. However, the teams worked with other projects to incorporate information and key points into FFS conducted by these project teams. The team also provided factsheets and other information for delivery at these schools.

8. Scaling up (Objective 3)

The benefits of developed value chains in communities were scaled up through a series of activities as follows:

- Engagement and information sharing on a regular basis targeting LGUs leaders, NGOs, and private business associations,
- Conducting workshops and conveying information with existing community organisations such as Rural Improvement Clubs, Samahang nayon Crop Improvement Group in Claveria, and Saloy Small Vegetable Farmers Association (SASVEFA) in Davao,
- Conducting workshops and field days with smallholders and other value chain members,
- Mentoring, supervising and conducting seminars for field researchers, including village level junior researchers in research methodologies, technical improvement implementations and rural development,
- Use of pamphlets, posters and social media to disseminate project innovations,
- Community-wide planning workshops to identify the specific priorities that are most relevant in each community,
- Community capacity building workshops to enhance skills, organisations and ways to maximise and sustain smallholder income.

9. Monitoring and evaluation (Objective 2, 3)

At each of the four sites pre- and post- project intervention surveys and semi-structured interviews were conducted to:

- evaluate changes in smallholders farming practices,
- engagement with markets, input suppliers and financial institutions,
- changes in smallholder roles in, and engagement with, the community, and changes in their livelihood including net-income.

At each site, 50 households were included in the evaluation, 25 households directly involved in the project and 25 households not included in the project but from the same community.

Participatory monitoring and evaluation of activity implementation was conducted based on the guidelines developed by van de Fliert et al. (2011) in ACIAR project AGB/2008/002 and adapted for the specific context of the project.

Differences in the roles of men and women in market development and in the community was managed in both the conduct of the research and in the results. Monitoring and evaluation techniques accommodated the preferences of men and women, for example, by engaging both men's' and women's' organisations, and holding interviews and group discussions in ways to encourage both men and women to have input. Gender differences were also recorded in research notes and during the assessment of the project actions against evaluation criteria.

8. Methods employed for Consultations and Participatory Activities with Mango Value Chian Members

The methods employed for this component of the project included:

1. Face to face interviews were conducted as the most appropriate way to engage smallholders and to gain both quantitative and qualitative information about mango production and marketing. This was consistent with an initial step in engagement being to understand the existing situation from the standpoint of smallholders. This also established relationships between farmer/contractors and the research team.

   The information gathering through interviews also provided an evidence base for the identification of priorities and to asses change. The provision of data back to smallholders is a key step in the action learning "cycle". The role of the data was not just to provide evidence but to also stimulate deliberation and learning between farmers. For example, interviews and subsequent follow up identified "real" issues that were not immediately apparent such as the deterioration in the condition of mangoes within wholesalers leading to high rejection rates.

2. A project workshop in February 2017 supported collaboration and empowerment by bringing together smallholders, input suppliers and mango buyers. Many growers had difficulty finding a buyer and many wholesalers and exporters had difficulty finding the quality of mangoes they were looking for. This indicated grounds for improvement in mango volume, quality and marketing. The sharing of information and interests created links between different actors in the mango supply chain and set the foundation for the development of an organisation made up of participants from all stages of the value chain.

3. From interviews and at the workshop, it was clear that farmer/contractors considered traditional "extension", such as Farmer Field Schools, was not effective and growers preferred demonstration plots or farms as ways to learn. This recognised the

existing capacity of farmers and supported action learning. Growers also preferred to share information with trusted friends and there was limited information sharing between growers or across the value chain. The workshop also showed that it was not necessarily a matter of "adopting" new practices but applying known practices better. Many progressive growers were aware of improved practices but lacked the financial resources to implement them. These issues led to the project's subsequent development of a demonstration farm and the establishment of an organisation as a mechanism for ongoing collaboration between smallholders, input suppliers and mango buyers.

4. The demonstration farm led to a lot of smallholder exposure to improved production and harvesting processes. This "hands on" demonstration increased the validity and relevance of improved practices. Some growers remained suspicious of chemical companies and needed to translate practices from the demonstration farm top their own situation. However, many growers were able to follow a crop thought to harvest, discuss new practices with peers and the harvest festival was a community-building event.

5. The demonstration farm provided participants with sufficient trust to allow group training and further workshops, so over a period of six months an extensive series of training workshops were undertaken. These included:
    a. Leadership training.
    b. Orientations on Philippine government's agricultural services particularly on Production Loan Easy Access (PLEA) and Philippine Crop Insurance Corporation (PCIC) programs.
    c. Financial literacy.
    d. Development of an organisation's constitution.
    e. Farm business planning.

6 Achievements against activities and outputs/milestones

Objective 1: To identify opportunities for improving farmer-to-market chain performance, competitiveness and farmer net income; and associated opportunities for community development

No.	Activity	Outputs/ milestones	Due date of output/ milestone	What has been achieved?
1.1	Analyse demand, seasonality, supply, price and consumption trends for targeted vegetables and mango at regional and local level.	A report describing demand, supply, price and consumption trends for selected sites	Sep 2014	Draft report was completed for mid-term review. Reviewers' recommendation was to accept it as final report. This report is complementary to the report from previous ACIAR vegetable project HORT/2007/066, which is also attached. Appendix I A1.1 Supply, Utilisation, Price and Seasonality Trends of Selected Vegetables and Mango in the Southern Philippines Appendix II A1.1b Vegetable market report HORT/2007/066
1.2	Understand the consumer value attributes of fruit and vegetables in major demand centres of Davao, Cebu, Tacloban and/or Ormoc.	A report collating existing information from HORT2007/066 and additional data collection	Nov 2014	Report on literature review on Filipino consumers' vegetable purchase, consumption patterns and preferences was completed and finalised Appendix III A1.2 Vegetable Purchase and Consumption Patterns and Consumer Value Preferences in the Philippines

1.3	Analyse market segments, consumer willingness-to-pay and market potentials for conventional, ICM produced and organic fruit and vegetables in major demand centres of Davao, Cebu, Tacloban and/or Ormoc.	Detailed report of completed data analysis and results of the intercept survey on consumer values	Feb 2015	Report on consumer surveys was replaced by rapid market appraisal (RMA) report (attached in 1.6), as agreed in MTR
1.4	Assess the social, regulatory and community institutional conditions impacting on smallholder farmer communities (including current government approaches and micro-finance, farmer group dynamic and external influences on farmer groups)	Report collating social, regulatory and other institutional conditions	Sep 2014	Report completed. Appendix IV A1.4-1.5-3.2 Institutional Framework Report

1.5	Identify and engage with local government units including district/municipality, barangays, private enterprises, wholesalers and retailers organisations, chambers of commerce, and communities at each of the four selected sites	Collaborative relationships established at each of the 4 sites and MOUs signed	Sep 2014; 2015; 2016	Engagement and relationship with various stakeholders are very dynamic processes that require intensive and continuous involvement of research team. Report on this activity is combined with 1.4
1.6	Undertake VCA of selected vegetable and mango chains, mapping and assessing their performance given the state of the market and external environment as identified above.	Detailed VCA reports for each vegetable and mango chain including identification of potential intervention opportunities	Dec 2016	RMA was conducted in Davao city, Cebu city, Ormoc city and Tacloban city to map market and network of supply chain for vegetable and mango. Appendix V A1.6a Vegetable report Appendix VI A1.6b Mango report
1.7	Analyse mango production in specific socio-economic context of Samal Island and identify improvements specific for each market segment identified in activity 1.3	Develop production protocols specific for each market segment taking into account socio-economic context.	Feb 2019	Completed and the results of analysis included in comprehensive report is attached. Appendix VII A1.6-1.7-2.5-2.7 Mango report

1.8	Through community engagement, supplemented by outputs from activities 1 to 6 above, analyse and identify community characteristics issues and development opportunities related to VCs	Detailed report of community, characteristics issues and opportunities to engage with VC	Dec 2014; 2015; 2016; 2017	Community profiling was completed and reported in detail. See attachments. Appendix VIII A1.8- 3.1- 3.2-3.4a Baseline Study Report of Community Characteristics in the Southern Philippines Part 1 Appendix IX A1.8- 3.1- 3.2-3.4a Baseline Study Report of Community Characteristics in the Southern Philippines Part 2
1.9	Conduct three vegetable case studies: • Davao (Gaisano retail chain) • Cagayan de Oro (Normin Veggies, wholesaler and consolidator) Leyte (Cabintan farmer groups)	A report describing three case studies, analyses and conclusions	Dec 2017	Case studies for Davao and Leyte are attached. For Cagayan de Oro, report is still being finalised. Appendix X A1.9 CALCOA (Layte) business model Appendix XI A1.9-3.1 Davao business model

1.10	Work with the three other ACIAR projects to conduct socio-economic analysis of options and innovations that producers and other stakeholders can evaluate for incorporation into farming systems, e.g. the adoption of ICM practices	Report of the assessment of the socio- economic feasibility of innovations from the priority sites	Ongoing until Feb 2018	Regular exchange of information and coordination meetings between vegetable ICM, mango ICM and post-harvest project team were maintained throughout the project
1.11	Prioritize intervention opportunities for improvement of selected farmer- to market- chains and associated community development opportunities based on VCA and community assessment	Report of prioritized intervention opportunities	Dec 2016	The project framework was based on the assumption that we would first conduct market and consumer research followed by a process of prioritisation of possible interventions and then intervention. However, we quickly learned that in the dynamic context of the Philippines, it is not possible to structure the program of activities as originally envisaged. In reality, substantial relationships of trust have been, and must be, established with farmers and farmer groups prior to market research being completed in order for it to be received by farmers who will engage with the data to influence their decisions, many of which impact their livelihoods. Research, prioritisation of interventions and intervention themselves have been happening simultaneously from the beginning of the project. After communities were identified intervention on improvement of production at all sites was immediately prioritised and commenced since it was clear that low productivity and low product quality was major obstacle for accessing higher value markets. Interventions have spanned a broad range of farmer and value chain partner business practices including deliveries to supermarkets were facilitated, sources of capital were identified and processes of investments were facilitated.

PC = partner country, A = Australia

Objective 2: To develop value chains to improve the level and sustainability of smallholder net income and livelihoods.

No.	Activity	Outputs/ milestones	Due date of output/ milestone	What has been achieved?
2.1	Measure existing chain performance with product/price/quality matrices and efficiency/ flexibility/quality matrices. Identify indicators of VC performance including household benefits for use in monitoring and evaluation through the rest of the project	Report on current chain performance and indicators for priority sites of Cabintan, Upper New Sabang, Canitoan/Pagatpat.	Sep 2015, 2016 and 17	Comprehensive economic analysis was done for Cabintan site. Report attached. Appendix XII A2.1 Cabintan economic analysis
2.2	Conduct initial workshops for all stakeholders (researchers from other components of the horticultural program, NGO's such as Landcare, local government authorities, and all chain participants)	Orientation and awareness raising of all stakeholders reported. Initial identification of interested participants for further activities	Sep 2015 Sep 2015	Completed

2.3	Conduct capacity building workshops and on-the-job training for researchers and partner stakeholders to support implementation and monitoring of interventions in each value chain and community such as micro-finance and institutional capacities.	Completion of training with participant evaluation reports	Sep 2014, 2015, 2016 and 17	List of training attached Appendix XIII 2.3 Capacity building
2.4	Develop implementation plans for VC improvement projects focused on value creation and distribution to improve the net incomes of smallholders and other small scale participants in selected chains and communities at priority sites	Guides that combine the concept of market orientation with principles of action research.	Regular revisions 2016 and 2017.	Project used rapid market appraisal approach to understand markets in Davao, Cebu and Tacloban (see 1.6) and the clustering approach to agroenterprise development for small farmers (see attached) to develop value chains. Book: clustering approach to agroenterprise Appendix XIV A2.4 develop implementation plan
2.5	Strengthen value chains through participatory activities involving value chain actors	Report on outcomes of specific tailored activities designed and implements by value chain actors designed to strengthen value chain relationships and value creation within the chain.	Progressive ly until Dec	Completed, reports can be found in 1.9 and 3.1

2.6	Develop and apply procedures to assess outputs, outcomes and impacts of VC improvement activities at each of the four sites including agreement on community and VC indicators of success. Assess the household benefits of improved VC performance such as increased smallholder income.	Report. Development of guidelines and instruments for assessing the outputs and outcomes. Report describing the implementation of VC improvement activities Report on household benefit from VC	Jun 2015 Continued until Dec 2017 Nov 2017	Clear identification of household benefits demonstrated through value chains in all sites. Appendix XV 2.6.A. Report on household benefits Upper New Sabang, Davao Appendix XVI 2.6 B. Report on household benefits Cabintan, Leyte Appendix XVII 2.6 Report on household benefits - Canitoan and Pagatpat, CDO
2.7	Provide feedback on results of VC improvement and monitoring activities to target communities and to other ACIAR projects and provide relevant material for inclusion in FFS conducted by other ACIAR projects.	Provide information that can be used by other ACIAR project teams to include in their FFS modules.	Sep 2015, 16 and 17.	Appendix XVIII 2.7 Collaboration with other ACIAR projects - Canitoan and Pagatpat, CDO

P= partner country, A = Australia

Objective 3: To maximise community benefits from improved value chains and enhance community capacity to support value chain performance.

No.	Activity	Outputs/ milestones	Due date of output/ milestone	What has been achieved?
3.1	Assess community dynamics and farm business structures in our study communities to identify local enthusiasm and leadership and to capitalise on existing social networks.	Complete and document in a report assessments at 4 sites	Sep 2017	A clear understanding of the dynamics of the communities was achieved. Reports completed for 4 sites: Appendix XIX 3.1 A. A Report on Community Characteristics and Farm business structures- Upper New Sabang, Davao Appendix XX 3.1. B. A Report on Community Characteristics and Farm business structures - Cabintan Leyte Appendix XXI 3.1. C A Report on Community Characteristics and Farm business structures – Canitoan and Pagatpat, CDO

3.2	Conduct research activities (interviews, focus group discussions, social network analysis) to assess how community characteristics (i.e. leadership, entrepreneurship, social networks, beliefs and perceptions) influence the performance of VCs including micro-finance and institutional capacities.	Completion, summarise and report of data collection at three priority sites Production of a report describing community characteristics related to VC	Sep 2017 Dec 2017	Completed FGDs and social network analysis to assess influence of community characteristics on VC Appendix XXII 3.2 a. FGD (male participants) to assess influence of community characteristics on VC Upper New Sabang, Davao Appendix XXIII 3.2 b. FGD (female participants) to assess influence of community characteristics on VC Upper New Sabang, Davao Appendix XXIV 3.2. c. Social network analysis (female participants) to assess influence of community characteristics on VC Upper New Sabang, Davao Appendix XXV 3.2 d. FGD (male participants) to assess influence of community characteristics on VC Upper Pamuhatan, Davao Appendix XXVI 3.2 e. FGD (female participants) to assess influence of community characteristics on VC Upper Pamuhatan, Davao Appendix XXVII 3.2 f. FGD (combined report for male and female) to assess influence of community characteristics on VC Cabintan, Leyte Appendix XXVIII 3.2. g. Social network analysis to assess influence of community characteristics on VC Cabintan, Leyte Appendix XXIX 3.2 h. FGD (combined report for male and female) to assess influence of community characteristics on VC Canitoan, CDO Appendix XXX 3.2 i. FGD (combined report for male and female) to assess influence of community characteristics on VC Pagatpat, CDO Appendix XXXI 3.2. j. Social network analysis to assess influence of community characteristics on VC Canitoan, CDO

3.4 (3.3 deleted)	Conduct participatory beneficiary assessment and research activities (focus group discussionshousehold survey, interviews with households and wider communityVC participants, informed person feedback) to determine the extent of economic, social and human benefits derived from improved VC such as greater empowerment, confidence, social networks)	Completion, summarise and report of data collection at three priority sites		The impact assessment was combined with 2.6 and 3.2. Appendix XXXII 3.4 A comparison on economic, social and human benefits between communities on selected sites.

3.5	Conduct on-going awareness and engagement activities (personal visits, follow up, documentation, field visits) to maintain community level (barangay or/and municipality) involvement with project activities. Conduct annual review and planning workshops as part of continuous improvement	Conduct of activities to maintain engagement. Completion of annual review with a report on engagement.		A report on-going awareness and engagement activities Appendix XXXIII 3.5. a. A report on-going awareness and engagement activities, Upper New Sabang Davao Appendix XXXIV 3.5. b. A report on-going awareness and engagement activities, Pamuhatan Davao Appendix XXXV 3.5 c. A report on-going awareness and engagement activities through Technical Advisory Committee, Leyte
3.6	Conduct activities (workshops, training, field visits) to support the outcomes of 3.2 to enhance the capacity of community members to support the performance of value chains			Conducted workshops, trainings and field visits. Appendix XXXVI 3.6.a. List of trainings provided, CDO Appendix XXXVII 3.6 b. Gender mainstreaming workshop and Leadership training

3.7	Conduct community-wide workshops and meetings to collaboratively plan with community stakeholders how the benefits from improved VCs can best lead to lasting social, economic and human benefits in communities.			Community wide workshops conducted to plan collaboratively for improved benefits of VC. Appendix XXXVIII 3.7 a Collaborative planning workshop with community stakeholders and turnover – Davao Appendix XXXXIX 3.7 b Collaborative planning workshop with community stakeholders and turnover – Leyte Appendix XXXX 3.7 c Collaborative planning workshop with community stakeholders and turnover - CDO
3.8	Identify and engage appropriate organisations that are in a position to assist communities in implementing action plans identified in 3.7 that will maximise community benefits from VCs and community support for VC performance.			Activity was combined with activity 3.7

3.9	Conduct capacity building workshops at each of the three priority sites including Barangays that are scale-up targets. These workshops will include farmers, researchers, govt and non-government extension officers and will result in plans to scale up VC initiatives and associated community development activities in other Barangays including ongoing support.			Appendix XXXI Scale up of VC activities, CDO
3.10	Develop integrated framework for value chain and community development and produce scientific papers by organising a specific workshop dedicated to enhancing scientific writing skills.			Not yet completed.

P=Partner country, A = Australia

7 Key results and discussion

1. Supply, Utilisation, Price and Seasonality Trends of Selected Vegetables and Mango in the Southern Philippines

The report (Appendix I) begins with a brief overview of the geo-physical and socio-economic characteristics of the Philippines. The geo-physical characteristics part focused on land and soil characteristics, and the agro-climatic conditions of the country. The socio-economic characteristics part included brief discussions on population and its distribution, employment and income, and consumption and expenditure patterns. The overview section of the report provides a macro perspective on the situation of the Philippines.

The overview is followed by sections dedicated to selected crops that are main focus of the project including bitter gourd (ampalaya), cabbage, capsicum, eggplant, tomato, and mango. Sections of the report dedicated to these crops discuss in detail the situation including production, consumption, prices and seasonality by focus regions of Eastern Visayas (Region VIII), Northern Mindanao (Region X), and Davao Region (Region XI).

Main implications for smallholder producers are summarised below:

Demand

Expected increasing demand for vegetables is linked with population growth rather than with increasing per capita consumption. This is shown in the relatively flat growth in vegetable consumption over the years. The flat growth in per capita consumption may be viewed as an opportunity as increasing may lead to higher demand for vegetables. Vegetable consumption in the Philippines is about a third of what is recommended by the WHO and FAO. This means that increasing per capita consumption at par with recommended dietary requirements can increase demand by as much as 200%.

In terms of demand distribution, the expected increases are greater in CALABARZON, Northern Mindanao, SOCCSKSARGEN and Davao Region. This is because of their growth rates that are higher than the national average. This means that the trajectory of population growth and concentration are moving to these regions creating more opportunities for smallholder agricultural producers.

The Philippines is also experiencing urbanization, however, some regions have a faster urbanization rate than others. Urbanization is linked with changes in consumer preferences that includes consumption patterns and choices of outlets. This is because of better economic opportunities that may lead to higher income. Urban barangays generally displayed greater per capita consumption levels of vegetables compared to rural barangays. Increasing rate of urbanization suggests that there will also be an increase in consumption.

Spatial distribution

At a macro perspective, it can be observed that there are regional differences in production of vegetables and mangoes and this is because of differences in availability of land, agro-climatic conditions and demand from consumers. Production of vegetables and mangoes are generally higher in areas where the climate is suitable. This is displayed by the large share of CAR in the production of cabbage, and eggplant for Ilocos. However, other regions that have almost similar climate also grow these crops successfully. Demand also played a part in encouraging production of some regions. The NCR has a very large population but has virtually no production given its urbanized nature, thus, generating a large demand that provides a market opportunity for regions that have agricultural production. The CAR, Ilocos Region, Central Luzon and CALABARZON addresses the demands of NCR along with other regions from the Visayas and Mindanao. The concentration of the population in Luzon

makes it an ideal market for agricultural producers located in the northern part of the country. However, seasonality of production because of agro-climatic conditions also creates a window for agricultural producers located in the south of the country to provide densely populated areas in Luzon with a supply of vegetables.

There were differences in the demand at the macro level and differences were also observed at the regional level. There were differences in prices according to provinces. This was also due to availability of supply and demand in these provinces. One potential reason for this is the integration of provincial areas in the national market. As Luzon demands greater volume of agricultural produce and offer higher wholesale and retail prices, supply in provinces in the central and southern part of the country may be brought to it. This leaves the agricultural production areas with lower availability of supply and a higher price.

The national infrastructure, and its network of national roads and a network of Roll-On and Roll-Off (RORO) ports, linked the major population and economic centers of the country. This also links agricultural producers with markets.

Prices

There is seasonality in prices of vegetables and this may be attributed to seasonal differences in production output. As demand may be considered as constant throughout the year, it is the difference in availability of vegetables that determine prices. Smallholder producers in the Southern Mindanao, Northern Mindanao, and Eastern Visayas may be able to take advantage of these opportunities because of seasonal differences in production. Taking harvests to other regions that offer higher prices is no longer a major constraint given availability of a national level road network.

Retail prices account for a large share of prices. This suggests that smallholder producers take advantage of this difference. However, this will require further investigation to determine why these differences exist.

Implications for AGB/2012/109 growers

The different vegetables covered by the research project have different characteristics in terms of production and demand. However, it was clear in this secondary data report that opportunities exist in urban areas mainly because these areas have greater consumption levels mainly because they have greater income compared to those living in rural areas.

Davao Region and Northern Mindanao are regions that are experiencing faster urbanization and can serve as potential markets for smallholder producers. This may present as a market that can be focused on by smallholder producers in these regions. Those based in Leyte may find Central Visayas as a potential market. Smallholder producers from these regions and the province of Leyte may also find regions in the Visayas and Luzon as potential markets. This may be made possible because of seasonality in production and availability of an improved logistics system.

Productivity of ampalaya, eggplant, capsicum, cabbage and tomato is low in Northern Mindanao, Eastern Visayas and Davao region. Improvements in farm productivity should be given attention. These include improvements in irrigation system to produce vegetables even during severe drought; introduction of varieties that are resistant to pest and diseases; and application of appropriate amounts of fertilizers and pesticides to achieve the desired level of outputs. Results also show that high per capita consumption of vegetables is observed in regions with high productivity. Thus, improving farm productivity provides opportunity for farmers to access to a wider market.

In Eastern Visayas, Northern Mindanao and Davao region, prices are low for vegetables that had high farm productivity. However, there are also a number of market opportunities for smallholder producers in these regions such as inter-regional trade and access to modern markets that offer higher price. In terms of seasonality, farm prices of vegetables are generally high in the months of January to March. Farmers in Davao region and Northern

Mindanao may explore the possibility of selling to Eastern Visayas markets during this period since farm prices in the region are higher and are also increasing faster than farm prices in Mindanao.

For mangoes, farm prices are high in regions where farm productivity is also high. This may be due to the type of markets where mangoes are sold such as processors and exporters. Fresh exporters, in particular, require high quality mangoes in huge volumes, which are bought at higher prices. Thus, when productivity of mango is low, these markets have lean chances of getting high quality mangoes and would be paying less. In terms of seasonality of mangoes, farmers may consider selling directly to wholesalers from Metro Manila when supply in Luzon is scarce. They may also consider selling to Cebu markets when prices are high in the months of January to March. During this period, prices in Davao region and Metro Manila are low.

However, despite market opportunities for mango farmers, farm productivity in Davao region has to be improved. Productivity remained low despite increasing per capita consumption. In general, retail prices increase faster than farm prices for vegetables and mangoes. This suggests opportunities for farmers to do retail activities themselves. However, they may have to organise a group to share risks among members and take advantage of economies of scale. The increasing retail prices and the increasing gap between farm, wholesale and retail prices imply that a number of value-adding activities occur at the retail level. These include those that are done by modern retail markets which have been increasing in number, have higher overhead costs and gain higher margins. Improvements in the efficiency of production may be implemented to ensure that smallholder producers can become more competitive, but at the same time, engaging in wholesale and retail activities can also be an option.

Conclusion and recommendations

This review of secondary data showed that there is concentration of demand in regions located in Luzon and possible reasons for this are the denser concentration of the population in these regions, higher urbanization levels, and higher income of the population. It is possible that these factors are linked because with urbanization is a greater concentration of the population that may lead to higher income and consumption.

While the concentration of the population is still found in Luzon, there are emerging regions that have higher population growth rates and urbanization levels than the national average. These include Davao Region, Northern Mindanao, and SOCCSKSARGEN. These are regions that are also emerging as potential markets for the smallholder agricultural producers. It would appear that these are the regions whose markets needed to be understood.

Based on the results of this review of secondary data, it is recommended that a better understanding of the markets in mentioned regions be conducted. This may be through a Rapid Market Appraisal and Value Chain Analysis of selected crops. This may also lead to the understanding of differences between farm gate, wholesale and retail prices. The differences between these prices may be exploited as an avenue for smallholder agricultural producers to enhance their income and profitability, which may lead to a strategy for community development. However, finalizing the strategy would depend on results of the Value Chain analysis.

2. Vegetable Purchase and Consumption Patterns and Consumer Value Preferences in the Philippines

Report (Appendix II) present comprehensive literature review of consumer studies in the Philippines.

Report presents findings from the recent comprehensive study that had a total sample of 1,612 respondents from Davao City that assessed consumer preferences for tomato, eggplant, sweet pepper and bitter gourd (403 respondents for each type of vegetable). Study also analysed the relative importance of various vegetable attributes (Ruyeras, 2014; Alcala, 2014; Comidoy, 2014; Echevarria, 2015). including how consumers make trade-offs between the organically grown attribute and other vegetable attributes such as price, size, colour, packaging, etc.

It was found out that the relative importance for method of growing, which includes the organically grown attribute level, is very low for eggplant (9.91%), tomato (13.12%), and sweet pepper (15.39%) but high for bitter gourd (32.44%). Vegetable attributes with high relative importance are texture (41.98%) and price (22.74%) for eggplant, price (26.64%) and color (21.79%) for tomato, price (35.90%) and color (24.89%) for sweet pepper, and method of growing (32.44%) and price (20.30%) for bitter gourd. In general, the relevant consumer groups (except for bitter gourd with no relevant clusters) that were clustered are the price-sensitive, appearance-sensitive, and the semi-health conscious group. The findings suggest that most consumers in Davao City do not make trade-offs between purchasing organic vegetables and paying for a higher price or settling for a less attractive appearance – even when they initially indicated that they prefer to purchase organic vegetables.

3. Rapid market appraisal-Major vegetable markets in Southern Philippines

Davao Region

Davao region is located in the Southern portion of Mindanao, Philippines. It consists of five provinces and five cities namely, province of Davao del Norte, Davao del Sur, Davao Oriental, Davao Occidental and Compostela Valley and cities of Davao, Tagum, Panabo, Digos and Samal. Davao region is bounded by provinces of Surigao del Sur, Agusan del Sur and Bukidnon to the north, Philippine Sea to the east and Central Mindanao provinces to the west. The region experiences type IV climate in which rainfall is evenly distributed throughout the year. It has no distinct dry and wet season. Moreover, it is not directly hit by typhoon as it is situated outside the typhoon belt, thereby further enhancing its agricultural production potentials. The following tables summarise the data collected from industry buyer categories in Davao city.

Table 7: Summary of RMA Davao vegetables

Characteristics to be assessed		Nodes				
		Assembler-Collector	**Collector-wholesaler**	**Viajedor**	**Shipper**	**Specialised Wholesaler**
Description		Buy at the production sites and sell to *viajedors,* small-scale wholesalers and shippers	Buy at the production sites; wholesale and retail vegetables; sell to concessionaires, *viajedors* and consumers	Wholesalers or retailers from other cities of provinces; Buy vegetables in Bankerohan market and transport them to their respective localities	Buy Class A vegetables from farmers and any wholesaler and ship it to major urban areas in Luzon (Metro Manila) and the Visayas; Peak shipping season is from June to December	Trade only one or two types of vegetables
Estimated number of actors per node		100	20	80	10	15
Market trends		No significant trend observed	Growing number of actors in the node; Perform forward integration	Buys from the wet market; has established relationship with preferred suppliers	Source directly from farmers; Provide assistance to farmers in terms of production advice and financing agricultural inputs	Shifted from general wholesaler to specialized wholesaler because income is higher
Average weekly volume traded by respondents interviewed	Eggplant	1.3-4.6 tonnes	240 kg-3 tonnes	NA	500 kg – 1.5 tonne	NA
	Bitter gourd	NA	240 kg-3 tonnes	NA	500 kg – 2 tonnes	NA
	Sweet pepper	300-900 kg	400 kg-1 tonne	1200	700 kg – 3 tonnes	690 kg – 2 tonnes
	Tomato	2.5-4.5 tonnes	1-1.5 tonnes	1000	800 kg – 2 tonnes	5-23 tonnes
Average weekly volume traded per node	Eggplant	20-80 tonnes	3.5- 43 tonnes		5 – 10 tonnes	NA
	Bitter gourd	NA	3.5 43 tonnes		5 – 10 tonnes	NA
	Sweet pepper	8-27 tonnes	6- 14 tonnes	20tonnes	7 – 20 tonnes	3-7 tonnes
	Tomato	35-75 tonnes	15- 21.5 tonnes	17tonnes	10 – 20 tonnes	20-90 tonnes
Quality characteristics sought	Eggplant	10ins, straight, Banate King variety	8-10ins, straight, smooth, shiny, purple colour, Banate King variety		Large, straight, not deformed, Condor and Banate King variety	NA
	Bitter gourd	NA	8-10ins, straight, green or light green colour, Jade Star and Galaxy variety		Large, straight, not deformed, Galaxy variety	NA

Sweet pepper	4ins, smooth, shiny, colour red with shade of green, Smooth Cayenne	2.5 ins., smooth, shiny, red with shade of green colour, Smooth Cayenne and Emperor variety	1.5-2.5 ins, red and green colour,	2.5 ins, red and red with shade of green colour, Smooth Cayenne and Sultan variety	Sultan variety
Tomato	1.5-2.5ins diameter, shiny, pinkish colour, Pinkish variety	1.5-2.5ins diameter, smooth, shiny, pinkish colour, Pinkish and Diamante Max variety	1.5-2.5 ins, pinkish, green and orange colour	2.5 ins, orange with shade of green colour, Diamante Max variety	half-ripe, round, 2-3 inches in diameter, Diamante max variety

Characteristics to be assessed		Nodes				
		Assembler-Collector	**Collector-wholesaler**	**Viajedor**	**Shipper**	**Specialised Wholesaler**
Value created		Provide financing to farmers; Transport of vegetables	Provide financing to farmers; Transport of vegetables	Transport of vegetables; take ownership of the products	Sort, pack, and transport products	Sort vegetables; Some provide crates to farmer-suppliers free of charge
Buying and selling prices (PhP/kg) Note: Range is due to seasonal variations	Eggplant	Buying price is 5-25 Selling price is 8-35	Buying price is 5-30 Selling price is 8-45	NA	Information not divulged	NA
	Bitter gourd	NA	Buying price is 10-50 Selling price is 15-60	NA	Information not divulged	NA
	Sweet pepper	Buying price is 12-100 Selling price is 20-120	Buying price is 15-100 Selling price is 25-120	Buying price is 30 Selling price is 45	Information not divulged	Buying price is 25-80 Selling price is 30-110
	Tomato	Buying price is 4-40 Selling price is 8-48	Buying price is 4-24 Selling price is 8-36	Buying price is 6-40 Selling price is 16-50	Information not divulged	Buying price is 8-26 Selling price is 8-32
Stage of node life cycle		Mature	Mature	Mature	Mature	Mature
Competitive forces	Existing level of Rivalry	Moderate	Moderate	High	High	High
	Power of suppliers	Low	Low	Moderate to High	Low to Moderate	Moderate
	Power of customers	Low	Moderate	Low	Moderate	Moderate
	Threat of new entrant	Low	Low	Low	Low	Moderate
	Threat of substitute Node	Moderate	Low	Moderate	Moderate	Moderate
Willingness to source directly from farmer groups		Yes	1 of 3 respondents is willing to source directly from farmer groups	Yes (viajedor from Surigao); No (viajedor from Tagum)	Yes	Yes

Characteristics to be assessed		Nodes				
		Producer-wholesaler	**Small-scale wholesalers**	**Wet Market Retailers**	**Concessionaires**	**Purveyors**
Description		Control large hectares of land; have contracted farmers; shoulder all production costs; transport products from farm to market and sell them to their regular customers	Wholesales and retails vegetables in the wet market; mainly wholesales	Retail vegetables in wet markets; Sell to household buyers, some restaurants, smaller retailers and small community markets	Buy Class A vegetables from various suppliers and sell them to customers in supermarkets	Sell mainly to supermarkets (outright purchase), hospitals, hotels, restaurants and institutional buyers
Estimated number of actors per node		20	50	250	10-15	
Market trends		They have existed in the industry for more than 10 years; only few are in this type of business model	Increasing number of farmers who do wholesaling and retailing functions	Utilization of Class B and sometimes unsold vegetables for minimal processing (pre-slicing and packing)	Increasing number of supermarkets in Davao City, hence creating opportunities for concessionaires to scale-up in their operations	Outsourcing of food service by institutions; Supermarkets increasingly buying from purveyors and selling them as house brand
Average weekly volume traded by respondents interviewed	Eggplant	NA	150 – 200 kg	140-175 kg	880 kg – 1 tonne	294-450 kg
	Bitter gourd	NA	150 – 200 kg	105-140 kg	1 – 2 tonnes	350-470 kg
	Sweet pepper	2-3 tonnes	600 – 900 kg	21-35 kg	225 kg	75 kg
	Tomato	9 tonnes	3 – 5 tonnes	105-140 kg	800 – 1 tonne	267-458 kg
Average weekly volume traded per node	Eggplant	NA	4 – 5 tonnes	6 –7.5 tonnes	4 – 5 tonnes	5.3-6 tonnes
	Bitter gourd	NA	4 – 5 tonnes	4.5-6 tonnes	2 – 3 tonnes	5.1-5.7 tonnes
	Sweet pepper	10-15 tonnes	16 – 24 tonnes	900 kg-1.8 tonne	1 tonne	1.2-1.7 tonne
	Tomato	44 tonnes	66 – 131 tonnes	4.5-6 tonnes	5 tonnes	1.8 tonne
Quality characteristics sought	Eggplant	NA	Violet-coloured, straight, 8 inches long, Banate King variety	Medium, straight, no holes	Purple-coloured, 6-8 inches long, straight-shaped, well-formed, smooth and shiny	10 inches, straight, purple coloured, Banate King variety
	Bitter gourd	NA	Green-coloured, 8-10 inches long; Galaxy variety	Medium	Dark green, 8-10 inches long, straight-shaped, well-formed	12-14 inches (3pcs in 1kg), no cracks and bruises, Galaxy variety

Sweet pepper	Half-ripe and Sweet Cayenne variety	Sweet Cayenne variety	Not ripe	Mix of red, green and orange colours, 4-5 inches long, smooth and shiny	4 inches, red with a shade of green, Cayenne
Tomato	Half-ripe and Diamante Max variety	Pinkish and Diamante max varieties	Shades of green, not ripe	Mix of red, green and orange colours, 2 – 3 inches in diameter, smooth and shiny	Large, smooth and shiny, orange with a shade of green, Native tomato

Characteristics to be assessed		Nodes				
		Producer-wholesaler	**Small-scale wholesalers**	**Wet Market Retailers**	**Concessionaires**	**Purveyors**
Value created		Provide financing to farmers; transport goods	Sort, grade, slice, pack vegetables	Provide access to fresh and inexpensive wide variety of vegetables to the vast majority of Davao consumers	Procure, sort, pack and retail vegetables	Purchase significant volume of Class A vegetables; Integrated vertically by co-financing farmers
Buying and selling prices (PhP/kg) Note: Range is due to seasonal variations	Eggplant	NA	Buying price is 7-15 Selling price is 10-25	Buying price is 20 Selling price is 30	Information not divulged	Information not divulged
	Bitter gourd	NA	Buying price is 8-25 Selling price is 15-35	Buying price is 40-50 Selling price is 60-70	Information not divulged	Information not divulged
	Sweet pepper	Selling price is 15-150	Buying price is 25-80 Selling price is 30-100	Selling price is 60-160	Information not divulged	Information not divulged
	Tomato	Selling price is 12-48	Buying price is 8-40 Selling price is 10-48	Buying price is 20 Selling price is 30-40	Information not divulged	Information not divulged
Stage of node life cycle		Mature	Mature	Mature	Growth	Mature
Competitive forces	Existing level of Rivalry	Low	High	High	Moderate	High
	Power of suppliers	Moderate	Low	Moderate	Moderate	Low
	Power of customers	Moderate	Moderate	Moderate	High	High
	Threat of new entrant	Low	Moderate	Moderate	Moderate	Moderate to High
	Threat of substitute	Moderate	Low	Low	Moderate	Low
Willingness to source directly from farmer groups		Yes	Yes	Yes	Yes	Yes

Characteristics to be assessed		Nodes				
		Supermarket AB	Supermarket C	4-5 Star Hotels and Restaurants	Budget Hotels and Restaurants	Institutions
Description		Has vegetable concessionaires; Caters to households belonging to income class AB	Has vegetable concessionaires; Caters to households belonging to income class C.	Expensive hotels and restaurants	Budget hotels and restaurants	Institutions that cater for large number of meals on a regular basis such as hospitals, prisons, schools, etc.
Estimated number of actors per node		3	10	5	50	80
Market trends		Customers looking for organic vegetables	Increase in sales of vegetables in supermarkets; Increase in number of supermarkets in urban areas	Emerging interest for organic products	Increasing number of budget hotels and restaurants in Davao City	Outsourcing food service from contractors or providers is becoming a trend
Average weekly volume traded by respondents interviewed	Eggplant		320-467 kg	40 kg	95 kg	65 kg
	Bitter gourd		228-370 kg	40-60 kg	50 kg	30 kg
	Sweet pepper		163-291 kg	70 kg	50 kg	10 kg
	Tomato		777 kg -1 tonne	80 kg	175 kg	25 kg
Average weekly volume traded per node	Eggplant	70 kg	1.6-2.5 tonnes	110 kg	3.8 tonnes	1.3 tonne
	Bitter gourd	70 kg	1.2-1.8 tonne	60-90 kg	1.9 tonne	400 kg
	Sweet pepper	Less than 20 kg	800 kg-1.5 tonne	110 kg	1 tonne	125 kg
	Tomato	200 kg	4 -5.5 tonnes	240 kg	3.5 tonnes	460 kg
Quality characteristics sought	Eggplant	12 inches, straight, well-formed, smooth, shiny, purple	6-10 inches, firm, plump, straight, fresh, free from rotting, free from any foreign smell and visible foreign matter, not wrinkled, well-coloured	6-8ins, straight, smooth, shiny, soft texture, purple colour	7-8 ins	6-8 ins, straight, smooth, shiny, soft texture, dark purple colour
	Bitter gourd	12-14 inches, straight, well-formed, dark green	10-12 inches, firm, plump, straight, fresh, free from rotting, free from any foreign smell and visible foreign matter	6-8ins, straight and with pointed edge or tip, dark green colour	10 ins	Not mentioned
	Sweet pepper	Smooth and shiny	3-4 inches, whole and intact, free from any abrasion, firm, fresh, elongated, free from any	Large, smooth and shiny, red and green colour	Red	Smooth and shiny

		foreign smell and visible foreign matter, free from rotting, semi-ripe			
Tomato	Smooth and shiny	Minimum of 1.5 inches, firm, free from any abrasion, firm, fresh, free from any foreign smell and visible foreign matter, free from rotting, semi-ripe	Regular size, crunchy, red colour	3.4 ins, breaker	2-3 ins, thick skinned, light orange

Characteristics to be assessed		Nodes				
		Supermarket AB	**Supermarket C**	**4-5 Star Hotels and Restaurants**	**Budget Hotels and Restaurants**	**Institutions**
Value created		Sells vegetables in kilograms or in small packs. Claims a commission from sales of concessionaires	Purchase Class A vegetables; Claim commission from concessionaires	Serving vegetable dish	Serving affordable vegetable dish	Take significant quantity of Class B vegetables and convert them to healthy meals
Buying and selling prices (PhP/kg)	Eggplant		Buying price is 33-55 Selling price is 43-63	Buying price is 30-60	Buying price is 28	Buying price is 5-50
	Bitter gourd		Buying price is 45-67 Selling price is 55-80	Buying price is 60-65	Buying price is 36	Buying price is 20
	Sweet pepper		Buying price is 76-145 Selling price is 97-181	Buying price is 80-150	No information	Buying price is 20-150
	Tomato		Buying price is 30-50 Selling price is 35-64	Buying price is 30-60	No information	Buying price is 6-16
Stage of node life cycle		Introduction	Growth	Growth	Growth	Mature
Competitive forces	Existing level of Rivalry	Low	Moderate	Low	Moderate	Low
	Power of suppliers	Moderate	Low	Moderate	Moderate	Low
	Power of customers	Moderate	Low	Low to moderate	Low	⊘
	Threat of new entrant	Moderate	Moderate	Low	High	NA
	Threat of substitute	High	High	Moderate	Moderate	Moderate
Willingness to source directly from farmer groups		No	Yes	Yes	Yes	Yes

The flow of vegetables from producers to consumers is always deemed to be important in a value chain analysis, and the flow of vegetables in the Davao region is shown

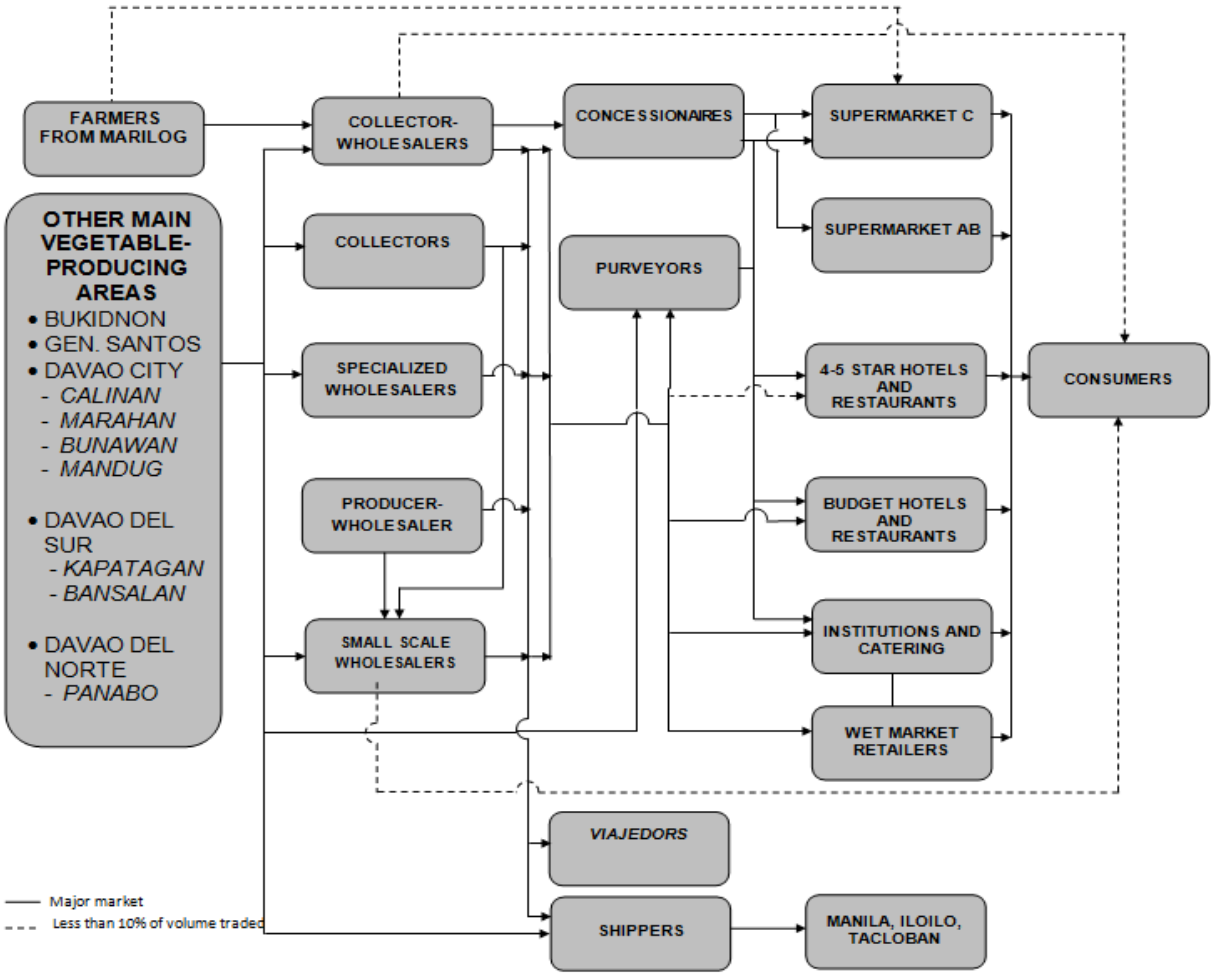


Figure 2: Flow of vegetables in Davao region

Leyte Region (Tacloban City)

Eastern Visayas, designated as Region VIII, sits on the east most side of the Visayas group of islands and faces the Pacific Ocean. The region is divided into six provinces namely, Biliran, Leyte, Northern Samar, Samar, Eastern Samar, and Southern Leyte. The region is geographically separated by sea from other regions. The following tables summarise the situation in Tacloban.

Table 8: Summary of vegetable RMA Leyte Region

Characteristics assessed		Node						
		Collector	Viajedor	Viajedor-Wholesaler	Purveyor-Wholesaler	Supermarket	Wet market retailers	Hospitals
Description		Buys from farms and sells to Tacloban markets	Buys from market and sells to other markets	A wholesaler who also handles the logistics	A trader who acts as concessionaire, purveyor, wholesaler and retailer	A modern retail outlet selling from groceries to fresh foods	Generally retailers selling fresh or pre-cut vegetables	Serves food to occupants.
Estimated Total number of Actors		30	6	11	3	3	~300	2
Market trends		Collectors mostly respond to supply rather than demand	A need to satisfy the local demand due to low local production	Wholesale market remains the bigger market and this continues to increase	A need to cater the growing establishments in Tacloban City that require formal arrangements.	More consumers are having access to this retail format driven by the expansion of commercial centres in Tacloban	Wet market retailers display a wide array of goods for customers who are looking for a convenient shopping.	Hospitals are currently operating more than its designed capacity, and dieticians are encouraging locals to eat healthy food
Volume traded (kg / week)	Ampalaya	2,000		4,650	2,000	420	2,500	30
	Cabbage	1,200	12,000	30,000	8,000	1,600	4,000	30
	Eggplant	2,000		4,650	6,000	420	2,500	30
	Tomato	600	24,000	10,500	4,000	1,050	4,000	30

Characteristics assessed		Node						
		Collector	**Viajedor**	**Viajedor-Wholesaler**	**Purveyor-Wholesaler**	**Supermarket**	**Wet market retailers**	**Hospitals**
	Sweet Pepper	600	1,000	8,400	4,000	420	2,000	30
Quality characteristics sought		Buys almost everything from farmers	Physically presentable vegetables	Commonly known and accepted vegetables	Commonly known vegetables at high quality	High quality and fresh vegetables	Typically accepted and known characteristics	Mostly fresh and medium sized.
Value Created and Margins Earned		Collectors basically provide logistics from production area to the market at P4-10/kg	They serve the lacking volume requirement in Tacloban market. They add P5-18 per kilogram.	Benefit from economies of scale from its large traded volume and generally set a P5-P10 mark-up	Assembles vegetables for supermarket and institutional buyers (P13-18 mark-up) while selling to traditional market. (P5-P10 mark-up)	Provides different retail experience to customers at P13-18 higher retail price	Providing readily available vegetables by minimally processing and grouping vegetables for a certain dish at P5-10 mark-up	Provision of set meals to patients
Stage of node life cycle		Mature	Mature	Mature	Late Growth	Growth	Mature	Mature
Competitive forces	Existing level of Rivalry	High	Low	Moderate	Low	High	Low	Low
	Power of suppliers	Low	Low	Low	Low	Low	Low	Low
	Power of buyers	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low
	Threat of new entrant	Low	Low	Low	Low	Low	Moderate	High

Characteristics assessed	Node						
	Collector	**Viajedor**	**Viajedor-Wholesaler**	**Purveyor-Wholesaler**	**Supermarket**	**Wet market retailers**	**Hospitals**
Threat of substitution	Moderate	Low	Low	Low	Moderate	Low	No known substitute
Willingness to source directly from farmers	Yes	Yes	Reluctant	Yes	Can't	Yes	Yes
Relative Attractiveness to Farmers	Moderate	Moderate	High	High	Low	Low	Low

Central Visayas (Cebu City)

Though there have been vegetable production areas in the region, production is still not enough to supply the demands in the region. Thus, Central Visayas is a net importer of vegetables, particularly chopsuey type, from other regions in the Philippines such as; CAR, Northern Mindanao and Central Mindanao. About eighty six (86) percent of the vegetables come from Northern and Central Mindanao, two (2) percent from CAR and only twelve (12) percent from its local production. The main production areas in Cebu province are in Mantalongon, Dalaguete and Sudlon, Cebu City. Vegetables traded, whether from traditional or non-traditional supply chains have gone through similar type of players before reaching their destination. Most of these players were located in Cebu City. This made Cebu City the transhipment point for vegetables to provinces in Central Visayas and even to neighbouring Visayas and Bicol regions. The following summaries data colelcted from Cebu City.

Table 9: Summary of vegetable RMA Central Visayas

Characteristics assessed		Nodes			
		General Wholesaler	**Specialised Wholesaler**	**Class A Wholesaler**	**Concessionaires**
Description		Operates in a large volume of assorted vegetables and cater to other wholesalers, retailers, supermarkets and HRIs	Operates in large volumes and sells to any market but focuses only on 1-2 crops	Purveys class A vegetables to supermarkets and HRIs	Purveys vegetables to supermarkets and HRIs and perform merchandising activities inside supermarkets
Estimated Number of Actors		20	5	3	6
Market trends		Wholesale market remains the bigger market and still continues to increase as wholesalers expand their businesses.	Focusing on a specific crop but still enjoy significant market share	Targeting modern retail & institutional markets by supplying premium vegetables and enjoying the increase of their operation	Enjoying with the growth of supermarkets since they have a significant share of vegetables displayed inside the supermarket
Volume traded (tons/ week)	Cabbage	33	28	1-2	8
	Eggplant	10	21	2	5
	Bitter gourd	24	14-21	1	5
	Tomato	45		1-2	11
	Sweet Pepper	14		<1	3
Quality characteristics sought		All grades of vegetables, they sort vegetables to different markets.	Commonly accepted quality vegetables, they sort vegetables to different markets.	Strictly high quality of vegetables	Generally high quality of vegetables
Value created and margins earned		Benefited from economies of scale at P5-40/kg mark-up (wholesale); P10-20/kg mark-up (retailing)	Trading crop specific model, Retail: P10-30/kg mark-up wholesale: P5-20/kg mark-up	Have a mark- up of P10-50 per kg.	Trading branded quality vegetables; mark-up (P10-50.00/kg)

Characteristics assessed		Nodes			
		Supermarket	**Premium Hotels & Resort**	**Budget Hotels**	**Filipino Restaurant Chains**
Description		Retail store offering wide assortment of goods from groceries to fresh products.	Refers to an excellent to outstanding full service accommodation and dining	Refers to an economy accommodations and services	Establishments that provides Filipino dining services
Estimated Number of Actors		40 branches (5 companies)	18 hotels	40 hotels	41 branches (5 companies)
Market trends		Supermarkets, as a growing alternative to the traditional wet market, have strategically positioned their branches to respond in the increasing new customers who want comfortable retail buying and will continue to do so in the next years.	Enjoying the demand for the increasing consumer spending outside home for quality accommodation and dining services	Enjoying the growth of tourism but targeting low to middle class economy	Responds to the increasing consumer spending outside home and provides consumers different dining experience through different concept restaurants.
Volume traded (t per week)	Cabbage	3	3	<1	1
	Eggplant	2	2	<1	2
	Bitter gourd	2	3	<1	1
	Tomato	3	1	<1	3
	Sweet Pepper	1	1	<1	1

Quality characteristics sought	Hygienic and safe quality vegetables	Strictly hygienic, safe and premium quality vegetable	Generally acceptable quality of vegetables	Commonly accepted quality vegetables
Value created and margins earned	Providing quality retail experience and sets 20-40% higher price than the local market	Providing luxurious accommodation and sumptuous dining services	Average mark-up of P3-5/kg from the buying price	Average mark-up of P3-5/kg from the buying price

Characteristics assessed		Nodes							
		General Wholesaler	**Specialised Wholesaler**	**Class A Wholesaler**	**Concessionaires**	**Supermarket**	**Premium Hotels &Resort**	**Budget Hotels**	**Restaurant Chains**
Stage of node life cycle		Late Growth	Late Growth	Introductory	Late Growth	Late Growth	Mature	Growth	Growth
Competitive forces	Existing level of rivalry	Low	Low	High	High	Low to Moderate	High	High	High
	Power of suppliers	Low	Low	Moderate	Low	Low	Low	Low	Low
	Power of buyers	Low- High depending on the buyers	Low- High depending on the buyers	High	Moderate	Nill	Nill	Nill	Nill
	Threat of new entrant	Low	Moderate	High	Moderate	Low	Low	Moderate	Moderate
	Threat of substitution	Moderate	Moderate	High	Moderate	Low	Low	Low	Low
Willingness to source directly from farmers		Yes	Yes	Yes	Yes	Yes, but with conditions	Yes but constrained	Yes but w/ conditions	Yes but constrained
Relative Attractiveness to Farmers		High	High	Moderate	Moderate	Low	Low	Low	Moderate

In Cebu, the position on the market life cycle for each buyer group was mapped as folows.

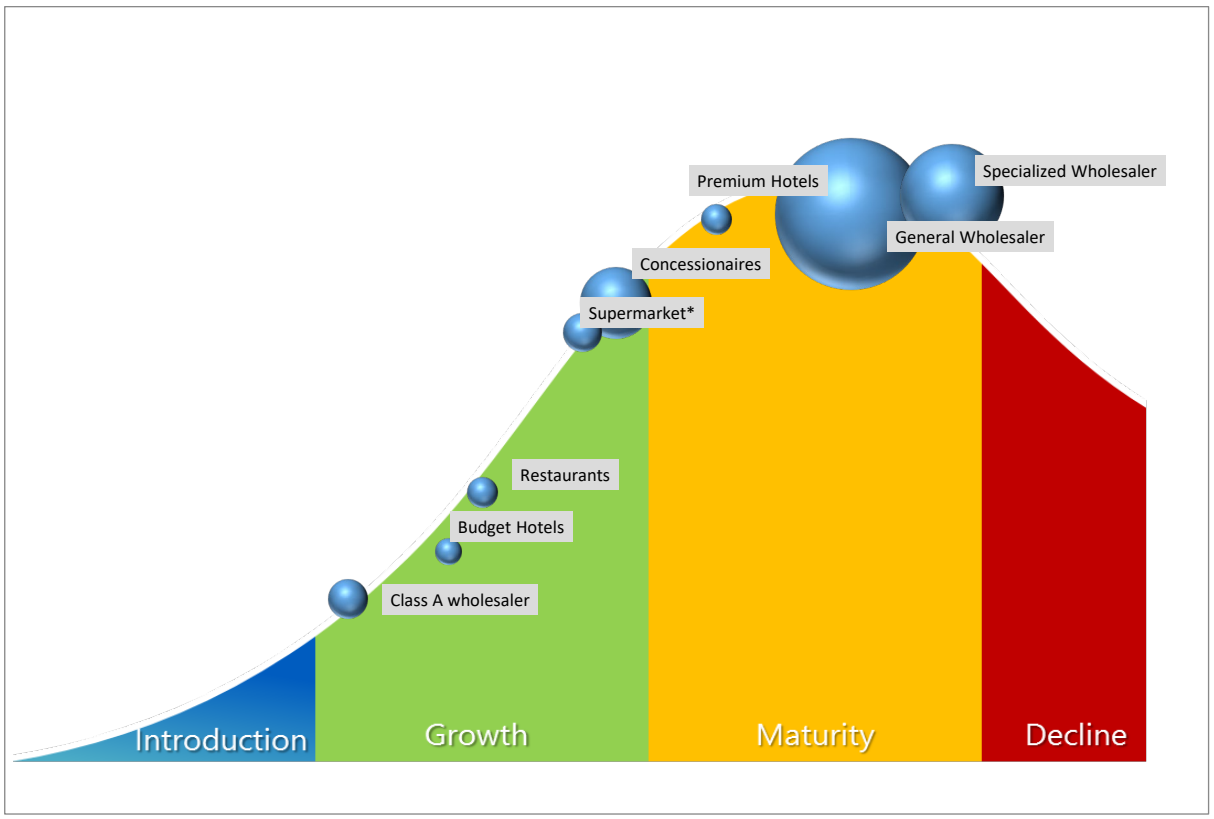


Figure 3: Product market lifecycle stage of 'nodes' in Cebu

The distribution flow of vegetables in Cebu was identified and shown below.

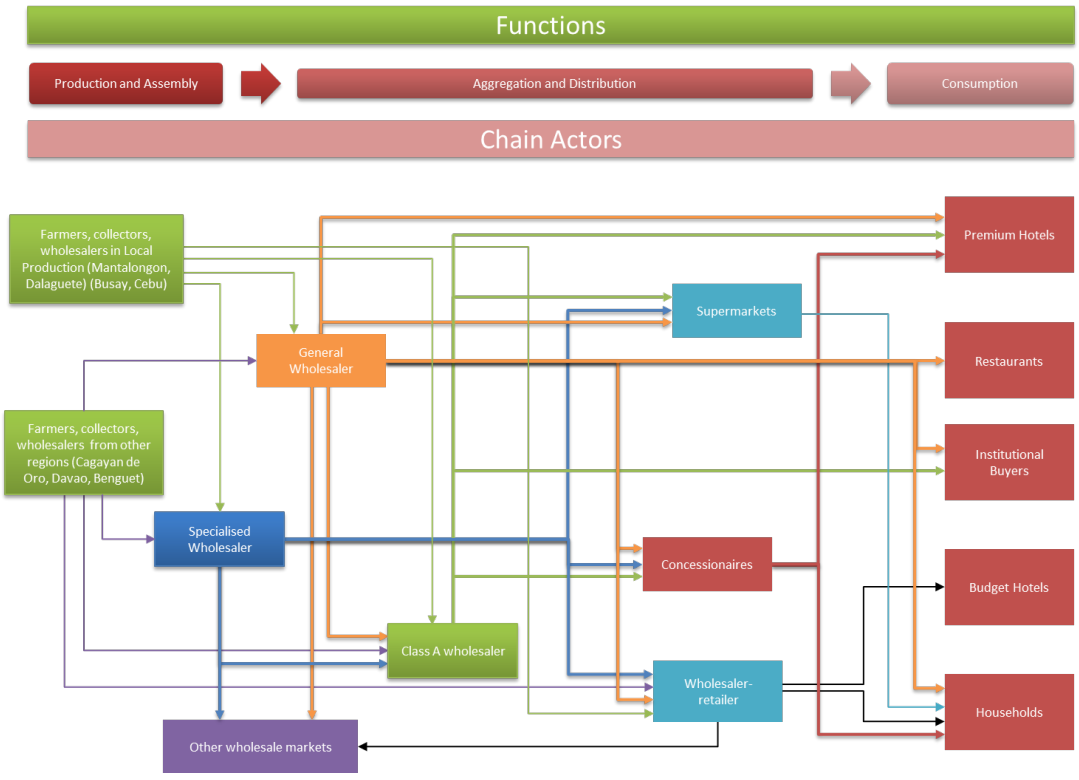


Figure 4: Distribution flows of vegetables in Cebu

Conclusions and Recommendations

1. Unlike more developed markets, data collection in Southern Philippines presents researchers with significant challenges. These challenges have limited the data available for analysis. Challenges included:

    a. Lack of commercially available secondary data and statistics. This may, in part, be because the regions included in this research are not high value vegetable production regions and consequently do not attract the attention of government statisticians and record-keepers.

    b. Distribution channels are complex and fragmented. In more developed markets distribution channels have rationalised into a smaller number of larger chains which are simpler to understand and analyse. In developing markets and industries there are many more actors providing a greater range of services and defining who does what and grouping them together into single business models (nodes) is complicated.

    c. Even the larger actors in the industry do not appear to have a good knowledge of their industry and so are unable or are reluctant to provide reliable information about market size and other important characteristics. This significantly hindered a methodology that substantially relied upon interviews with industry key informants.

    d. Government statistics, where available, are not reliable. In one instance when clarification of reported production statistics was sought from the Department of Agriculture the advice was that they were probably unreliable.

2. Decision-making by actors in nodes involved in the distribution of vegetables in the Southern Philippines appears to be driven more by upstream availability and downstream customer (one step in the chain only) requirements and relationships than final consumer demand. This may be a consequence of the stage of development of the industry and the significant reliance on wet markets for retail distribution. However, as consumers' income and education about health related to the foods they consume, as Concessionaires and Supermarkets differentiate 'healthy' and 'safe' vegetables, and as consumers increasingly change their purchasing behaviour to favour supermarkets, it is very likely that consumer influence over how vegetables are produced and distributed will increase. However, at the present time and the for the foreseeable future it is appropriate to characterise vegetable marketing in the Southern Philippines as being much more production-oriented than market-oriented. As a consequence, expecting modern approaches to value chain management that rely on consumer preference information being communicated upstream to all actors in the chain including to farmers, and expecting all actors to respond by changing their practices in response to consumer demand may not be appropriate in this region, at least not without changing the way information is communicated along supply chains and the basis on which B2B decisions are made along supply chains.

3. There was very little evidence that vegetable safety i.e. agricultural chemicals or handling practices, represents a significant concern to actors involved in the distribution of the vast majority of vegetable destined for retail consumption. Segments in which personnel who are trained about vegetable safety and hygiene are employed eg. dieticians in hospitals and chefs in premium dining restaurants, do care about these issues, but they represent a very small percentage of the market for vegetables in Southern Philippines. This does not mean that farmers and downstream actors should not adopt safe practices, but it may be difficult to

change behaviour without a significant financial (or regulatory) incentive. At present there is little evidence of either.

4. Small-scale farmers appear to be caught in situations where they are production-oriented price-takers producing commodities that sell at 'market prices' which fluctuate in response to supply and demand. However, it is more likely that small-scale farmers will be profitable if they produce a product for which demand exceeds supply so that premium prices can be commanded. This would require a significant transformation in farming practices starting with the desire to do so. The basis for differentiation can be product specific eg. a different type of vegetable such as the irrigated bell peppers produced under protective cropping structures with the assistance of Israelaid, or 'vegetable safety' based on certified protocols of production, or service specific eg. being able to guarantee specific vegetable quality attributes and specific schedules of deliveries to buyers who need to have confidence for their own business success. Farmers need to agree on the basis on which they will compete in the future and this is obviously something to which this project can contribute through Community Development activities. Successful intervention may be difficult without this very important first step, which in itself is an importance intervention objective.

5. The role of supermarkets for the distribution of vegetables in the Southern Philippines is increasingly becoming important but at this stage selling directly to supermarkets is probably not viable for small farmers for a range or reasons. However, supplying wholesalers and concessionaires that supply into and through supermarkets is an opportunity that will benefit from the long-term consumer trend of sourcing vegetables from supermarkets. Farmers may even (eventually) be able to supply vegetables in a plastic wrapping as this appears to be the way consumers differentiate between vegetables sourced from supermarkets from other sources. Beyond simple plastic wrapping may be opportunities for farmer groups to develop brands as a means of differentiating vegetables from a specific location or region. However, before these opportunities can be considered or realised, farmers must be able to produce quality vegetables consistently and develop the commercial relationships with customers to allow value-adding initiatives to be considered. If further consumer research is to be undertaken, focusing on supermarket buyers would be appropriate, as this represents possibly the single most significant end user growth opportunity for differentiated vegetables.

6. The role of Concessionaires in the supermarket channel is significant and whilst it is not known whether supermarkets will continue this business model in the long-term, the fact is that Concessionaires currently control the vast majority of vegetables sold through supermarkets in all regions. Consequently, Concessionaires (and wholesalers who supply them) are considered to be a high priority for possible relationship-development with small-scale farmers.

7. When identifying potential customers it would be prudent to select partners that are established and have excellent reputations and significant market shares rather than adopting the more risky practice of collaborating with actors who are not yet well established or who do not have good reputations, particularly as it appears that it may be difficult for new Concessionaires to enter supermarkets.

8. The research has identified two opportunities for re-thinking how nodes are classified for future projects:

    a. Fine Dining and 4 & 5 Star Hotel Restaurants. These classifications do not make a lot of sense in Southern Philippines because hotels are not yet

rated according to stars, because the rating applies to the whole hotel and not just to the restaurants, because there are few, if any, fine dining restaurants in the region and because hotels may have a combination of premium quality dining and institutional catering. One suggestion is that future research re-classifies the segment as incorporating eating establishments that typically seek class A vegetables, probably employ trained chefs, have formal QA systems etc. Perhaps the segment (node) could be named 'premium dining' to reflect the experience sought by consumers.

b. Supermarkets. Classifying supermarkets as targeting a specific category of consumer depending on incomes is potentially flawed because supermarkets usually seek as many customers as they can get and employ promotions to expand their customer base beyond specific income ranges. Perhaps this segment could be defined based on a supermarket's approach to sourcing and presenting vegetables. For example, could the 'top category' be supermarkets that are responding to the apparently emerging consumer desire for convenience by offering pre-prepared vegetables and for hygiene as demonstrated by plastic wrapping. This approach may be a more market-led by focusing on the consumer trend that's influencing demand for premium quality vegetables.

4. Rapid market appraisal-Market options for mango produced in Davao region

Mangoes are sold in Southern Philippines according to a well-known and strct set of market standards. These include:

- *Export Grade (0-0)* – Mangoes in this class shall be of superior quality. Fruits shall be clean, well-trimmed well formed, smooth and free from mechanical, skin, and discolour defects. Size requirement depends on the importing country.
- *Export Grade (0-1)* – Mangoes in this class shall be of good quality. Fruits shall be clean, well-trimmed, Well-formed, smooth and free from defects with the exception of very slight superficial defects, provided that these defects do not affect the general appearance. With slight/small scab, light latex (one part of mango face only), generally small/slight defects on side of fruit. Size requirement depends on the importing country.
- *Hong Kong Grade* (0-2) – Mangoes in this class which do not qualify for inclusion in the higher classes. Light to medium skin defects like scab, ant urine, latex on both two sides of fruit.
- *Local Manila Grade 0-4* – Mangoes in this class which do not qualify for inclusion in the higher classes. With medium to heavy skin defects like scab, ant urine, latex on both two sides of fruit. Specific size requirements are >300 grams for Extra Large and 250-300 grams for Large. The Export Grade (0-1) and Hong Kong Grade (0-2) can also be sold as Local Manila Grade.
- *Local Market Grade (0-4)* – Mangoes in this class which do not qualify for inclusion in the higher classes. With medium to heavy skin defects like scab, ant urine, latex on both two sides of fruit. Specific size requirements are >300g for Extra Large, 250-300g for Large, 220-250g for Medium and 180-220g for Small. Note: the photos is the same for Local Market Grade and Local Manila Grade but the size requirements differ.
- *Process Grade* (0-5) – Mangoes in this class which do not qualify for inclusion in the higher classes. With the heaviest skin defects like scab, ant urine, latex on both two sides of fruit. Fruit should not have bruises, bumps, and cracks. Minimum size ranges from 150-180g to a maximum of 400-500g. The image for this grade is labelled 'Dried' because the processor that provided it specialises in dried mango, but the specification applies to all processing mango. Note: the photos is the same for Local Market Grade and Local Manila Grade but the size requirements differ. Maturity – 110 to 120 days.

The relative significance of each of the buyer groups operating in the Davao region is shown in the following table.

Table 10: Relative significance of mango buyer groups in Davao region

Name of Node	Number of Participants	Annual Quantity of Mango (tonnes)
Processors in Davao	4	43,000
Contractors/Collectors	25	18,000
Direct wholesalers to Manila	20	14,400
Supermarket Concessionaires	4	8,000

Primary Wholesalers	4	4,000
Wet Market Retailers	100	3,600
Davao-based Exporters	2	3,400
Secondary Wholesalers	20	576
Hotels and Restaurants	10	120
Juice and Smoothie Bars	3	100

Descriptions of each of the buyer groups identified and their requirements are included in the following table

Table 11: Summary of mango RMA

Characteristics	Contractor/ Collectors	Primary Wholesalers	Secondary Wholesalers	Direct Manila Wholesalers	Processors in Davao	Davao-based Exporters	Hotels & Restaurants	Wet Market Retailers	Supermarket Concessionaires	Juice & Smoothie Bar
Node Description	Contractors buying mangoes on production site	Large wholesalers buying mangoes from Contractor / Collectors and mango farmers	Secondary wholesalers buying mangoes from primary wholesalers and selling to wet market retailers	Wholesalers selling to Manila buyers	Firms that process mango mostly into dried, frozen cuts, and puree	Firms exporting fresh mango to Japan, Korea, and other importing countries	Privately owned and managed hotels and restaurants	Retailers selling mangoes in traditional wet markets	Concessionaires selling mangoes in supermarkets	Privately owned and managed enterprises that process fresh mango into juice and smoothies
Product Requirements	Buys all grades (All-in)	Buys all grades (All-in)	Local market grade but preferably large size and blemish free	Predominantly buying Hong Kong grade and Local Manila grade but may also buy All-in	Buys process grade and local Davao grade	Buys export grade and Hong Kong grade	Sweet; large size; blemish free; insect-damage free	Sweet smell; large size; minimal blemishes, spots, and skin damages	Sweet; large size; blemish free	Buys large size local market grade only
Emerging Need	More supply of mango during lean season	More supply of mango during lean season	More supply of mango during lean season	More supply of better quality mangoes (HK and Local Manila grades)	More supply of mango during lean season	More supply of high quality mango year-round; mangoes that adhere to MRL	Nothing in particular	Nothing in particular	Good quality mangoes during wet season; blemish free	More supply of large size mango during lean season
Quality characteristics sought but not delivered consistently	Greater proportion of harvested mango classified as Export, HK, and Local Manila grades.	Greater proportion of harvested mango classified as Export, HK, and Local Manila grades.	Mangoes with less incidence of stem end rot and anthracnose when ripened	Greater proportion of output that can be classified as Hong Kong Grade and Local Manila Grade	Mature mangoes with no bruises and cracks	Superior quality mangoes with no insect bites, latex burns, blemishes, etc.; MRLs	Sweet mangoes (rarely)	Nothing specific, they can choose what to buy	Good quality mangoes which are blemish free, no dark spots and bumps (rarely)	Large size mangoes during lean season; consistent quality of all mangoes inside the purchased basket (sometimes)

Characteristics	Contractor/ Collectors	Large Wholesalers	Secondary Wholesalers	Direct Wholesalers	Processors	Exporters	Hotels & Restaurants	Wet Market Retailers	Supermarket Concessionaire	Juice & Smoothie Bar
Volume of Requirement/ month	60mt/month (average)	40 to 80mt/month (average)	1.4 to 3.4mt/month	60mt/month (average)	600 to 1,200mt/month	120 to 140mt/month	450 to 900kg/month	2.4 to 3.6mt/month	108 to 225mt/month	Did not disclose information on volume requirement
Buying Price (PhP/kg)	Farmgate price (P22.50, All-in)	Farmgate price (P30.28, All-in)	Wholesale price: (P42.90, local market grade; large size and blemish free)	Farmgate price (P45.00, HK and Local Manila grade)	Processor Price (P28.00, Process grade)	Export price (P68.50,Export grade)	(P52.50, sweet, large-size, blemish free mangoes)	Small wholesaler price (P57.28, sweet, large-size, minimal blemishes, spots, and skin damages)	(P55.00, sweet, large-size, blemish free)	(P57.00, large size local market grade)
Support Services Provided to Farmers	(3) Produce preparation and packaging; Product handling; Transportation	(4) Produce preparation and packaging; Product handling; Transportation ; Input financing	(0) None, they only buy from wholesalers	(3) Produce preparation and packaging; Product handling; Transportation	(3) Transportation ; Tech. support on farm management; Input financing through contract growing	(3) Transportation ; Tech. support on farm management; Input financing	(0) None	(0) None	(0) None, they buy mangoes from wholesalers)	(0) None, they buy mangoes from wholesalers)
Stage of product life cycle	Maturity	Maturity	Maturity	Maturity	Growth	Growth	Growth	Maturity	Growth	Growth

Characteristics		Contractor/ Collectors	Primary Wholesalers	Secondary Wholesalers	Direct Manila Wholesalers	Processors in Davao	Davao-based Exporters	Hotels & Restaurants	Wet Market Retailers	Supermarket Concessionaires	Juice & Smoothie Bar
Sources and strength of competition	Threat of new entrant	Moderate	Low	Moderate	Moderate	Low	Low	Ø	High	Low	High
	Bargaining power of suppliers	Low	Low	High	Moderate	Low	Moderate	Low	Low	Moderate	Low
	Bargaining power of buyers	Moderate	Low	Low	Low	Ø	Low	Low	Moderate	Low	Low
	Threat of Substitute Nodes	Moderate	Moderate	Low	Moderate	Low	Low	Moderate	High	Low	Moderate
	Rivalry of firms	Low	Moderate	Moderate	Low	Low	High	Ø	Low	Ø	High
Willingness to support farmer groups		Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Capacity to support farmer groups		Moderate	High	Low	Ø	Very high	Very high	Very low	Very low	Low	Low
Relative Attractiveness		**3.1**	**3.5**	**2.2**	**3.6**	**3.4**	**4.4**	**2.5**	**2.6**	**3.1**	**2.7**

At the end of data collection and analysis a final workshop was conducted at which the following summary of findings and possible responses were developed

Table 12: Possible responses to RMA findings

Node Characteristics	Key Findings	Possible interventions
Product requirements & buying prices	Different nodes have different product (mango classification) requirements; Higher mango grades/classification gets higher buying prices – Exporters buy export grade mangoes at P68.50/kg, supermarket concessionaires buy large size and blemish free mangoes at P55.00/kg, direct wholesalers to manila buy Hong Kong grade and local Manila grade at P45.00/kg, large wholesalers buy mangoes all-in at P30.28, processors buy process grade mangoes at 28.00/kg	**Increase the overall quality of mangoes produced at the farm** by adopting an **Integrated Crop Management (ICM) farming system** **Possible Impact:** A 100% increase in the current proportion of output that can be classified as Export (20%), Hong Kong and Local Manila grade (30%) can increase income by 18.91% (**Error! Reference source not found.**)
Node buying requirements /conditions	Collectors, large wholesalers and direct wholesalers practice the all-in buying system wherein they shoulder the cost of harvesting, sorting and grading and they get the benefits of selling high grade mangoes to various downstream buyers.	**Farmers should perform the sorting and grading activities** to be able to sell to different nodes and acquire the benefits of higher buying prices for higher grade mangoes **Possible Impact:** Sorting and grading of mangoes and selling them to different nodes can increase the income by 39.61% (**Error! Reference source not found.**)
Quality characteristics sought but not delivered constantly	Post-harvest damages from harvesting, product handling and transportation contribute to losses accounting up to 20% reject (due to bruises and cracks) for process grade mangoes and 30-40% for export grade mangoes (due to insect bites and latex burns)	**Farmers should adopt a cost effective postharvest management technology** that can reduce the post-harvest losses from product handling & transportation and damages from insect bites and latex burns **Possible Impact:** Adopting a postharvest management technology that can reduce postharvest losses can increase the farmers revenue by (**Error! Reference source not found.**)
Emerging need	The collectors, large wholesalers, direct wholesalers, processors and exporters node have all indicated that they need more supply of mangoes during the lean season and year-round for the exporter. These nodes had observed the declining supply and quality of mangoes in the lean season.	**Develop a cost effective off-season production farming system for mangoes** **Possible Impact:** Adopting a cost effective off-season production technology allows the farmer to produce mangoes during lean season and take advantage of the high prices.

A series of scenarios were developed to test the sensitivity of value chain participants taking various actions.

The potential impact on producer income from improving the quality grades of manages produced was estimated, as in the following table.

Table 13: Income impact of various responses

Mango Classifications	PhP / Kg	Baseline		With improvement in top grade (50%)		With improvement in top grades (100%)	
		% of Crop	Income (PhP)	% of Crop	Income (PhP)	% of Crop	Income (PhP)
Fresh Export Grade A	68.5	10.00%	50,416	15.00%	75,624	20.00%	100,832
Manila local B	45	15.00%	49,680	22.50%	74,520	30.00%	99,360
Processing C	28	60.00%	123,648	47.500%	97,888	35.00%	72,128
Fresh local	30	12.00%	26,496	12.00%	26,496	12.00%	26,496
Reject	30	3.00%	6,624	3.00%	6,624	3.00%	6,624
Income		100.00%	256,864	100.00%	281,152	100.00%	305,440
Benefit from Baseline (PhP)					24,288		48,576
Benefit from Baseline (%)					9.46%		18.91%

The potential income of sorting and grading mangoes was also estimated as in the following table.

Table 14: Financial impact of sorting and grading mangoes

Mango Classifications	PhP / Kg	Sell 'All-In'		With Grading	
		% of Crop	Income (PhP)	% of Crop	Income (PhP)
Fresh Export Grade A	68.5			10%	50,416
Manila local B	45			15%	49,680
Processing C	28			60%	123,648
Fresh local	30			12%	26,496
Reject	30			3%	6,624
All-in	25	100%	184,000		
Income		100%	184,000	100%	256,864
Benefit from Grading (PhP)					72,864
Benefit from Grading (%)					39.60%

Finally, the potential impact on income of adopting a postharvest management technologies were estimated as in the following table.

Table 15: Financial impact of adopting enhanced post-harvest handling

Mango Classifications	PhP / Kg	Baseline		With Postharvest Management technology reducing losses by 50%	
		% of Crop	Income (PhP)	% of Crop	Income (PhP)
Fresh Export Grade A	68.5	10%	50,416	10%	50,416
Manila local B	45	15%	49,680	15%	49,680
Processing C	28	60%	123,648	60%	123,648
Fresh local	30	12%	26,496	12%	26,496
Reject		3%		3%	
LESS: Rejects					
Fresh Export Grade A	68.5	35%	17,646	17.5%	8,823
Processing C	28	20%	24,730	10%	12,365
Total Revenue		100%	**207,865**	100%	**229,052**
Benefit from Baseline (PhP)					21,188
Benefit from Baseline (%)					10.19%

4. Case study on Cabintan Livelihood Community Association (CALCOA)

4.1 Location

Cabintan barangay, 21km away North-Eastern part of Ormoc City, in Province Leyte, covers an area of 277 ha and is located at an altitude of 600 to 700 meters above sea level. The word Cabintan comes from the local term “Baknit/ Kabaknitan”, a wild strawberry (*Fragaria virginiana*). Most of the land area in Cabintan is reserved and protected by Energy Development Corporation (EDC). The area receives rainfall frequently with wet and very wet months. The wet months are during the months of February to June and very wet months are from July to January. The area is at high risk with frequent occurrence of typhoons. The high rainfall and typhoons increase the risk of growing vegetables in this area. The soil type in this area is observed to be sandy loam with a PH ranging from 3.5 to 5.6. The source of water for irrigation is from a river that flows through the barangay.

The barangay has a population of 2,498 people, constituting 584 households and 608 families with an average number of 5 people per household. Among the total population 53% are males, 47% are females and 51% are young children (15years old and below). Farming is the main occupation for the households with an average monthly income of 3, 611 Pesos (100AUD) and annual per capita income of 11, 375 Pesos (311AUD). The barangay provides education facilities, beginning from elementary to secondary education, providing plus K to 12 Program. The enrolments in elementary school has gradually increased over time from 300 students to 439 students in 2017. Amongst the population, 60% of the barangay inhabitants owned the land, while 22% occupied the land for free with consent from the owner. Amongst the households, 457 people own the lot where their house is built and the rest of the households either have occupied for free of cost with consent from owner or are family owned. Majority of the households have access to basic needs such as electricity and water.

4.2 Community characteristics:

A sustainable livelihood approach was followed to identify the entry points to facilitate market linkages.

Cabintan Livelihood Community Association (CALCOA) was registered with Department of Labour and Employment (DOLE) in 2005 with a total of 44 households as of 2014. The association was supported by EDC to improve livelihood for vegetable and abaca producers.

4.2.1 Physical Capital:

Most households (91%) have mobile phones and 45% of the households agreed that mobile phone service signal is strong and 36% of households stated that the services is moderate. The mode of transport commonly used is jeepney (85%) however road conditions are poor and limiting development. The group required a space to conduct post-harvest facilities.

4.2.2 Financial capital:

Cash is the most common financial asset amongst 77% of the households in Cabintan. Payments to sales are on credit and farmers just "withdraw" this credit payment whenever they feel the need to buy any goods. The most commonly owned appliance in all households is television. Radio is still in use by 43% of the households in Cabintan. Bolo, shovel, hoe and sprayers are the most common farm tools owned by more than 60 % of the households. Farm animals commonly owned by 40% of the households are poultry, cattle and goat.

Majority of the farmers in Cabintan (44%) declared ownership of the land where their house is built, either through inheritance or through purchase. An in-kind arrangement for land use in Cabintan is reported for their housing with the Energy Development

Corporation (EDC). Electronic gadgets such as mobile phones and farm animals are reported as non-cash security, more by women than men in Cabintan.

The CALCOA association owned protective structures on a communal land leased through EDC, where, Low Tunnels provided through AFOS; 13 high tunnel and 1 big structure through IsraAid; 11 High Tunnels through EDC/PMPC. In addition to the protective structures the members of the CALCOA paid monthly dues for capital build up. The CALCOA association also owned a Sari-sari store to generate off farm income. However, the monthly membership fee was not paid regularly by all members of the association. Also, the income generated from the communal land was divided equally to all members of the association encouraging more free riders. The entry point to improve financial capital of the association was to improve capital build up through revising the bylaws of the association. The CALCOA association members also agreed to allocate budget to re-invest in business and maintenance of the structures.

4.3.3 Human Capital:

Prior to planting season, both male and female respondents in Cabintan consider planting season and weather conditions as the most important criteria for growing plants followed by capital availability. Households in Cabintan perceived that they possessed farm management skills such as land preparation, irrigation, pest and disease management, post-harvest, sowing/planting, weeding, harvesting and required assistance with respect to marketing. The CALCOA members participated in farm education such as farm trainings, farm business trainings and field days which improved the farm management skills. The farmers were willing to adopt new practices which is an entry point to introduce improved practices for the protected structure to maximise their income.

4.3.4 Environmental Capital

Since Cabintan is an upland barangay, most of the farmers take measures to save water and prevent soil erosion. To control soil erosion, farmers in Cabintan have tried contour farming. The farmers who involved in a FAO funded project on Sloping Agricultural Land Technology are practicing contour farming. Improving drainage by making canals and plots has been also practiced to control erosion. The entry point in this project is to improve the irrigation system in the protective structures. A surface water impounding facility to save water was constructed. This allowed farmers to save water for irrigation when their existing irrigation facility failed. A bamboo fence was established to protect the water source from garbage and other disposal.

4.3.5 Social Capital

Voluntary activity such as the *bayanihan* has the potential to facilitate community building and strengthening by encouraging greater participation and contributing to the social capital in communities. Community-based physical activity interventions foster social connections, cooperation, reciprocity, collective identity, and trust in the community.

Majority of the respondents in all sites have participated in *bayanihan* activities in the last three years. The participation in *bayanihan* activities is highest in Canitoan followed by Cabintan. This is because the rules of Cabintan Livelihood Community Association (CALCOA) states participation in *bayanihan* activity to be essential to be a member of the association. There are more farmers from Cabintan and who communicate often with the people beyond their families. In Cabintan, there are more respondents from Cabintan who know most people in their community as there are also more neighbourhood stores where liquor and other food items are sold which invites more interaction among community members. In Cabintan, it is mostly due to attendance in formal meetings, as they are too busy in doing farm activities thus; they have limited time to interact with other people in their barangay.

4.3 Vegetable production in Cabintan

Farmers are producing vegetables based on the seasonality of the crop. During rainy season (July to January) they grow cabbage and Chinese cabbage and during dry season (February to June) sweet pepper, chilli, tomato, beans, pechay and cabbage. Farmers plant these crops at the time of favourable growing conditions not because of market demand resulting in oversupply and low price.

Most of the farmers are small and depend on traders for credit to source inputs. Consequently these traders who are product aggregators dictate the price. Farmers sell products without grading usually in overloaded sacks and box resulting in high percentage of rejected product and further reduction in income.

4.4 Post typhoon intervention in Cabintan

During the early phase of the project, on November 8, 2013, Super typhoon Yolanda caused catastrophic destruction of lives, livelihoods and economy across the central Philippines. Project sites in Ormoc were severely affected, with all tunnels destroyed.

During post-typhoon recovery phase, there were an influx of NGOs and other international organisation providing humanitarian aid to people in affected area. However their efforts were carried out in very individualistic and disorganised manner, and sometimes even came into conflict (especially when two organisations targeted same group of beneficiary). In response to this situation, in August 2014, project team initiated The Technical Advisory Committee (TAC) to coordinate all the organizations working in Barangay Cabintan. The TAC group composed of our project representatives from Visaya's State University (ACIAR/VSU), German foundation AFOS (Stiftung für Unternehmerische Entwicklungszusammenarbeit), Ormoc Chamber of Commerce (OrCham), Energy Development Corporation (EDC), Ormoc- City Agriculture Office (CAO) and IsraAid. The diagram below (Figure 5) summarizes the different interventions of TAC partner organizations and agency.

Coordinated efforts of TAC members and CALCOA farmers resulted in construction of 30 small tunnels, 13 high tunnel Israeli type and 11 high tunnels Filipino type and 1 large greenhouse.

While construction of tunnels and irrigation system required lot of labour hours from CALCOA members, farmers were generally quite willing to participate over nearly two years of construction. Real problems started when construction was completed and crop production phase started. Farmers were asked to grow same crops in different ways from what they had become accustomed to (tomato, for example), or they were asked to grow crops they had never grew before (bell pepper) and there were lot of experimentation with crops that were unsuccessful. Even though farmers were compensated for unsuccessful crops, they were not happy partly because IsraAid did not seek farmers' opinion or approval, and also never communicated properly what was aim of the experiments and how the trials can lead to better production and commercial outcomes. Income distribution also contributed to farmers' dissatisfaction. Even though farmers did trust that IsraAid, or our project, will pass all income to them, they were not sure if they would get fair share of the income proportional to their labour input. In other words, the question was whether farmers who did not put much time or effort would be reworded same as farmers that worked hard.

To address income distribution issue, project team worked with CALCOA leaders to improve collective decision making, and to organise farmers in small working groups, each of them assigned to specific high tunnels, so they labour input and value of their products could be recorded.

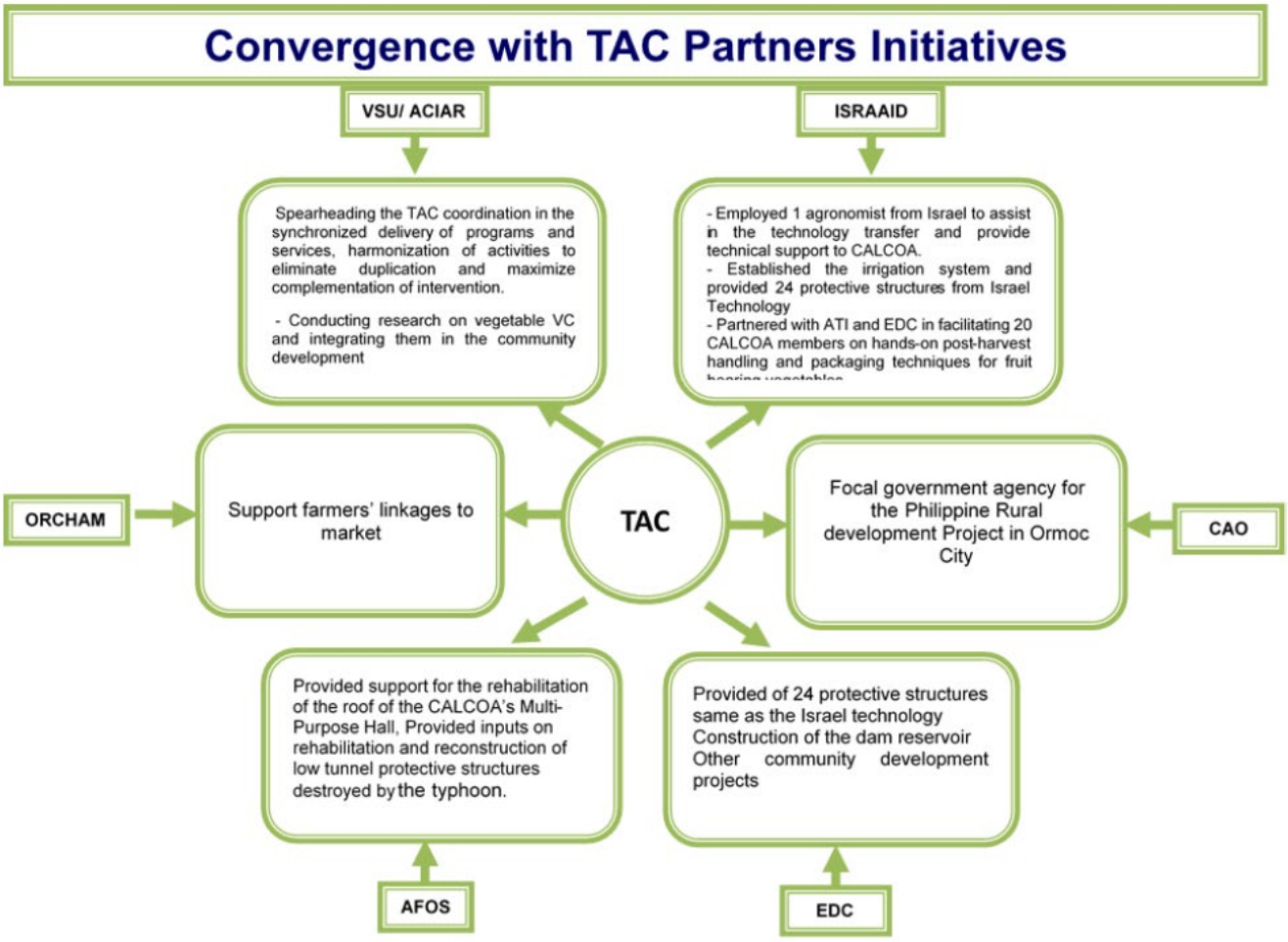


Figure 5: TAC partner organizations and agencies and their role in Cabintan post-typhoon recovery

Regarding production, the project team shift initial focus from new products to improving production of familiar tomato variety and made innovations in marketing: grading and better packaging. After initial success with tomatoes, farmers were confident to start production of bell pepper, which required substantial investment in buying seeds imported from Israel. Farmers voted in favour of introducing a new crop (Picture 1) but only after our project team agreed to underwrite risks by guarantee compensation if crop fail.

Picture 1: CALCOA members vote on capsicum (bell pepper) production

4.5 Improve farmers' production capacity

Slowly through participation in collective vegetable production, farmers adopted new agricultural and post-harvest practices. Farmers now have more confidence in producing crops using new technologies, and they also applied new knowledge to their own individual field. Change in practices include:

Seedling production

Use of seedlings trays with sterilised and well mixed potting media that increased seed germination, root development and vigour. Well planned seedling production to allow harvest at time when market conditions are predicted to be favourable.

Land preparation

Deeper ploughing (carabao ploughing) followed by cultivator to increase soil aeration and subsequently improve plant growth and yield. Reduction of pest and disease pressure by exposing soil to sunlight

Pesticide application

Introduction of mist blower to increase spraying efficiency and pesticide effectiveness.

Irrigation

Adoption of drip irrigation system. Farmers learned how to operate the system properly in terms of timing and volume of water based on crop stage. They understood the importance of regular maintenance of main lines and sub-line system. Eventually they learned how to utilise the system for fertigation.

Fertilisation

Reduction of fertiliser by optimising timing and amount used.

Post-harvest practices

Vegetables have been harvested only during a cool period of the day. Plastic crates are used to get vegetable from the tunnels to shaded processing area. Vegetables have been graded and packaged according to customer requirements.

Production planning

CALCOA has developed one year cropping calendar (Fig 6). They purposely selected crops that commands higher price and are preferred by the buyers. Members identified the total area to be planted to meet target volume based on the demand.

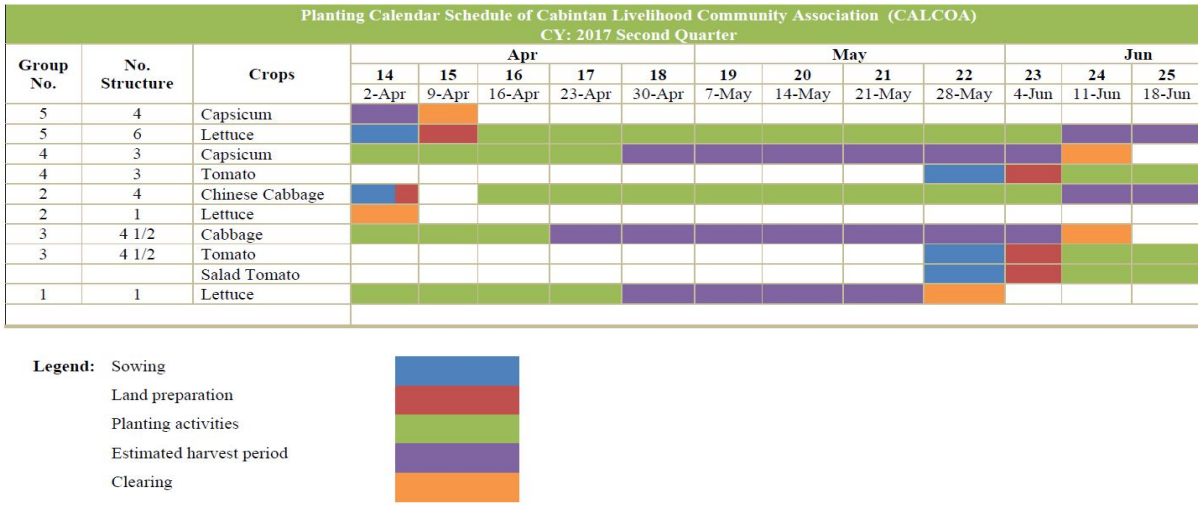


Figure 6: Example of planting calendar

4.5 Development of value chains

After using rapid market appraisal method to map vegetable distribution channels of major consumption centres in the Southern Philippines, the project team facilitated development of several value chains to supply Cebu, Tacloban and Ormoc markets through a strategic engagement and consultation with traders and retailers in these areas. The project team also organised visit of 20 key traders from Cebu and Tacloban to production site, where they had chance to see "first hand" farmers' production and technology capability. This activity also help to build traders' trust in CALCOA's capacity to deliver agreed quantities of high quality vegetable on time. CALCOA members also gain understanding on functioning of VC and where value for them can be created (Figure 8). In the end, after organising their production in tunnels, CALCOA successfully penetrated high value institutional market, where they sold 70-80% of production (Figure 7). That was achieved through implementation of GAP-compliant production protocols and development of farmers' capacity to grow vegetable crops and varieties that these markets need.

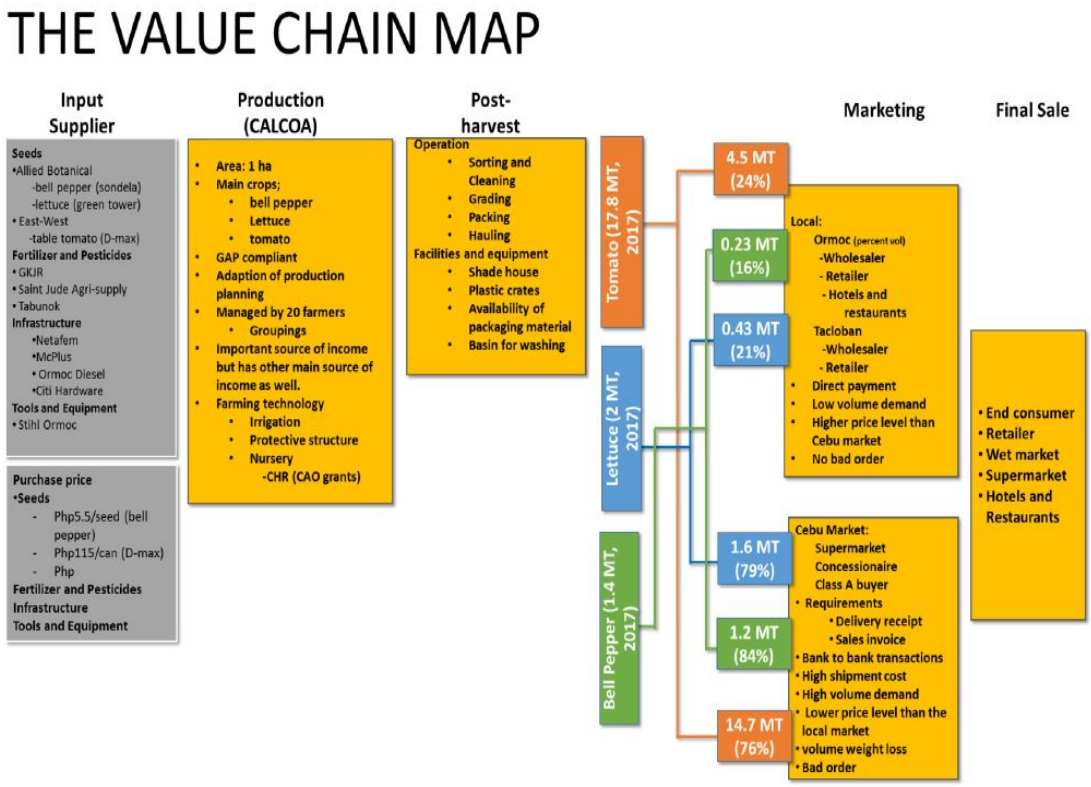


Figure 7: CALCOA value chains map

The moderate but continuously improving relationship between CALCOA and its customers resulted in better coordination within the chain. Generally CALCOA has stronger relationship with wholesalers supplying supermarket than with supermarkets and concessioners themselves.
There is still room for improvements in quality consistency and reduction of post-harvest losses along the chain.

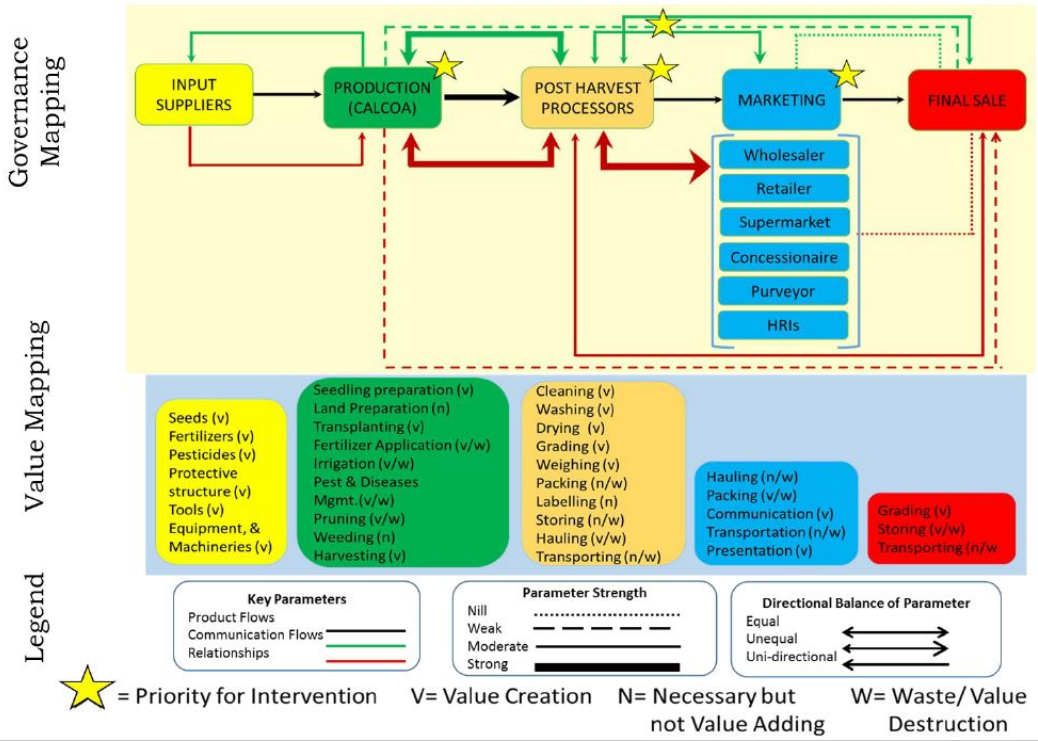
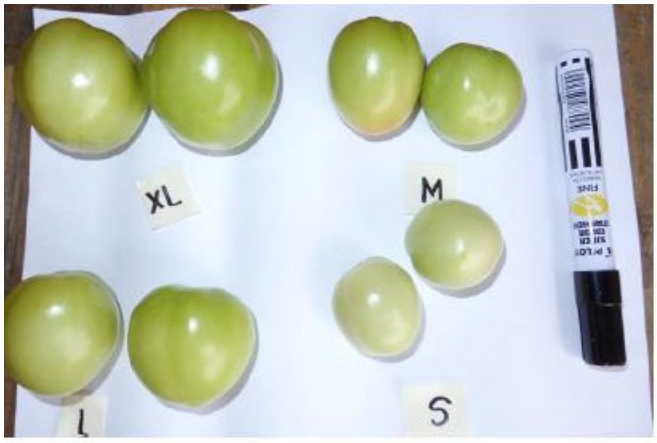


Figure 8: Value and governance mapping along the chain.

Grading of tomato at CALCOA (Picture 2) and selling tomato per grade was most successful value adding innovation in marketing of CALCOA products. Post-harvest loss were reduced by organising delivery in the evening and transporting tomatoes directly from the farm to the port, which prevents damage from excessive heat. However, the major breakthrough in post-harvest was achieved by changing packaging practice. When it comes to tomatoes, normal practice is for every 24 kilogram of tomatoes sold to traders, farmers would add 2 kg of tomatoes without charge in order to compensate for anticipated losses during transportation. However, prior to project intervention, farmers would put all 26 kg of tomatoes in one box, which resulted in overloading and paradoxically further increase loss and damages during transportation. After the project team identified this problem agreement was reached with traders that instead of overloading tomatoes in one box, CALCOA will deliver one free box for every 10 boxes containing 24 kg of tomato.



Picture 2: Grading tomato at CALCOA and selling tomato per grade (XL @ 45.00 PhP and L @36 PhP sold to Cebu supermarket, and M @25PhP and S@15 PHP sold to Tacloban trader)

Sale per market outlet (Tables 16) was accurately recorded and project team developed together with CALCOA finance officer detail accounting system so farmers involved in collective production had clear picture how income was divided.

Table 16: Sale of capsicum per market outlet

Market Outlet	CAPSICUM				
	Qty (kg)	Qty (%)	Price (PhP)	Sales (PhP)	Sales (%)
Concessionaire RC	1,480.00	68.17	201.40	298,066.00	68.61
Supermarket Metro	149.00	6.86	198.94	29,642.00	6.82
Purveyor- FWT	50.00	2.30	195.00	9,750.00	2.24
Wholesaler	129.00	5.94	466.17	29,730.00	6.84
Viajedor	85.00	3.92	27.20	2,312.00	0.53
HRIs	256.25	11.80	1,434.71	60,892.50	14.02
Others/ walk-in	21.75	1.00	907.29	4,070.00	0.94
TOTAL:	**2,171.00**	**100.00**	**200.12**	**434,462.50**	**100.00**

Period: February 2017- March 2018

Farmers were getting income in two ways, by paid wage for they labour and by receiving a share of profit (Table 17). Capital build-up fund was established for regular maintenance or emergencies, and 10% of sale after subtracting marketing costs has been put into the fund. By the time of project completion, CALCOA had been registered with tax office and was able to issue invoice, which helps to reduce marketing costs.

Table 17: Financial impact of adopting enhanced post-harvest handling

Table_ Net Income Statement of vegetable production of CALCOA 2016-2017

ITEMS	TOMATO		CAPSICUM		LETTUCE	
	TOTAL	AVERAGE	TOTAL	AVERAGE	TOTAL	AVERAGE
	35.5		12		15	
Gross Sales:	761,657.85	21,455.15	436,334.50	36,361.21	185,199.31	16,836.30
Less: 5% Association Shares	5,069.10	499.48	6,694.35	557.86	3,516.24	319.66
Less: 5% Sales Tax	17,731.58	142.79	19,240.85	1,603.40	181,683.07	16,516.64
Sales After Tax	711,851.18	20,052.15	410,399.30	34,199.94	6,674.30	667.43
Less: Production Cost	327,925.94	9,237.35	159,204.71	159,204.71	175,008.76	15,909.89
Gross Margin:	410,931.23	11,575.53	251,194.59	20,932.88	71,335.55	6,485.05
Less: Marketing Cost	55,653.57	1,567.71	31,247.88	2,603.99	103,673.22	9,424.84
Less: Marketing Commission	15,204.30	428.29	6,787.00	565.58	40,129.90	3,648.17
Sales After Marketing Expenses	340,073.36	9,579.53	213,159.71	17,763.31	1,853.33	168.48
Less: 10% Admin Cost	34,007.34	957.95	21,315.97	1,776.33	61,689.98	5,608.18
Less: 10% (CBU or resiliency)	34,007.34	957.95	21,315.97	1,776.33	6,169.00	560.82
Less: 5% PMPC Marketing Services	7,060.68	198.89	1,205.07	100.42	6,169.00	560.82
Net Income:	264,998.00	7,464.73	169,322.70	14,110.23	892.70	4,405.39
Net Income Share/ Farmer	**15,579.18**	**438.85**	**26,387.93**	**2,198.99**	**13,721.98**	**1,247.45**
		-	-	-		
Total Labour	89,857.81	2,531.21	37,917.25	3,159.77	29,693.75	2,699.43
Plus Labour Share (5)	4,686.48	132.01	6,562.37	546.86	9,998.96	909.00
Total Farmer Share:	**20,265.66**	**570.86**	**32,950.30**	**2,745.86**	**23,720.94**	**2,156.45**

4.6 Building CALCOA capacity -Community development interventions:

Community development interventions were implemented in a cyclic process through a process of collaborative reflection and action.

Ensure needs are addressed: CALCOA association began with a mission to improve vegetable production and committed to help members and non-members to adopt, share most improved and sustainable technology on vegetable farming with tangible benefits of better price and good services.

***Employ Participatory process*:** A participatory process was employed to understand the CALCOA members' willingness to engage in the learning process to action change. An ongoing decision making process using participatory process allowed members to take ownership for actions.

Enhance knowledge and skills: Farmers from CALCOA attended training/seminar on irrigation, clustering of farmers/ modular production, safe vegetable production, training on Grafting vegetables, Leadership, and Gender and Development Mainstreaming workshop. Development and implementation of production protocol, record keeping, and Market related activities such as facilitating access to market, conduct of transactional activities related to product distribution, product promotion and other market development activities.

***Educate Community in Group Process*:** Educate the community about sharing resources such as water source and agriculture inputs. Facilitate the community to engage in group process to make joint decisions for markets. Encourage the community to develop guidelines to share the benefits and income from vegetable production and to manage capital build up for the association. Facilitate the community to establish relationship, linkages and communication with the buyers and able to extend this benefit to PMPC and other organizations. Access support from different Government agencies (DOT, ATI, CAO, DOLE, etc.) derived from its continuous production and marketing activities and solid member's participation.

Engage in community action: CALCOA farmers, undertake collective vegetable production over 2 ha of land under protected cultivation. CALCOA farmers plan and coordinate production to ensure pre-determined volumes at different schedules. The farmer association has different subgroups producing vegetables that are consolidated and marketed together. The vegetables produced by CALCAO includes capsicum, lettuce, tomato, chinese cabbage, cabbage, and salad tomato. These vegetables are planted monthly to enable continuous supply and follow rotational cropping to minimize pest build-up. The CALCOA farmers built a packinghouse for product sorting, grading, packing and other value adding activities. CALCOA farmers hire vehicles from Partners Multi- Purpose Cooperative (PMPC) and other private vehicle to facilitate product distribution. PMPC is the apex body of associations initiated by Energy Development Corporation in Ormoc.

Experiment Learnings**:** CALCOA farmers conducted facilitated experimental trials through “Participatory Field Trial Research” on various agronomic practices such as nursery techniques, sowing time, seed variety, crop rotation and types of protective structures. The results are shared during farmer meetings and problems were identified for the forthcoming experimental trial. CALCOA farmers developed and revised association guidelines on membership duties, build-up of financial capital, allocation for repairs and maintenance of the structures, allocation of tunnels to groups, purchase and sharing of inputs, conduct of post-harvest activities and marketing.

Empower community**:** CALCOA registered as an independent entity to manage production and business related activities. The association extended its lease agreement for the communal land and expanded its production area by 2ha by investing own capital. CALCOA is accredited as a Learning Site by Agriculture Training Institute and as "Agri-Tourism Site" in Ormoc City by Department of Tourism, providing opportunity for additional source of income and development of physical capital in the barangay. The association is empowered to raise invoices on completion of registration with Bureau of Internal Revenue.

8 Impacts

8.1 Scientific impacts – now and in 5 years

Vegetable

- Scientific impacts in terms of vegetable production are already evident and will continue with the proposed SRA in Leyte and expansion into additional barangays in CDO.
- The project developed innovations in how to investigate and analyse markets for vegetable and articles on the methods developed can be expected to be submitted for publication during 2019.

Mango

- The project facilitated the formation of an innovation platform with participants from multinational chemical companies (input suppliers), mango farmers and contractors, mango processors, mango wholesalers, mango traders and fresh mango exporters to work collaboratively to improve the competitiveness of the mango value chains responsible for distribution of mango from Samal Island. This group decided to establish itself as a non-commercial entity responsible for industry development. The impact now is that the group has been established and the process of its formation are lessons learned. The group's development should be monitored and preferably supported as the lessons learned from observation over the next five years are expected to inform community developed initiatives.
- Whilst no scientific publications have resulted from this activity it is expected that observing the group's progress and development will provide substantial opportunity for theory development and publications. Enter text

8.2 Capacity impacts – now and in 5 years

Vegetable

- Significant increase in knowledge and skills of local researchers, as well as the non-academic members of the project team, including the collaborating members of TWGs, LGUs, NGOs and also the FAs who have acquired some understanding of transdisciplinary participatory action research and the iterative development process.
- Collaborating research institutes and other members of the project team intend to continue to apply the project process.
- Capacity of community members including small scale farmers to produce premium quality vegetables and pack and deliver them to selected customers to achieve premium pricing was greatly developed in this project.

Mango

- The project invested a significant amount of time in training of mango farmers and contractors. Whilst it was generally agreed at the completion of the training that much of it was not being used, it was expected that as the non-commercial entity progresses through developmental stages that the learnings from the training will become important to its success. The ultimate objective of this group is to establish a cohesive, collaborative learning organisation that is capable of identifying and prioritising opportunities for improvement, conducting its own research into possible solutions including field trials and dissemination of information across Samal Island in a way that benefits all participants in mango production and distribution.
- Without further support it is unlikely that the opportunity for this group to transform into a collaborative, self-managed learning organisation will be realised. The type

of support required is not technical mango production, harvesting or post-harvest management. It is facilitation to become an effective group and training to identify and prioritise its own opportunities for improvement and develop skills in research and problem solving.

8.3 Community impacts – now and in 5 years

Household Surveys were conducted in Cabintan (Leyte), Canitoan and Pagatpat (Cagayan de Oro, Northern Mindanao) and Upper New Sabang (Davao, Southern Mindanao) as a baseline to bench mark the five capitals physical, financial, human, social and environmental. After project interventions, the household surveys were repeated as end-line to assess the community impacts.

Vegetable

- Farmers' organisations in all sites have been strengthened as have collaborative linkages with barangay and city local governments.
- Women's roles and standing in the community have also improved as have the housing, school attendance, and probably also the diets and nutrition of participant families.
- Increased and more stable household incomes, increased cash and other reserves that can be used to manage risk and calamity, less reliance on money lenders, and some increased diversification of farm enterprise with related improvements in income and risk reduction.

Mango

- The project's facilitated a meeting of multinational chemical companies (input suppliers), mango farmers and contractors, mango processors, mango wholesalers, mango traders and fresh mango exporters was the first time participants from the entire value chain had been in one meeting. Subsequent activities including facilitated meetings have had a significant impact on:
    - Communication along the value chain. Marketers communicating specifications required. Input suppliers communicating technical solutions. Wholesalers sharing prices.
    - Self-confidence of farmers and contractors.
    - Willingness of all participants to attend meetings.
    - Commitment to the continued process demonstrated by a commitment of the leadership team to contribute cash for their meetings.

8.3.1 Economic impacts

Cash was the most common form of financial asset in Cabintan. The ability of the farmers to save had also increased both for savings in cash and savings deposited in banks. The improvements of the respondent's financial asset may be attributed to the increase of the average income of the respondents. Farmers were reported to own new farm tools and equipment such as mist blower, drums and tunnel. Generally, percentage of the non-cash security considered by the respondents had increased from the baseline survey.

At end-line, the rate of Upper New Sabang respondents who have cash and savings increased to 94% and 50%, respectively. Twenty-two percent of the end-line respondents give loans to fellow farmers. These significant differences can be attributed to the project intervention of engaging a NGO, Centre for Community Transformation for providing financial capital services through micro credit for farmers. A significant increase in the number of Upper New Sabang respondents who own television, refrigerator, rice cooker, washing machine, water heater, and electric fan was observed due to access to electricity. The Upper New Sabang respondents through loan from Centre for Community

Transformation (CCT), a microfinance institution acquired farm tools such as bolo, drum, sprayer, shovel and hose.

The Endline response in CDO recorded a decrease in cash and savings compared to the baseline which may be attributed to repayment of their loans which was recorded high during baseline. Most of the farmer respondent acquired water pump from their linkage with City Agriculture Office through the help of the Agricultural Technicians.

8.3.2 Social impacts

Human Capital:

After the project intervention, both male and female farmers responded that they can do all farm activities with confidence including marketing skills. Significant change was perceived by female respondents (89%). This can be attributed to their exposure to various marketing channels and activities through ACIAR project.

Both male and female respondents in Cabintan indicated increased participation in farm trainings, farm business trainings and field days. Almost 90 percent of male and female respondents attended farm trainings. While more than half of the female and male reported having attended field days and farm business trainings.

In Cabintan, a concerted effort has been made to increase vegetable yield and in particular to improve farmers' fertilization practices. Since there were different types of vegetables cultivated in Cabintan, it was a rational approach to have an appropriate fertilization to each vegetable. In which vegetables were categorized based upon their nutrients absorption pattern.

Survey results show that 45% of the male respondents said they have been adopting new knowledge on fertilizer application such as usage, appropriateness, the rate and timing of fertilization. As they developed the vegetable production protocol and attended farm trainings, they have been informed on the balance use and suitability of fertilizers to be used to various crop varieties.

In Cabintan, majority of respondents (56% female & 75% male) stated that they minimized production risks through production scheduling. The application of pesticides to minimize the occurrence of pest and diseases had decreased from the baseline survey. This can be attributed to new farm techniques learned by the farmers to control the occurrence of pest and diseases.

The majority of the respondents in post-intervention survey were implementing some level of production, marketing, and financial planning in their farm business. The production planning included crop diversification, development of planting calendar, availability of inputs and watering schedule using drip irrigation. Marketing has been added in the planning consideration due to engagement of farmers with institutional markets. Another very important planning consideration is financing of the next cropping cycle.

The Upper New Sabang respondents stated they improved their knowledge and skills in relation to irrigation, postharvest, weeding, harvesting, and marketing. The capacity building activities included farmer field school, farm demonstration, post-harvest training, market visits, and farm cross visits. The Upper New Sabang respondents reported that they follow protective measures during chemical application on the farm. These include wearing mask, jacket, gloves, boots, and hat.

Post-intervention survey indicate that majority of the male and female respondents from Upper New Sabang keep records of their farm expenses and revenues from marketing vegetable in order to monitor their business. Record keeping was introduced to the farmers as it was one of the important component of safe vegetable production in order to ensure traceability. Survey also shows a significant increase in the rate of Upper New Sabang respondents who participated in farm business training, field days, and farmer field school.

More female respondents from Upper New Sabang adopted new farm practices in the last year compared to male respondents.

Farmers in Canitoan and Pagatpat increased their confidence in marketing of their goods. All respondents from both barangays stated that they increased their disposable income. Farmers stated that they are practicing modular farming, pruning, crop rotation and intercropping.

Social Capital:

The majority of the respondents in Cabintan have participated in community (bayanihan) activities in the last three years. This can be attributed to the policy of the Cabintan Livelihood Community Association (CALCOA) that participation in bayanihan activities is essential requirement for the members of the association. The vertical linkages for CALCOA improved with their accreditation as a Learning Site by Agriculture Training Institute and as "Agri-Tourism Site" of Ormoc City by Department of Tourism. CALCOA established market linkages with traders in Cebu, Tacloban and Ormoc.

In Upper New Sabang rate of male participation in bayanihan increased and activities were centred on repairing roads and building fish pond.

All respondents in Canitoan and Pagatpat have participated in community or group organization. Majority of the respondents in all sites have participated in *bayanihan* activities in the last three years. They improved they social capital through the partnerships with City Agricultural Office, Barangay institutions, NorMinVeggies and Landcare, which provided them training and marketing support.

8.3.3 Environmental impacts

In the past 3 years, Cabintan respondents did not clear any land for farming and the majority of the respondents took measures to prevent soil erosions (76%), and save water (86%). When asked about what methods they follow to prevent soil erosions, majority of the respondents practiced contour farming (67%), plant trees, and Napier grass and utilize plastic mulch. In terms of saving water, having surface water storage like water impounding was the most common practice in Cabintan.

In CDO undertook measures to save water.

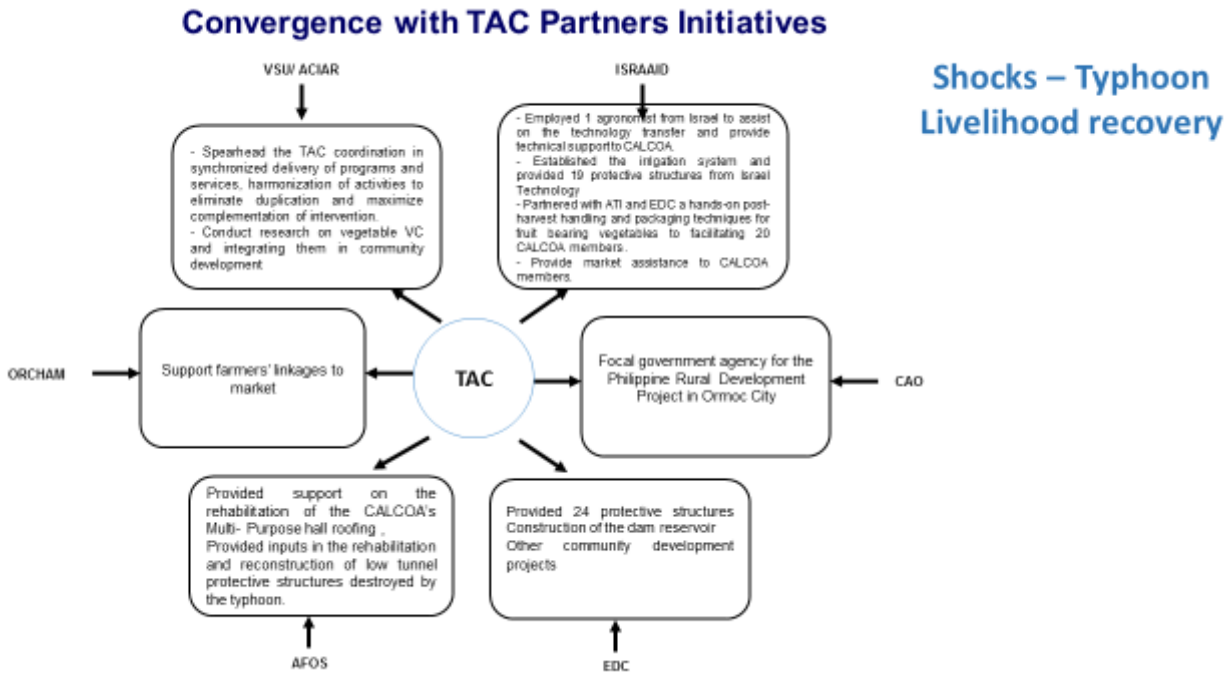
At all sites use of pesticide was reduced and less environmentally harmful pesticide were used.

8.4 Communication and dissemination activities

A range of communication and dissemination activities were completed during the project. Examples, as reported in annual reports, are listed below.

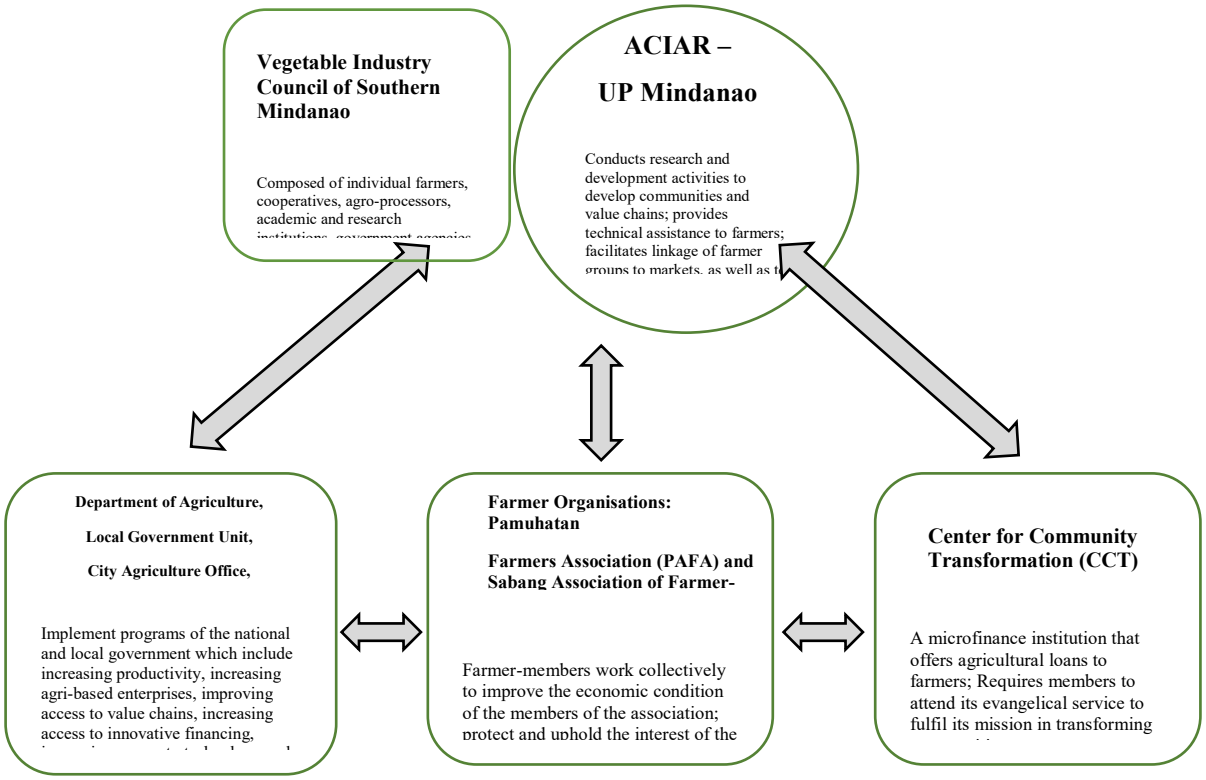
The participatory nature of this project means that stakeholder engagement is fundamental to the research outcomes. The project team has established and maintained relationships with an extensive range of stakeholders including Departments of Agriculture, Barangay Councils, Farmer Organisations, Value Chain Participants and marketing companies. The project team has also engaged closely with farmers and farmer organisations at all of the project's field sites. The team has also collaborated with other ACIAR projects teams particularly Post-Harvest and ICM.

Project stakeholders have been particularly engaged through a technical advisory committee that coordinates contact between stakeholders and research communities, see diagram below.

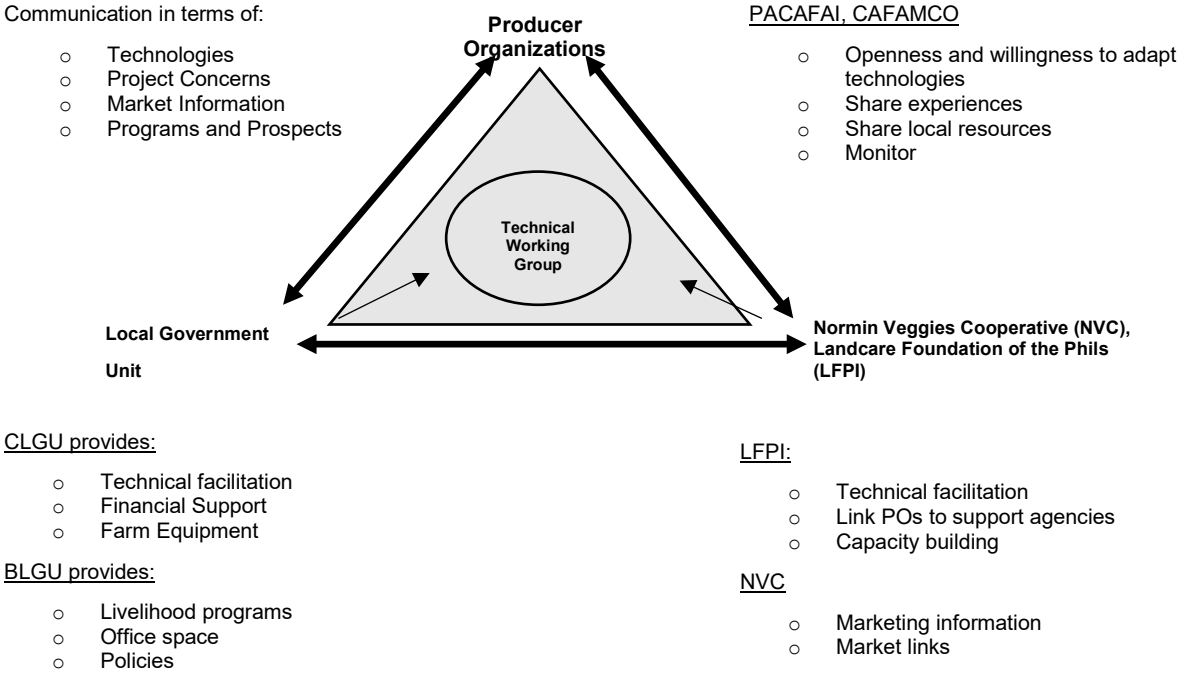


Project stakeholders have been facilitating incorporation of farmer groups into LGU institutional framework that allow them to influence Barangay planning and access to Barangay development funds.

In the Davao sites, the project team facilitates coordination between the farmer groups and the institutions. The team has been building the capacity of the farmer-organisations to engage with markets, as well as with government and nongovernment organisations. The project team is in the process of forming a Site Working Group (SWG) in Marilog, which shall be composed of the barangay council, city government, Centre for Community Transformation and the producer organisations.



In Cagayan de Oro City, a Technical Working Group (TWG) was formed, which is composed of producer organisations, the local government unit, Normin Veggies Cooperative and Landcare Foundation Inc. The TWG coordinates activities of stakeholders and research communities.



Key dissemination activities over the last year have included:

- Papers presented in the 2016 ISSAAS Conference in Hanoi, Vietnam on 5-7 November 2016:
    - The Restructuring of Vegetable Value Chains and Its Implications to Smallholder Farmers in the Southern Philippines *by Roxanne Aguinaldo*
    - Willingness to pay for certified safe vegetables amongst consumers in Cagayan de Oro City, Philippines *by Vlademir A. Shuck*
    - Food safety concerns of vegetable consumers and customers in Davao city, Philippines *by Hermelie R. Oracion*
    - Prerequisites for integrating vegetable value chains and community development for smallholder producers in the Southern Philippines *by Luis Antonio Hualda*
    - Analyzing market-driven opportunities in the mango supply chain of Davao city, Philippines *by Jillian April D. Alcala*
    - Improving mango production and marketing practices in Samal Island: integrating market-driven and technology-driven perspectives *by Nikko L. Laorden*

9 Conclusions and recommendations

9.1 Conclusions

Conclusions are based on discussions held during the end of the project review and reviewers comments documented in the End of project review report.

Early community participation and development of partnerships facilitates inclusive value chain development

The project team decision to look at the benefits of the project beyond the value-chain and to include communities and their local government institutions in the project resulted in impacts that go beyond the farmers to the communities and benefited poor and wealthy farmers. This project avoided the danger of developing value chains that would only link together rich farmers and rich consumers through niche markets by understanding variety of market distribution channels and including variety of traders in the project activities.

A community is a group of people with a same objective (e.g., barangay, cooperative). Community capacities support changes in value-chains. Different community capacities trigger different reactions to value-chain development (e.g., Learning Alliance in Cabintan de Oro). Moreover, communities have different social networks and hence different relations with various institutions. Value-chain improvement means more collective community decisions, more visibility for some people and a deeper involvement of some people in their networks. Carrying out an initial situation assessment (mapping of distribution channels, community assessment, institutional mapping) is therefore an essential step before value-chain development. Furthermore to build a partnership, it is essential to know what is available in the community –e.g., the social capital, the institutional links, the human capital. To effectively develop a value chain one needs people to build relationships. Communities are therefore important, and there is a need to develop their human and social capital and leadership. In CDO [and Cabintan], the relationships between producer organizations and local institutions helped support value chain development. Value-chain development in the absence of community partnership is an academic exercise. Therefore, community participation at the early stages is essential (from review report) and this project demonstrated that.

Economic empowerment of women was enabled by modifying farmer organisation policies and rules

The community development approach used in the project was instrumental in understanding women and their roles, and the relationships between men and women. The project team facilitated changes to these relationships by modifying farmer organization policies and rules decided by the farmers themselves. These changes enabled women's participation in decision making and implementation of activities.

Interdisciplinary approaches create a learning community and ensure long-term project sustainability

Interdisciplinary approaches were utilised in a way that resulted in agricultural, agribusiness and community development researchers working according to the rules of their discipline but regular meetings were held (monthly) and most activities were implemented in a transdisciplinary manner. The research assistants fully employed by the project were the most affected by transdisciplinarity and will continue to influence the way future projects are implemented. One of the main achievements of the project was to create a learning community for farmers, researchers, traders and government officials. Engaging with all private sector stakeholders, and more generally of bringing different types of stakeholders together (e.g. farmers and supermarket concessioners) to improve mutual understanding, made problem solving processes easier and enabled learning and trust building processes to occur. Involving local groups, LGUs and support institutions

(e.g., micro-finance, microcredit council, ATI, Regional Development Councils) right at the beginning of the project increased participation, improved ownership, agency coordination and support for the program, and will ensure project sustainability beyond the life span of the project.

9.2 Recommendations

Development and validation of a value chain and community development model

While the project has successfully established vegetable value chains based on an emergent value chain development approach that incorporated community development, this approach was never fully developed in the theoretical sense or validated. It was recommended in the end of project review report that a future project develop and validate a 'value chain and community development' model that can then be used in other situations to diversify farming systems. The model could be used for development of value chains other than vegetables including poultry, pigs and high value fruit (e.g. papaya) particularly where the following situation prevails:

- there is a ready and proximate market for a good quality farm product,
- there are opportunities to significantly improve the value chain from production through marketing to satisfied consumers; and
- there are receptive stakeholders willing to collaborative in a 'learning alliance' to manage each step in the iterative development process to achieve common objectives while building local capability and capacity to sustain development.

Development of policy briefs to advocate policy change

The project team established excellent working relationship with LGUs and other government institutions which were instrumental for successful implementation of the project. The project influenced how these agencies delivered their services but no attempt was made to influence higher level polices. It is recommended that future projects develop policy briefs and advocate policy changes at Regional Council levels.

Use of digital technologies to improve VC performance: The project did not assess in any way the current and potential use of digital technologies in order to improve value chain functioning and transparency. Complex, long and inefficient financial transactions between farmer cooperatives and institutional buyers could be easily overcome by using electronic invoicing and payments. Long transaction time is the main reason why in the end so many farmers sell their product for cash at the farm gate for a much lower price. In addition farmers do not trust delayed payments so the possibility of tracking transactions and having their money credited to a virtual wallet was proven in several recent projects to increase willingness of farmers to participate in value chains that require payments terms of up to a few months.

Digital technologies can also be used to provide farmers with up to date information on the market situation and products as well as advice on production planning (especially in relation to adjusting production to forecasted climatic conditions).

10 References

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10.2 List of publications produced by project

Enter text

11 Appendixes

I Supply, utilisation, seasonality and price trends BAS data report

II Vegetable market report HORT 2007 066

III Vegetable Purchase and Consumption Patterns and Consumer Value Preferences in the Philippines

IV Institutional Framework Report

V Vegetable Regional Market Assessment

VI Mango Regional Market Analysis

VII Mango final report

VIII Baseline Study Report of Community Characteristics in the Southern Philippines Part 1

IX Baseline Study Report of Community Characteristics in the Southern Philippines Part 2

X CALCOA Business Model

XI Davao Business Model

XII Assessing the profitability and viability of veg production in EV Ph using high tunnels

XIII Capacity building activities organised by the project

XIV Develop implementation plans for VC improvement

XV Report on household benefits Upper New Sabang, Davao

XVI Report on household benefits Cabintan, Leyte

XVII Report on household benefits - Canitoan and Pagatpat, CDO

XVIII LFPI's input to final report re collaboration with other ACIAR projects

XIX Report on Community Characteristics and Farm business structures - Upper New Sabang, Davao

XX Report on Community Characteristics and farm business structures - Cabintan Leyte

XXI Report on Community Characteristics and business models

XXII FGD (male participants) to assess influence of community characteristics on VC Upper New Sabang, Davao

XXIII FGD (female participants) to assess influence of community characteristics on VC Upper New Sabang, Davao

XXIV Social network analysis (female participants) to assess influence of community characteristics on VC Upper New Sabang, Davao

XXV FGD (male participants) to assess influence of community characteristics on VC Upper Pamuhatan, Davao

XXVI FGD (female participants) to assess influence of community characteristics on VC Upper Pamuhatan, Davao

XXVII FGD to assess influence of community characteristics on VC Cabintan, Leyte

XXVIII Social network analysis to assess influence of community characteristics on VC Cabintan, Leyte