Fruit Tree Crops & Nurseries in Aceh

A Rapid Market Appraisal of Aceh Jaya and Aceh Barat

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List of Acronyms

BRR	Badan Rehabilitasi dan Rekonstruksi
DPH	Dinas Pertanian dan Kehutanan
FFI	Fauna & Flora International
FHI	Food for the Hungry International
GAM	Free Aceh Movement (Gerakan Aceh Merdeka)
TNI	Indonesian Armed Forces (Tentara Nasional Indonesia)
IHS	Insan Hitawasana Sejahtera
ISRI	Indonesian Soil Research Institute
LRPI	Institute for Estate Crops (Lembaga Riset Perkebunan Indonesia)
KDP	Kecamatan Development Program
MoU	Memorandum of Understanding
NOEL	Nurseries of Excellence
UNORC	UN Recovery Coordinator for Aceh and Nias
USAID	United States Agency for International Development,
ESP	Environmental Services Program
PODES	Village Potential Statistics
ICRAF	World Agroforestry Centre

Figure 1. Map of Aceh Jaya and Aceh Barat

Executive Summary

The goal of this research is to contribute to the rehabilitation of agroeconomies in Aceh Jaya and Aceh Barat through identification of market opportunities and challenges for smallholder farmers in perennial horticultural systems. The objectives of this research are to: identify priority tree crops and their markets; identify and describe opportunities and challenges in said markets' structure and channels; develop recommendations for resolving these problems; propose participatory, applied research activities to support agroforestry production and marketing; and develop measurable indicators for follow-up in 6-12 months. This research was conducted in May 2007 in Aceh Barat, Aceh Jaya, and Banda Aceh in Indonesia. The research areas were selected by the NOEL ICRAF staff in order to assist their ongoing efforts to develop tree nurseries and appropriate skill sets in the region.

Data collection and analysis methods followed a PRA framework using statistical methods, semi-structured interviews, focus groups, observations, and secondary materials available from literature, government, or NGOs. Farmer established their priorities for tree crops as: price stability, a higher share of market prices, and better access to genetic material. Priority species for Aceh Jaya (*citrus, sapodilla, rambutan, durian, mango, cacao, and coffee*) and Aceh Barat (*durian, rambutan, langsat, banana, and mango*) were identified. Seven market structures were identified for various types of fruit. These structures ranged from household consumption to export oriented production. Actors in particular market structures used different market channels depending mainly on seasonality, market demand, and other possible factors that need more investigation. Examination of market structures and channels revealed several serious problems in access to inputs, markets, and collective organizing; ways in which market channels may be socially embedded and limit producer profitability; ways in which conflict and tsunami damage may have impacted markets; and puzzling changes in regional production of durian and mango that should be further examined. A list of recommendations for future research with and assistance to producers concludes this paper:

- Identify local sources of tree improvement materials, create a database, then help publicize and distribute the database to stimulate further demand.
- Gather seedling market information by identifying key buyers.
- Develop nurseries of priority tree crop and seedling species for Aceh Jaya and Aceh Barat.
- Perform a detailed analysis of durian, citrus, and rambutan production by collecting survey information on farmers' inventory, quality, and market transactions (number, size, frequency); collecting market consumption information; documenting market structures and channels; and investigating tsunami impacts production bases and market access.
- Identify regions of growth and possible introduction of trees with high market demand.
- Gather data on final markets' and exporters' prices, quality standards, social networks, etc.
- Expand the study to Pidie, Medan, and Banda Aceh.
- Support collective group activities to overcome the lack of value-added processes and benefit from economies of scale to access market information, training, and other opportunities.
- Support coordination activities between agroforestry projects.
- Document successful collective efforts to increase price stability, increase farmer gate price, and improve access to inputs (like the patchouli oil farmer collectives).
- Explore gender issues in market structures and market channels.

Research Goal

To contribute to rehabilitation of agroeconomies in Aceh Jaya and Aceh Barat through identification of market opportunities and challenges for smallholder farmers, particularly in perennial horticultural systems.

Objectives

1. Identify priority tree crops and markets.
2. Identify and describe market structure and channels for priority tree crops.
3. Describe opportunities and challenges in structures and channels.
4. Develop recommendations to resolve commodity chain problems.
5. Propose recommendations for participatory, applied research activities regarding agroforestry production and marketing to be conducted by smallholder farmers, field professionals, and local NGOs.
6. Develop measurable indicators for follow-up in 6-12 months.

Context

The 26 December 2004 Indian Ocean earthquake and tsunami changed the human and natural landscape of the Aceh province of Indonesia. The tsunami was catastrophic in the coastal regions of Aceh, where it is estimated to have killed over 170,000 people and left over 500,000 homeless. Particularly hard hit were parts of the provincial capital, Banda Aceh, and districts in western Aceh close to the epicenter of earthquake: Aceh Besar, Aceh Jaya, and Aceh Barat. These lowland regions experienced devastating human loss and, with very few exceptions, massive destruction of productive resources (roads, utilities, farmland, administrative capacity, forest crops, home gardens, etc.). It is estimated that more than half of the producing rice fields, fisheries, livestock, and agricultural and tree crop lands in this region were lost. Much of the infrastructure (like main roads and utilities) was destroyed and is still only partially functioning. Recovery of these productive resources will continue to take many years. The human loss also continues to hamper development through the great amount of psychological trauma still being endured, by limiting regional human capacity, and through irrevocable change of social networks. Changes to social networks affect the ways in which people access everything from educational to market opportunities. Using a sustainable livelihoods approach that organizes productive resources as human, social, natural, physical, and financial capitals, it is clear that individual and regional opportunities have been vastly reduced across the board and pose significant challenges for mid to long term development scenarios.

Rehabilitation of agroeconomies in coastal and inland areas is a critical component of the mid to long term development process. After the tsunami, relief in the form of straightforward aid and work-for-pay systems was readily available in the lowland regions. However, as relief aid becomes less abundant, the affected population is turning back to earning a livelihood from local resources. Historically perennial horticultural

systems and tree crop agribusiness play an important role in the region. Despite this, little is currently know about livelihood change or market opportunities and challenges that exist for smallholder farmers, particularly in perennial horticultural systems. A better understanding of tree crops and the steps to rehabilitate tree crops from both plantations and managed forests is of decisive importance to regional development.

This research focuses on identifying priority tree crops; identifying opportunities or challenges in the tree seedling and tree crop markets; providing descriptions of commodity chains and opportunities to change them; and proposing participatory, action-oriented research to develop capacity and knowledge over the next 6-12 months. This research was undertaken for ICRAF's NOEL (World Agroforestry Centre's Nurseries of Excellence) program. ICRAF NOEL is a new regional project that will offer technical assistance for agroforestry nurseries in both coastal and inland villages. Agroforestry nurseries could include fruit, reforestation, or estate production trees depending on farmer desire and market demands. As there are previous and ongoing ICRAF ("ReGrIn") studies in Aceh Barat on rubber, cacao, oil palm, coconuts, and areca nut, this research makes reference to these commodities but does not intensively focus on the commodity chains for these crops (ISRI, LRPI, & ICRAF 2006).

The post-tsunami, coastal relief and recovery efforts have made significant short term progress in restoring some services, homes, and infrastructure. However, the mid to long term impacts of the tsunami on livelihoods, environmental services, and infrastructure are still critical challenges to local and regional development. In this respect, there is now a more intense development focus on rehabilitating productive resources, introducing appropriate new resources, and becoming more geographically and thematically inclusive. Many new development initiatives are now confronting a wide variety of development topics in both tsunami-impacted and non-tsunami areas farther inland. This broadening of thematic and geographic focus introduces different dynamics into regional development work. Perhaps most obvious is the role of conflict. Post-conflict related issues have received international attention and been the focus of some organizations. Yet, the different ways in which conflict and the tsunami have impacted livelihoods is just beginning to be understood in the context of livelihood recovery, specifically for agroforestry systems. Although both the tsunami and conflict are important regional dynamics, many agencies have been focused on regions where tsunami impacts were relatively higher than conflict impacts.

While, it is widely recognized that the tsunami played an important role in ending a 30-year conflict between GAM (Free Acehnese Movement) and TNI (the Indonesia military) (Waizenegger 2007), the impacts of the history of the conflict on current development programs is less clear. The conflict is estimated to have killed over 30,000 people and has caused damage to or limited access to many productive resources. As the focus of development has expanded beyond the tsunami area, the role of the damage caused by the conflict has become more important in understanding livelihood development scenarios. Damages caused by the conflict result from either politically motivated destruction or restricted access resulting in lack of maintenance. For this study, the Acehnese conflict is important for the ways in which conflict damages impact a variety of market and

production factors, for example: historical and future productivity, market access, development priorities, creation of farmer collectives, and the location of populations.

The Kecamatan Development Program (KDP) has recently made an effort to disaggregate three types of damage in the Aceh province: conflict, natural disaster, and lack of maintenance. They find that damages were caused in ratio of 1:2:2 (conflict, natural disaster, lack of maintenance). Though, as mentioned above, lack of maintenance may be related to restrictions on resource access during the conflict. They note that, "Damage due to conflict seems to be focused on economically productive assets, with fish or shrimp ponds, generators, and other farm land or orchards being the types of infrastructure where damage is most likely" (Wong et al. 2007:4). Both the TNI and GAM limited access to and damaged farmers' crops, particularly in the managed forests (*kebun*). The importance of these *kebun* in providing local communities income, food security, and a range of environmental services cannot be overstated. The rehabilitation and return of these forests as productive assets in Aceh will play an important role in poverty amelioration, forestry plans, and the region's mid to long term development scenarios. These forests are one of the primary sources of tree crops and environmental services in the region.

NOEL has chosen to focus this study on Aceh Jaya and Aceh Barat districts, which were highly productive regions before the tsunami (DPH 2007, IHS 2006). These regions were home to many productive fisheries and rice fields, but were also noted for their high production of export oriented products like rubber, oil palm, coconuts, and cacao. Tree crops from this region also played an important role in regional markets, supplying Banda Aceh, Medan, and other areas with large amounts of areca nuts, durian, and citrus fruits (DPH 2007). Despite this, historic and current data on local markets is largely nonexistent, missing, sporadic, or difficult to access. According to the Wong et al. (2007), the Aceh Jaya district was the worst damaged by the tsunami and Aceh Barat was close behind. Both provinces have high amounts of tsunami-caused damage to productive land. These provinces also showed high amounts of damage from the conflict, with particular reference to damaged productive land in Aceh Jaya. The differential impacts of tsunami or conflict related damage on long term development is important for understanding orchard/forest/market access, organizational and capital resources relevant to fruit and forest production, potential market structure and channels, and the overall regional context livelihood recovery.

The remainder of this report will present this study's research approach; methodology; priority tree crops and seedlings for each Aceh Jaya and Aceh Barat; market channels and relevant opportunities/challenges; and research priorities and activities that would assist in monitoring and understanding market structures and channels.

Research Approach

The goal of rehabilitating agroeconomies is to create a situation wherein food and livelihood security are balanced with environmental services managed by local communities. This approach starts with eliciting farmers' main concerns. It also

prioritizes price stability, that producers' receive higher market prices, sustainable livelihoods, lower general transaction costs, and greater specific access to information, technology, and the market. This research seeks value and stability for producers, but also sees that such stability can benefit other actors on the commodity chain through, for example, processes which lead to better synchronization of trade times, quantity, and quality.

Broadly speaking, markets are places of economic, social, and cultural performance and exchange. However, this research follows Roshetko & Yuliyanti (2002) in defining:

- *A market* as, "The demand for one product, in one place at one time under specific conditions."
- *A commodity chain/market channel* as relational network through which a commodity moves from producer to final market.
- *Agroforestry crops/tree crops* included tree derived crops as well as banana, papaya, and other non-ligneous species that occupy tree-like niches in agroforestry systems.

Understanding the type, size, timing, and quantities of commodity transactions; where these transactions occur; and how specific social relations change these transactions allows us to identify possible points of vulnerability and intervention in the commodity chain while being cautious of the cultural or social roles of commodities in the market.

This market research draws from participant input, elements of feasibility analysis, transaction cost analysis, sustainable livelihoods theory, and access theory. The research attempts to prioritize commodities according to local desire and market demand; identify potential markets; describe the structure of and relationships in commodity chains; and identify barriers to price stability, price premiums, sustainable livelihoods, inputs, and market information. Feasibility analysis measures *market potential* (market structure, consumption trends, market location, product quality, distribution systems, market entry and exit, buyers, selling arrangement, and prices), *raw product supply* (minimum economic size of controlling unit, risks to supply stability, other access issues), *production process* (facility needs, investment capital needs, labor needs, costs of operation, profitability), and *environmental constraints* (institutional structure, transport, availability of utilities and services, physical site location). Placing feasibility analysis in the context of sustainable livelihoods approaches and using transaction and access theory to operationalize and add to the above variables allows a more comprehensive understanding of market structures, channels, challenges, and opportunities.

Methodology

Location

The study took place on 07-21 May 2007. The area of study was in the Aceh Jaya and Aceh Barat districts. Specific villages were chosen by the NOEL field staff. Research started with interviews in Banda Aceh (the provincial capital) but mainly took place within the area of study. Data on the Aceh Jaya district was collected in Calang and its

surrounding communities. Data on the Aceh Barat district was collected in Meulaboh and its surrounding communities, including some data from the Nagan Raya district.

Sampling and Participation

This study used a Participatory Rural Appraisal (PRA) framework to generate the rapid market analysis. The PRA framework included: semi-structured interviews, observations, farmer focus groups, and secondary data (statistical data, geographic information, and literature review). Purposive sampling was used to identify knowledgeable informants and key actors in commodity chains; snowball sampling to trace direct linkages between farmers and other actors on the commodity chain. The brief nature of the study, small staff, and the availability of respondents limited equal sampling of the different actors in each geographic area. For example, the accessibility of traders and vendors was naturally much higher in Aceh Barat than Aceh Jaya due to the presence of a port, closer proximity to Medan, larger markets, and denser population in Meulaboh. The visit to Banda Aceh was primarily to gather regional statistics and information on government and NGO programs, so there was limited interaction with other actors. None of the participants in this study were paid or promised future action; however, ways in which ICRAF programs could work productively with these groups were explored.

Actor Definitions

Actor roles often overlap over time or geographic areas, yet in this study labels were used to help describe the relational actions of relevant actors. **Farmers** were defined as primary producers of a commodity. **Vendors** are people who interface with the public in a local or regional end market; they are supplied by farmers, local collectors, export collectors, processors, or importers. **Local collectors** are people who collect locally from farmers and sell only to local or regional traders. **Local traders** usually buy from local collectors and farmers and resell to local markets/vendors. **Regional traders** are people who collect locally or regionally, often from farmers, local collectors, or local traders, and sell to exporters or may sometimes resell in bulk to vendors. **Processors** are people or companies that convert raw products into another stage. **Exporters** are people who export either nationally or internationally. **Importers** are people who export either nationally or internationally. **Government offices** are those of the Indonesian state, and in this study refer to either the office of Agriculture, Forestry, and or Industry. **Farmer groups** are groups of two or more farmers officially recognized by a NGO or government organization. These definitions apply to both the data collection and to the market structure and channel descriptions offered later in this report.

Table 1. Data collection overview

ACTOR	Banda Aceh	Aceh Jaya	Aceh Barat	TOTAL
Farmer	0	7	2	9
Local Collector/ Local Traders	0	0	3	3
Regional Traders	0	0	2	2
Processor	0	0	0	0
Vendor	0	2	11	13
Importers Exporters	0	0	0	0
NGOs	1	4	3	8
Government Office	2	4	2	8
Observation	1	4	4	9
Farmer Group	0	3	0	3
TOTAL	4	24	27	55

Data Collection

The study included 55 primary data interactions: 43 interviews, nine observations, and three farmer group meetings (Table 1). Semi-structured interviews were chosen over a survey method due to the brief nature and small staff for this study. Semi-structured interviews also allowed more comprehensive, open-ended questions and interesting topics to be rigorously pursued. The 43 interviews used different topical outlines to focus conversations on relevant topics for individual farmers, vendors, collectors, processors, exporters, NGO programs, and government programs. Three focus groups, conducted in Aceh Jaya, allowed farmers to comfortably deliberate on questions and for the PI to witness group dynamics. These groups usually consisted of 2-4 male farmers who talked casually for 15-20 minutes, then answered more focused questions in a semi-structured interview format. Market observations consisted of six 0.5-1 hour periods locating and watching traffic at vendors in temporary and permanent stalls. Three market observations were taken in each Aceh Jaya and Aceh Barat. Field observations consisted of note and picture taking for extended periods through different road type areas. Secondary data resources include academic literature, GIS and aerial photography analysis, statistical analysis provided from many government and NGO offices, and field reports and summaries from various government and NGO agencies.

Of the 43 interviews, ten interviews were with women. The women were government or NGO employees (5), vendors (4), export collectors (1), or farmers (1). The lack of female farmer respondents may be due to the nature of farmer collectives that have been formed by NGOs and the government, the fact that men present themselves as the head of households in agricultural families, or for other reasons that need more investigation. It is not clear whether the lack of female respondents has a large impact on the results of this study.

The types of questions asked, research method, and data sources are grouped into thematic areas in Table 2.

Table 2. Question themes and data sources

Focus Area	Question	Data Collection Method	Source of Data/Information
I. Priority Trees			
1	Priority Tree Crops	Semi-structured interviews	Farmers, traders, and extension workers
		Statistical Data, Secondary Data	DINAS, UNORC, BRR
2	Priority Tree Seedling	Semi-structured interviews	DINAS, UNORC, NGOs, farmers
		Statistical Data, Secondary Data	DINAS, UNORC, NGOs

Focus Area	Question	Data Collection Method	Source of Data/Information
II. Market Structures, Channels, and Transactions			
1	Market Actors	Semi-structured interviews	Farmers, traders, and extension workers
2	Market Structures	Semi-structured interviews	Farmers, traders, and extension workers
3	Types of relations in markets	Semi-structured interviews	Farmers, traders, and extension workers
4	Transaction frequency and size	Semi-structured interviews	Farmers, traders, and extension workers
5	Method of transaction	Semi-structured interviews	Farmers, traders, and extension workers
6	Number and Type of commodity produced, bought, sold, or stored.	Focus Groups, Semi-structured interviews	Farmers, traders, and extension workers
7	Credit extension and amount	Semi-structured interviews	Farmers, traders, and extension workers
8	Processing facilities	Secondary data, Semi-structured interviews	Extension officer, NGOs, farmers
9	Method of Process	Semi-structured interviews	Farmers, traders, and extension workers
10	Transportation cost	Semi-structured interviews	Farmers, traders, and extension workers
11	Infrastructure facilities	Secondary Data, observation	DINAS, UNORC, BRR, PODES
12	Informal or formal business	Semi-structured interviews	Traders, farmers
13	Grading	Focus Groups, Semi-structured interviews	Farmers, traders, and extension workers
14	Market demand for seedlings	Secondary data, Semi-structured interviews	Pamphlets, farmers, extension officers, DINAS documents

Focus Area	Question	Data Collection Method	Source of Data/Information
III. Prices (history, stability, seasonality)			
1	Farm Gate	Semi-structured interviews	Farmers, traders, and extension workers
2	Local Market	Semi-structured interviews	Farmers, traders, and extension workers
3	Collector	Semi-structured interviews	Farmers, traders, and extension workers
4	Trader	Semi-structured interviews	Farmers, traders, and extension workers
5	Regional Market	Secondary data, Semi-structured interviews	DINAS, Farmers, traders, and extension workers
6	Exporter	Semi-structured interviews	Farmers, traders, and extension workers
7	Factory gate price	Secondary data	DINAS
8	World Market	Secondary data	Internet search
9	Grocer	NA	NA
10	Input prices	Focus Groups, Semi-structured interviews, observation	Extension workers, farmers
11	Price of seedlings	Secondary data, Semi-structured interviews	Pamphlets, farmers, extension officers, DINAS documents

Focus Area	Question	Data Collection Method	Source of Data/Information
IV. Sustainable Livelihoods			
1	Livelihood activity	Focus Groups, Semi-structured interviews, observation	Farmers, traders, and extension workers
2	Livelihood change since tsunami	Focus Groups, Semi-structured interviews	Farmers, traders, and extension workers
3	Capitals Status: Natural, Social, Human, Physical, Financial	Focus Groups, Semi-structured interviews, observation	Farmers, traders, and extension workers
4	Problems acccesing inputs (land, technology, finance, etc.)	Focus Groups, Semi-structured interviews, observation	Farmers, traders, and extension workers
5	Farmers future plans	Focus Groups, Semi-structured interviews, observation	Farmers, traders, and extension workers

Data Analysis

Statistical data was summarized in SPSS and Microsoft Excel. Data collected through interviews was organized in NVIVO 7 software to analyze interconnected themes. Data was grouped according to the question themes listed in Table 2 above:

1. Priority Trees
2. Market Structures, Channels, and Transactions
3. Prices (history, stability, seasonality)
4. Sustainable Livelihoods

Results

Farmer Priorities

Farmers interviewed in this study cited their main concerns with production and the market to be:

1. Commodity price stability
2. Getting better prices (a higher percentage of the end market price)
3. Lack of access to improved planting and grafting materials

Extension workers, on the other hand, focused explicitly on production input problems, indicating that the main problems in the region were access to technology, access to improved genetic material, and access to finance. NGOs also were largely focused on improving access to productive inputs (specifically land, crop management skills, finance, and seeds), though they are starting to focus on improving market knowledge.

Identifying Priority Tree Crops and Seedlings

Priority crops, as mentioned above, were determined by talking to extension workers, farmers, NGOs, and local vendors. As well, the PI considered historical data on production at the district level; price data from international, regional, and local markets; population centers; likelihood of the ability of processing the tree crop for long term storage; and the location of any infrastructure for specific tree crops. Field observations indicate that although many durian, citrus, mango, cacao, and sapodilla were killed in the tsunami and make these priority species for replanting, many fruit trees with a diameter greater than 5cm were able to survive and resprout 5 months after the tsunami (Manurung, Nugraha, & Roshetko 2006). Below, *priority tree seedlings* and *tree crop markets* are outlined for Aceh Jaya and Aceh Barat.

Aceh Jaya

Fruit tree crop priorities
According to local informants, this region was historically known for its citrus production as well as substantial production of sapodilla, rambutan, and durian. Data for citrus and sapodilla production before the tsunami was, unfortunately, not available. However,

Figure 2 considers the relative proportion of other fruit crops in the overall production from Aceh Jaya in 2004. This pre-tsunami production data indicates that rambutan, durian, mangos, and jackfruit are some of the most important tree crops (not including citrus and sapodilla). Surprisingly, for the high amount produced, jackfruit is usually locally consumed as a vegetable and not regionally exported, thus indicating its possible importance for local food security.
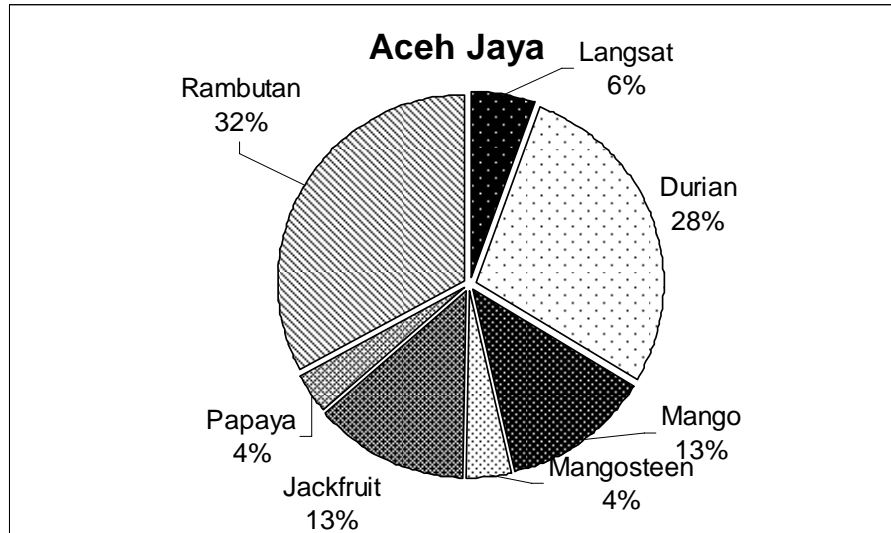

Figure 2. Aceh Jaya 2004 Fruit Production

Considering which trees were most damaged by the tsunami, the previous knowledge of working with specific species or varieties of tree crops, farmer desires, and market demand allows us to establish some priority tree crops. The tsunami destroyed many of the fruit trees and estate tree crops in the coastal plains. Many informants indicated that citrus and rambutan orchards/forests had experienced massive destruction. That being said, some coconuts, rubber, and fruit trees have survived. Many rubber trees survived by losing their leaves and 'wintering' for a brief period. Fruit trees, as mentioned above, have recovered in some areas according to their age and maturity. Local knowledge of rambutan and citrus trees management seems very high, though not necessarily market-oriented (no knowledge of quality standards) or adoptive of tree improvement strategies (grafting, selection, seed banks, etc.). Farmers expressed interest in market oriented crops (rambutan, citrus, durian, and mango), rarely citing jackfruit or papaya as species that they needed help with – possibly reflecting their good amount of previous management ability or lack of desire to invest in/ask for help with non-market species. Tree crops that NGOs working with farmer groups in Aceh Jaya have selected to plant may also indicate some farmer preferences. Table 3 shows the number of trees to be planted as reported by NGO 'agroforestry' projects to UNORC, thus it should nto be considered by any means conclusive of farmer desire, but just indicative of the relative importance of these species in current agroforestry projects. *Priority fruit tree crops for Aceh Jaya include citrus, sapodilla, rambutan, durian, mango, cacao, and coffee. Expansion of improved rubber, coconut, banana, improved mango and oil palm production is a priority for estate crops.*

The potential to implement larger production scenarios for mangosteen, salak, nutmeg, and other trees should still be explored.

Table 3. Aceh Jaya NGO Agroforestry Activity (UNORC 2007)

FRUIT TYPE	# TREES	OVERALL%
RUBBER	27090	40.1
CACAO	15010	22.2
RAMBUTAN	9268	13.7
MANGO	5605	8.3
SAPODILLA	3489	5.2
COFFEE	3200	4.7
DURIAN	1719	2.5
NUTMEG	836	1.2
DUKU/LANGSAT	465	0.7
JATI	350	0.5
ORANGE	300	0.4
POMELO	215	0.3
COCONUT	40	0.1
	67587	**100**

REMARKS ON TABLE:
- Only NGOs (not government)
- 12 projects, only 8 listed the number and species of trees.
- Citrus trees did not, despite farmer response, account for more than 1%.
- No focus on mangosteen.
- USAID ESP and private industries have established nurseries for at least 150,000 rubber trees.
- Number of fruit trees procured outside district nurseries is well over 40,000 a year.
- Mango grafting is not yet practiced.
- Coffee tree number is from only one project.

Seedlings
Due to the deforestation resulting from the tsunami and an emphasis on reestablishing export oriented crops, the tree seedling market in Aceh Jaya is large. FFI, FHI, Logica, Caritas Czech, USAID ESP, government extension, and OXFAM programs are focusing on export oriented crops, coastal reforestation, and mixed fruit tree management in livelihood development. These programs are driving seedling demand in the region. Table 3 shows only the 2007 agroforestry tree demand (trees used in agroforestry projects) reported by development agencies to UNORC and does not include governmental demand, undocumented agency demand, industrial or private demand. Fruit tree seedlings and rubber stumps are mainly bought in and transported from Medan. Short term focus on meeting NGO and government demands and an emphasis on cash for work programs has led some NGOs to open temporary, large nurseries primarily for rubber, cacao, and reforestation species. Some farmers have been trained in fruit tree nursery skills through the USAID ESP trainings in Medan or other agencies. Although, the above organizations have made some progress in developing local nurseries, many fruit tree seedlings are still brought into the region from Medan at inflated prices. The agroforestry projects and seedling demands in FFI, FHI, Logica, Cartias Czech, OXFAM, and USAID ESP make them natural partners for ICRAF NOEL. These programs' *fruit tree* work has focused primarily on sapodilla, rambutan, durian, mango, cacao, and coffee (UNORC 2007, see Table 3). *Demand for these trees and the skills to propagate, graft, and market them is a short term priority for nursery establishment. Mid to long term priorities for nurseries involve centralizing nursery production information, orienting production towards local demand (which focuses primarily on improved genetic material for fruit trees, provision of large amount of rubber PB 260 and IRR 104, and introducing new species), helping farmers market their nursery product, and working on economies of scale.*

Aceh Barat

Fruit tree crop priorities
Like Aceh Jaya, Aceh Barat experienced destruction of orchards/managed forests in the coastal regions. Fruit production data for Aceh Barat indicates that there have been some quantitative changes in the types of fruit commercially produced after the tsunami. Before the tsunami durian was an important fruit accounting for 57% (2003) and 58% (2004) of the region's fruit production in consecutive years. Rambutan was the next highest contributor with over 20%, followed by bananas, mangos, and langsat each with less than 10%. After the tsunami (production data for 2005, shown in Figure 3), rambutan, bananas, and langsat production nearly disappeared due to damage to these crops. Interestingly, durian and mango production increased exponentially in both its proportional share of district fruit production and in overall tonnage (see Figures 3-7). This region is historically known for both its cultivated and wild durian production, yet that alone does not account for its dramatic post-tsunami increase. Although unconfirmed, several possible scenarios, or a combination thereof, could explain why durian production increased in 2005 as a result of conflict, tsunami, and/or market dynamics:

- Higher access to markets, which increase demand on existing, though unharvested managed forests and orchards.
- Better post-conflict access to managed forests or orchards (now that GAM and TNI are not hindering access).
- Durian and mango harvests were extremely good for ecological reasons.
- Farmers choose to focus on durian and mango as substitute commodities because of new access, more market demand, bumper crops, availability of old unharvested trees, or the ability of these trees to recuperate after the tsunami.

Further investigation would be needed to verify any of these theses; however the important point here is that the high production of durian and mangoes show the market viability of both these crops. As well, the reduction of rambutan, langsat, and bananas production due to tsunami damage indicate that these crops need to be redeveloped. *Priority crops for Aceh Barat include durian, rambutan, langsat, banana, and mango.* Introducing improved genetic materials and training of tree propagation (grafting) and genetic selection would improve the local gene pool. Additional work on establishing market quality and quantity demands would assist in establishing sorting, grading, and possibly some value-added process for higher producer premiums/farm gate prices. All of the above crops were mentioned by NGOs, farmers, and government agencies, ye tmost agencies also included cacao and rubber as priority agroforestry species. Investigation of alternative crops like mangosteen, salak or spice crops (nutmeg, cinnamon, etc.) should be seriously considered.
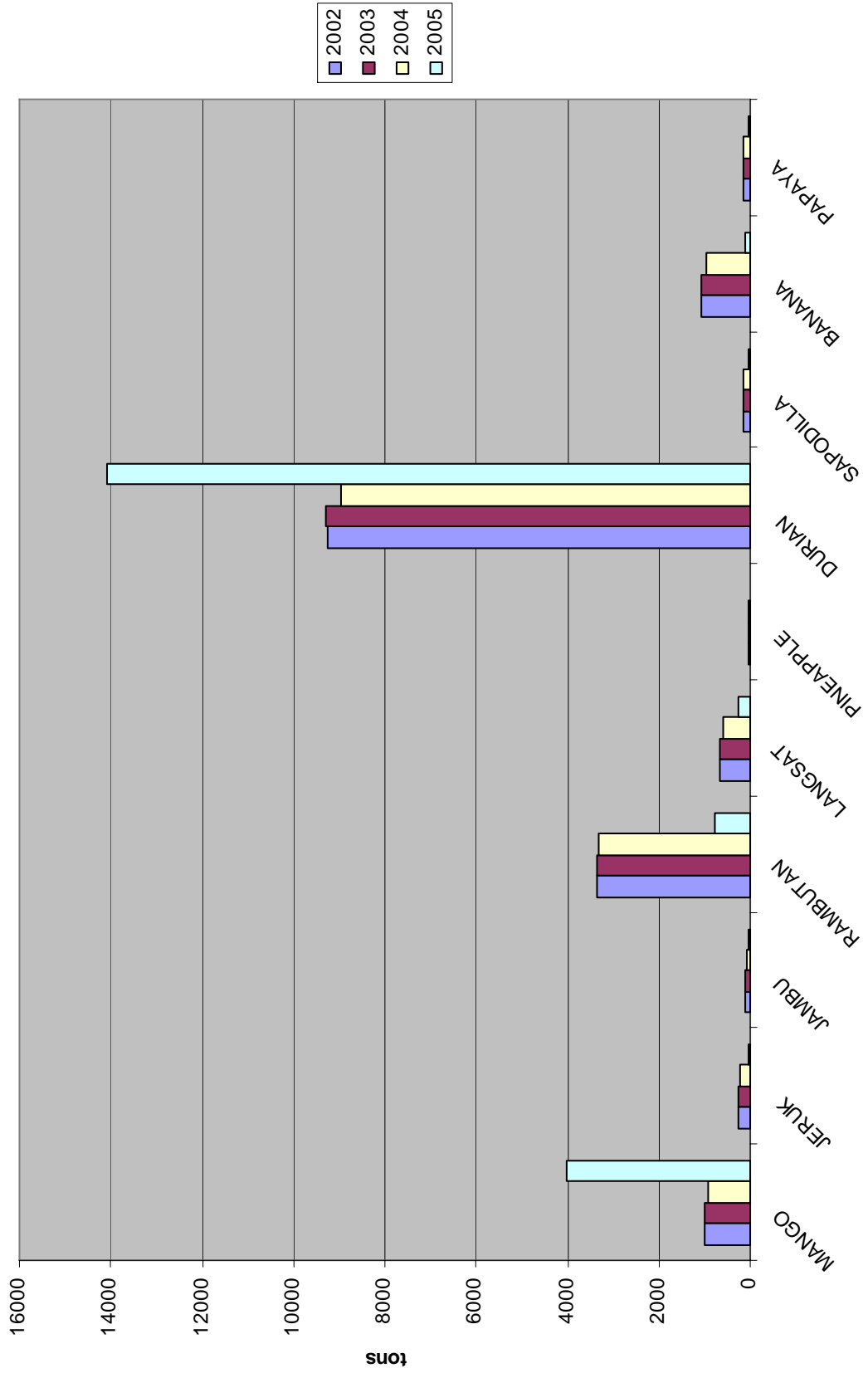
Figure 3. Aceh Barat Fruit Production 2002-2005
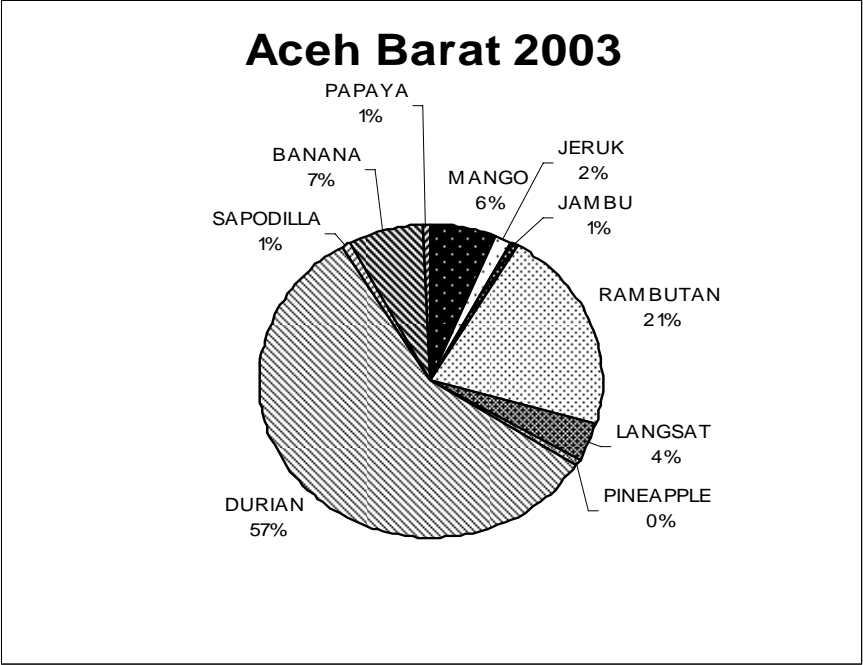
Figure 4. Aceh Barat 2003 Fruit Production

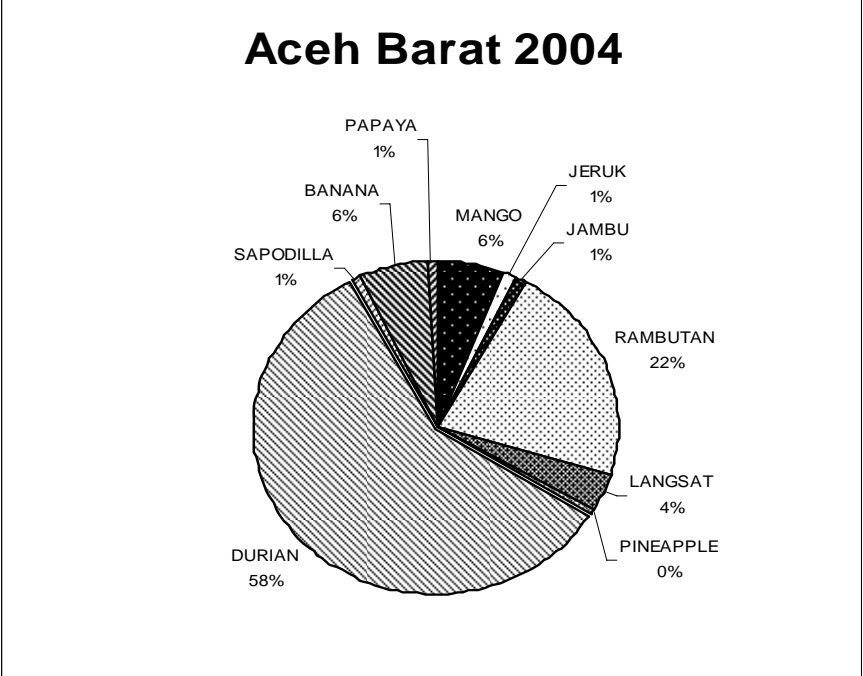Figure 5. Aceh Barat 2004 Fruit Production

Aceh Barat 2005

PAPAYA
0%

BANANA
1%

JERUK
0%

JAMBU
0%

MANGO
21%

SAPODILLA
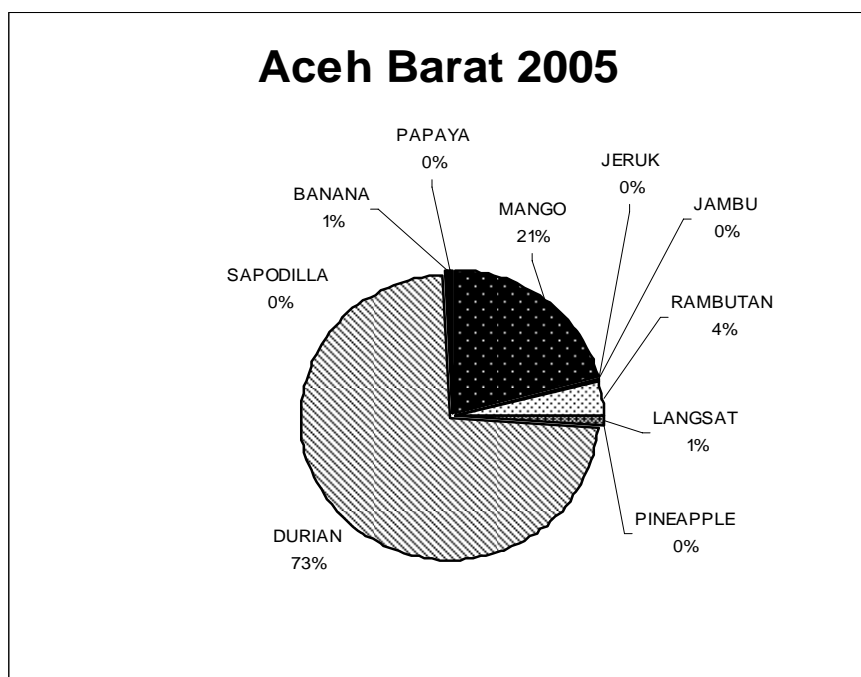0%

RAMBUTAN
4%

LANGSAT
1%

DURIAN
73%

PINEAPPLE
0%

Figure 6. Aceh Barat 2005 Fruit Production

Seedlings

The seedling situation in Aceh Barat is very similar to that of Aceh Jaya in that a large demand for reforestation species, rubber, cacao, coffee, and fruit trees is driven by program funding. This demand is short term but can help fund training and facility development. Most seedlings are bought in Medan at somewhat inflated prices (compared to local nurserymen's prices) that do not factor in transportation costs, which make the seedlings even more expensive. The reasons for bringing in seedlings from Medan are the quality and quantity of seedlings available. Improved genetic material is available from Medan. Local sources of improved genetic materials in Aceh Barat are little explored or documented. Seedlings for some market crops (like areca nuts) and locally consumed fruits (like jackfruit) may continue to be non-commercially produced as farmers do not see an economic benefit to further improvement of these species. Long term plans will rely on continued private industry and small holder demands for improved rubber clones, coffee, oil palm, cacao, and commercial fruit crops.

Market Structure and Market Channels:

In Indonesian official statistics, commodity chain prices are usually broken down to farmer gate (*harga petani*), district level (*harga kecamatan*), and factory gate (*harga pabrik*). This rather simplistic break down of prices idealizes market structures and channels in terms of administrative divisions. These administrative divisions also do not reflect complete production areas as geographic zones. Data reliability for both

production and market structure would benefit from a more comprehensive study that documents production areas geographically or in terms of market channels.

In this study different activities and the relational structure and activities that took place in commodity chains were inspected. Market activities consisted of:

- **Production:** Raw commodities
- **Assembling:** Bringing together/collecting components from individual raw producers. Often this is explicitly a geographic and coordination task. However, some rudimentary grading and sorting necessarily occurs.
- **Wholesaling:** Large amounts of commodities are brought together in a central location for resell to vendors or larger traders.
- **Processing:** Can occur anywhere in the market channel, but often occurs just before public market consumption.

In general commodity chains work on a traditional format wherein the producer and end market are separated by a number of intermediaries (including traders and processors). The end result is that the farmers rarely have knowledge of where, to whom, and for how much their products are sold, much less any downstream processing. Grading is limited to sorting out rotting fruit, and not based on any market specifications. Processing appears limited to drying fruit, mostly export oriented or regional market (areca, cacao, spices). There are few if any value-added acivities that the farmers engage in. The previously defined *actors* apply to the charts given below. Local markets would be village based and include Meulaboh and Calang markets. Local markets are sometimes transient, seasonal, or day/night markets. Regional markets include Banda Aceh, Medan, and other urban centers. Exporting was considered to be moving items beyond the region to other national or international destinations: Jakarta, Singapore, Bali, Hong Kong, Australia, etc.

Interlinkages between actors are often complex multifaceted relations through which economic transactions are only one component. The importance of familial or ethnic bonds, social class, cultural metaphor, gender, geography, and other dynamics ultimately modify the type, quantity, reoccurrence, and other characteristics of market transactions. One of the main ways in which farmers gain access to finance is through selling futures on their crop (taking out a crop-based loan from) traders and collectors. Unfortunately, many of these crop-based loans are below eventual market prices and therefore result in a loss to the farmers. Moreover, it appears, as in many other sectors, that most loans fund household consumption instead of financing investment in agribusiness expansion. One of the main advantages to accessing finance through these avenues is that the farmer offers his crop and social reputation (credit) as collateral for the loan. The arrangements are informal, customary, and trust-based with little transaction or bureaucratic costs. So while knowledge of downstream market quality demands, better synchronicity of market transaction timing and quantity, and market price knowledge are important things to develop in raising farm gate prices, they can be irrelevant when a household is taking out loans (future contracts) for household consumption. Loan amounts between traders and farmers were found to be as high as 2 million rupiah (roughly USD225) and surely may

go much higher. These interlinkages between actors are not only between farmers and traders/collectors, but commonly between traders/collectors/exporters/and vendors too. The main difference between loans involving only traders or traders and producers is that the size of loan increases according to the ability of the actor to amass commodities, rely on the debtor. There are certainly other possible socio-cultural variables that should be explored in a more comprehensive market study. It is not clear whether social networks are more important in areas less impacted by the tsunami as these regions experienced less human loss and may have more intact social networks. Post-conflict dynamics may also impede certain market interactions in ways that have yet to be explored. It is clear that social networks played little role in import-based market channels wherein vendors call orders in to fruit importers (usually based in Medan) who then ship internationally-imported fruits from docks in Medan to local and regional markets in Aceh. These transactions relied on bank based exchanges and often never involved face-to-face contact between actors.

This study identified seven market structures for fruits. The market channels used in these structures vary according to season, social connections, geographic location, and other variables. As mentioned earlier, rubber, cacao, and oil palm have been covered in previous ICRAF research and their market structures and channels are qualitatively different from other tree crops in the region, though we did look at cacao since it tends to be more comparable with other tree crops. Mangos were included in two different market structures as different varieties of mangoes were managed and traded according to their origin and quality. The market structures are grouped as:

1. Banana, Papaya, and Jackfruit (Figure 7): Mid-value products that were mostly consumed at the household or in local markets. Local collectors/traders played an active role in distribution. These products involved little processing, though marginal amounts of sorting and grading took place by each actor. These fruits were generally not priority species in that farmers propagated these tree crops themselves. However, food security initiatives could support genetic improvement of these trees or value-added processing may be used to convert these to a higher value product.

2. Citrus, Durian, Rambutan, Sapodilla, and Mangos (Figure 8): High value, perishable regional products. Local collectors/traders and regional traders played an active role in distribution. These products involved little processing, and sorting and grading took place mostly at the level of traders and collectors. These products were commonly cited as high priority species for farmers.

3. Areca nuts (Figure 9): Semi-perishable, high value regional products. Areca nuts were processed on the farms by simply cracking open the nuts or doing some drying. These were not priority species for farmers as they felt comfortable propagating them and felt that they could access genetic materials.

4. Cacao (Figure 9): Semi-perishable, high value export. Cacao was often dried on farms. Grading and sorting took place by collectors and traders. Value-added processes and principles of fermentation were nonexistent. This was a high priority species for many NGOs, farmers, and government agencies.

5. Cloves, Cinnamon, Cardamom (Figure 10): Semi-perishable, mid-value regional and export products. These products are produced in masse in regions outside Aceh Jaya and Aceh Barat, so there was little competition against estate plantation prices and small farmer collections. Additionally, production of these commodities suffered under years of monopoly of the clove industry by the Suharto family. Thre was very little interest in these trees, though they have great potential for producing semi-perishable, value-added products.
6. Salak, Apples, Sunkist Oranges, and Grapes (Figure 11): Internationally imported or distant products. Salak, though imported from Java through Medan, was the best selling fruits for many vendors who sold imported fruits. Climates suitable for salak may be located in the inland regions and would probably be highly profitable considering the regional demand and lack of supply.
7. Tree Tomatoes and Mangos (Goleh) (Figure 12): High value local and regional, but also regionally imported products. These products often came from other districts in NAD as the climate was better (Tree Tomatoes in the highlands) or ability to meet demand (Mango Goleh) was not locally sufficient.

Market Prices

Market prices at the different actor levels and different markets are aggregated below. But do not represent reliable estimates or the complexity of the actual market channels. This study took place in a low fruit season and relied on interviews and secondary data for much of the data below. The lack of reliability and consistency of these prices thus calls for another study to document the main commodity prices according to actor and region during the fruit season. The main fruit season, of course, varies according to altitude and geography, yet falls between November-February.

Table 4. Market Prices

| ACTOR	Rambutan	Citrus (Mandarin)	Sapodilla	Durian	Mango	Areca Nut
Locals (farm gate1)	4000	""	""	""	""	3000
Collectors (farm gate2)	5000	2000	""	6-15000 two fruits	2500-4000	3000-3500
Local Traders	""	""	""	""	""	3500
Regional Traders	1-10000	6500	""	""	""	3500-4000
Local Markets	""	5000	""	""	""	5000
Regional markets	""	7500	6500	""	5500	15000
Exporters	""	""	""	""	""	""
Grading/ Sorting?	Collector/ Trader	Collector/ Trader	No	Unknown	Trader/ Market	Trader/ Market
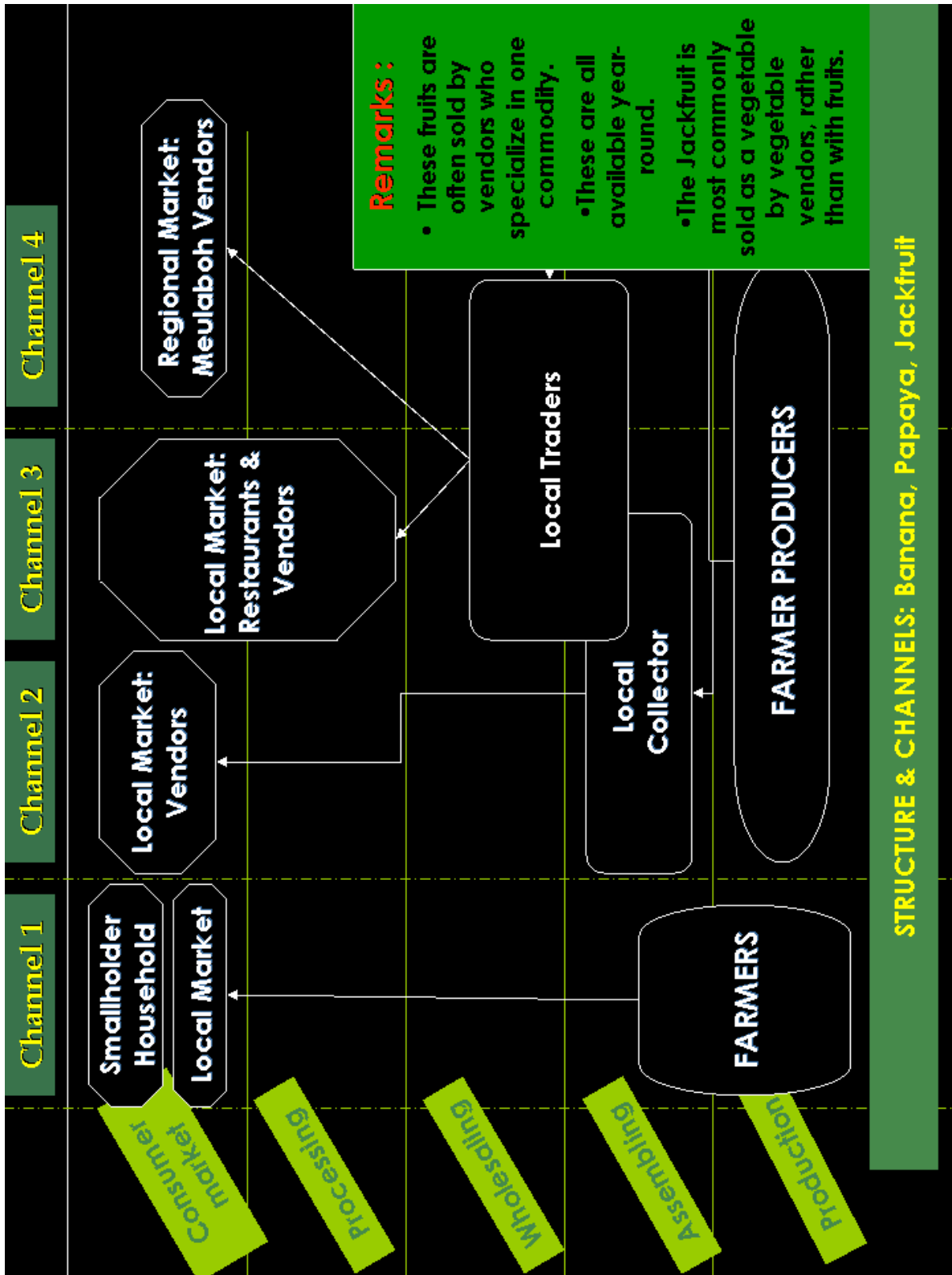
Figure 7. STRUCTURE & CHANNELS: Banana, Papaya, Jackfruit
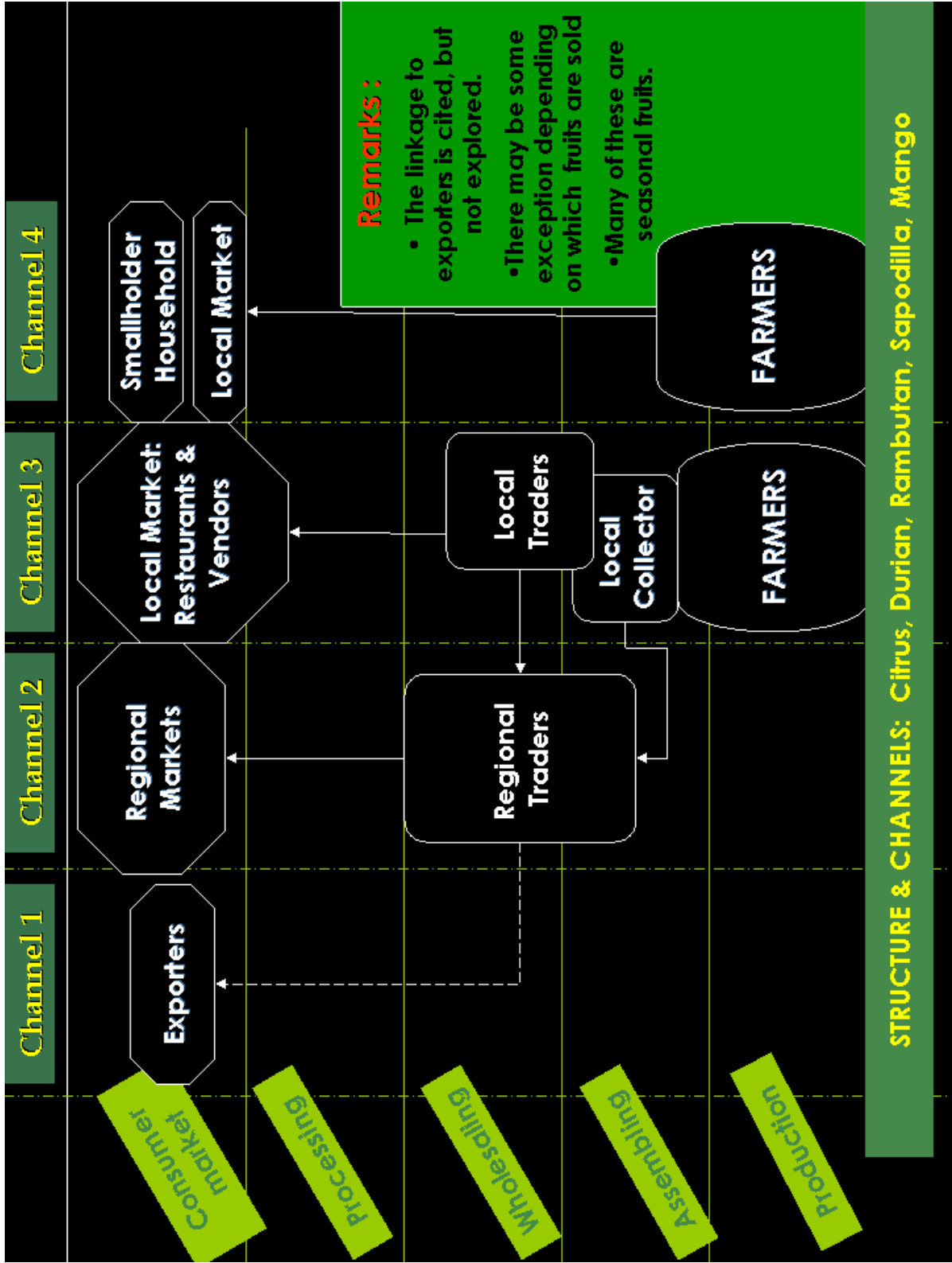(format adapted from Tukan *et al.* 2005)

Figure 8. STRUCTURE & CHANNELS: Citrus, Durian, Rambutan, Sapodilla, Mango
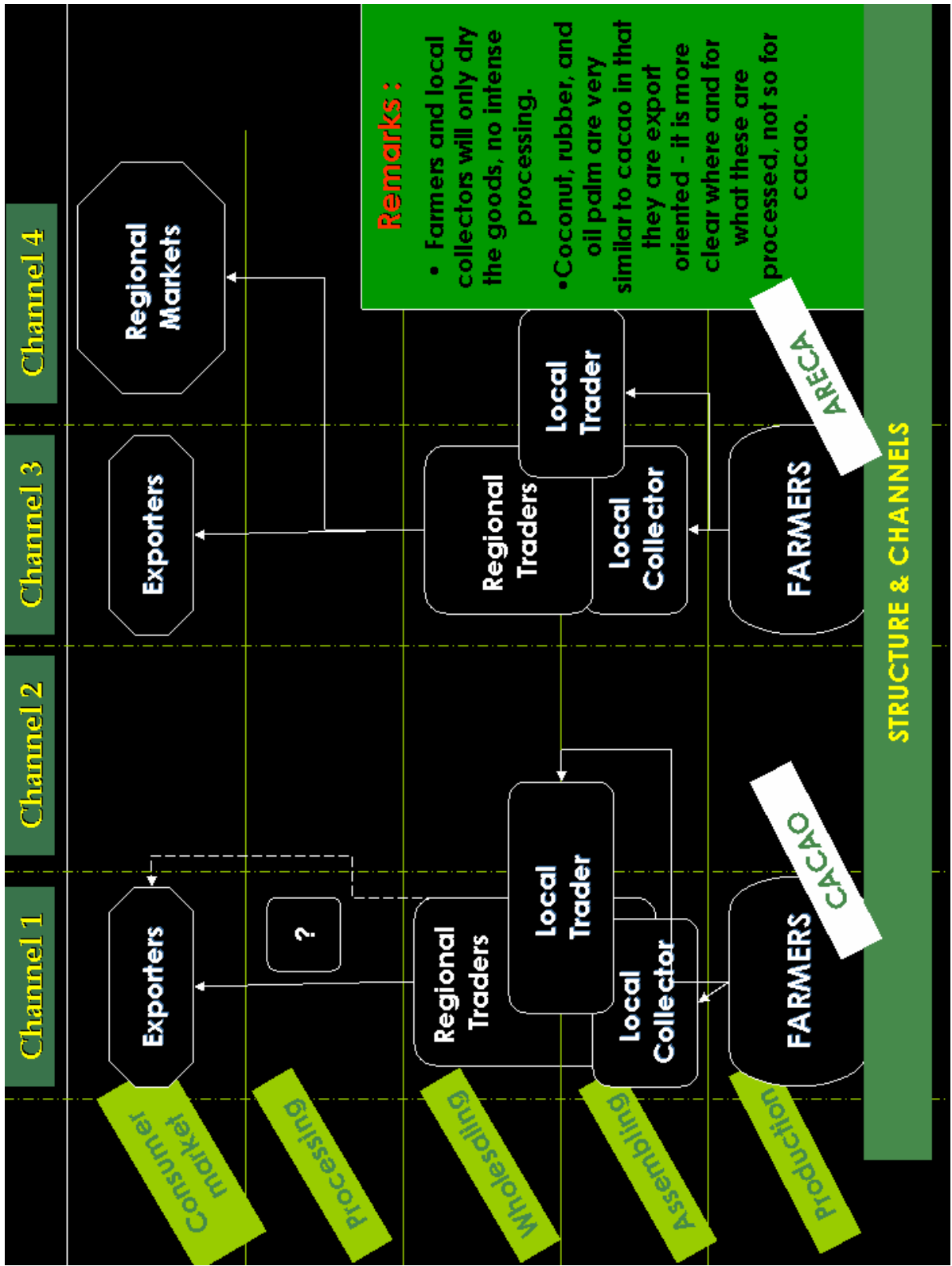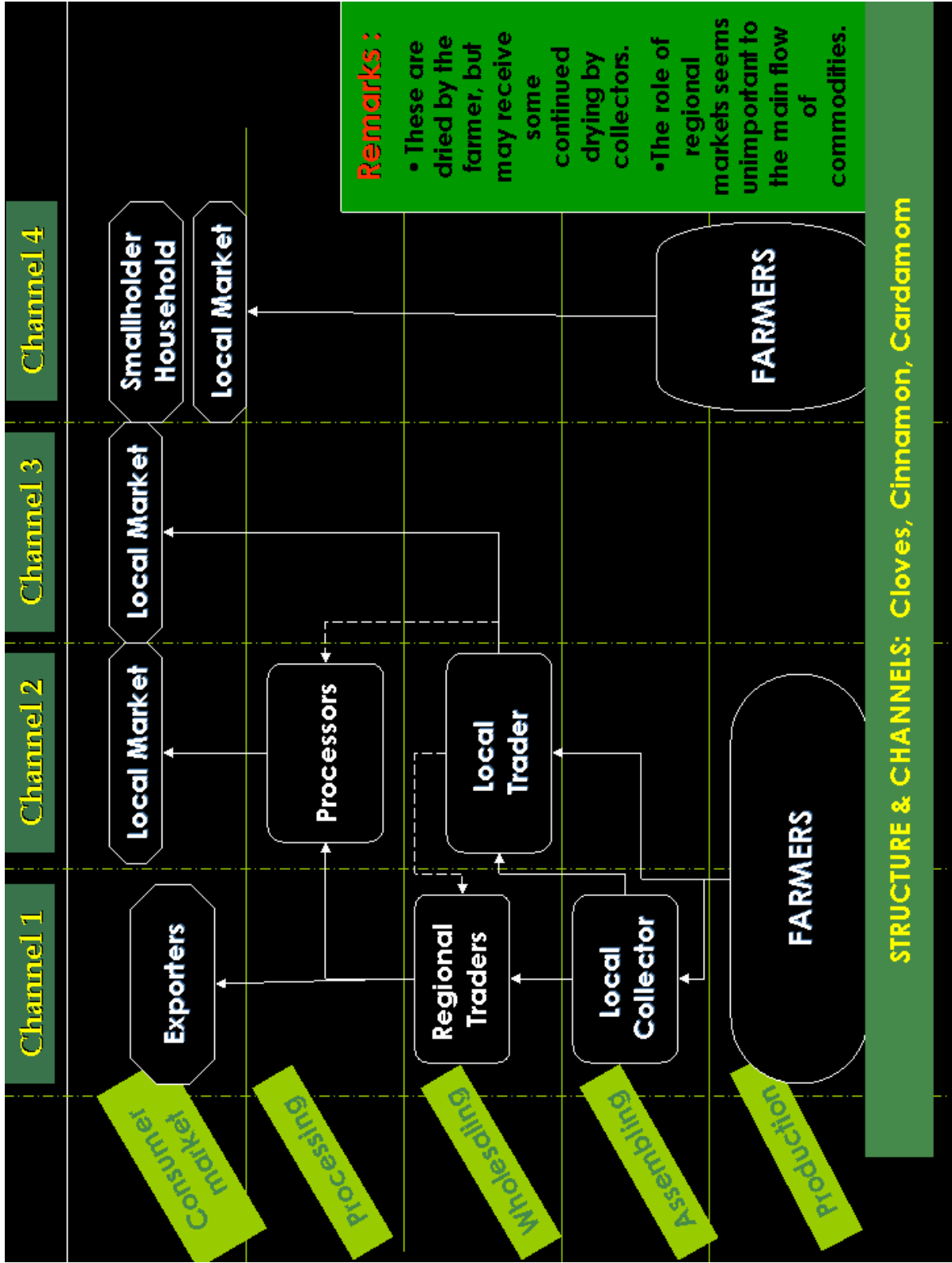
Figure 9. STRUCTURE & CHANNELS: Cacao & Areca

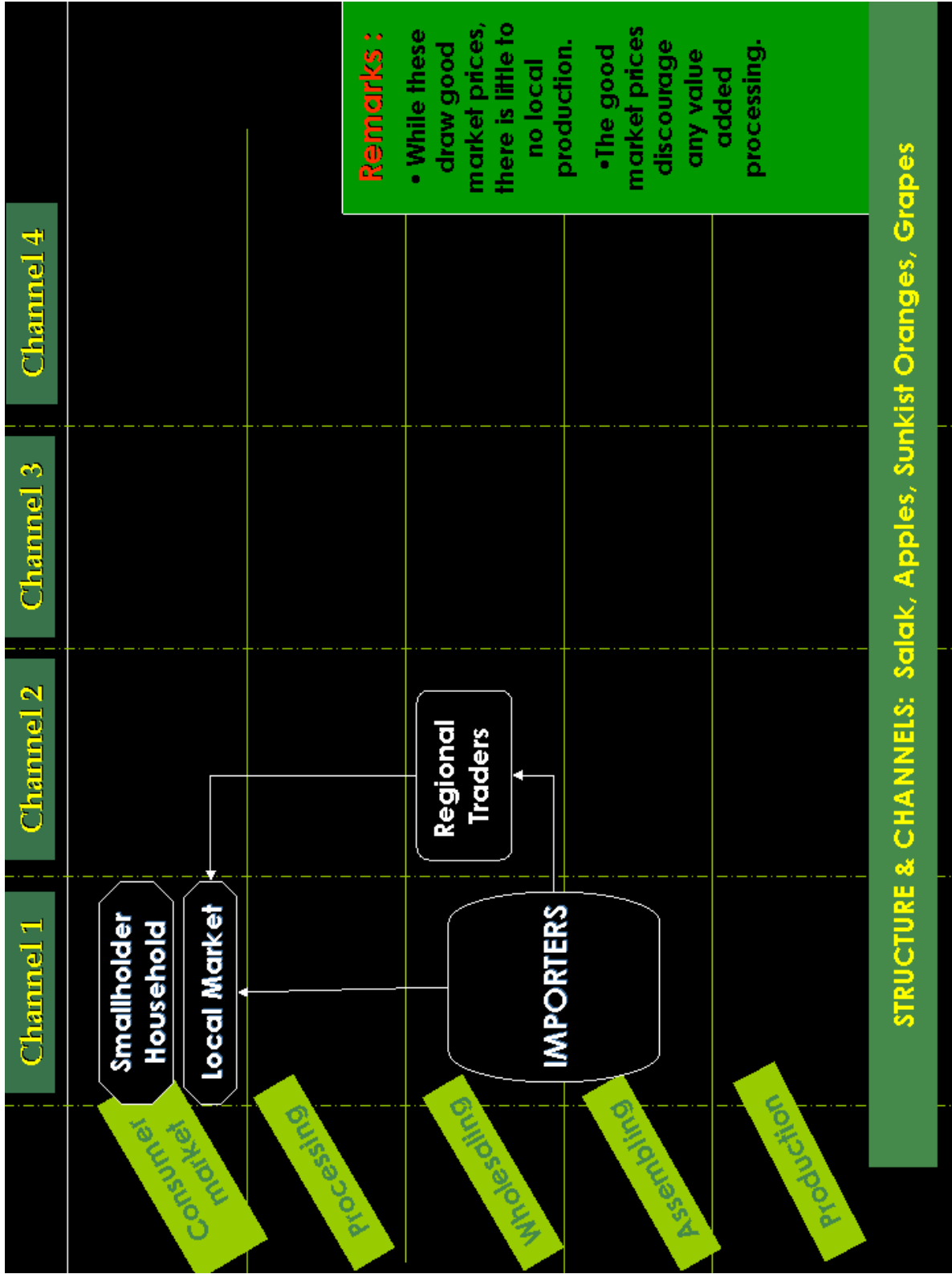Figure 10. STRUCTURE & CHANNELS: Cloves, Cinnamon, Cardamom

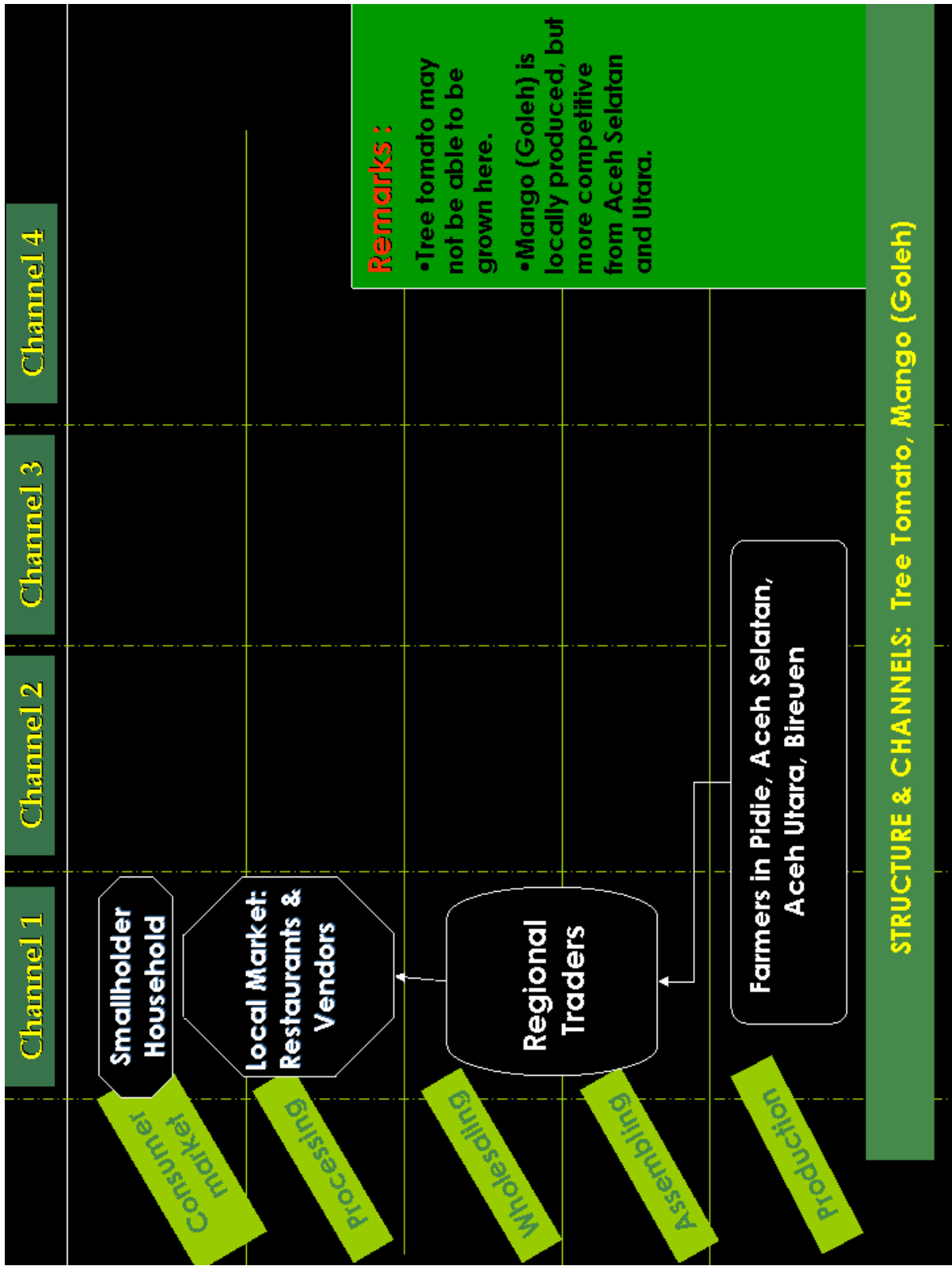Figure 11. STRUCTURE & CHANNELS: Salak, Apples, Sunkist Oranges, Grapes

Figure 12. STRUCTURE & CHANNELS: Tree Tomato, Mango (Goleh)

Market Structure/Channel Problems

Market structure and channel problems are the main focus of this section. Input problems were often the main focus of many of the interviewees. Input problems, while not typically thought of as market problems, can be linked to market transactions in the case of finance and resource access. Input problems mentioned by farmers, NGOs, and government agencies included:

- Limited access to improved genetic materials
- Limited labor or ability to pay labor
- Limited flexible financial credit
- Limited management knowledge
- Limited access to pesticides

Beyond input problems, problems with market structures and channels can be broken up into four groups:
1. Economies of Scale
2. Access
3. Value-added
4. Conceptualizing the Market

Economies of Scale

Farmers did not have access to economies of scale to either reduce transaction costs (transport, market information access, etc.) or increase bargaining power (for finance, goods, transport, labor, credit, etc.). Individual transactions reduce farmers' bargaining power and increased trader/collector coordination costs, thus reducing farmer gate price. Although some cooperatives existed, these groups usually did not engage in market oriented bargaining. Building cooperatives capacities to bargain collectively, to keep inventory, and to share risk might overcome many of the economy of scale issues.

Access

Access, when approached from a sustainable livelihoods framework, can entail many elements of human, social, natural, physical, and financial capitals. Access to market information is often of primary concern and considered (rightfully or errantly) as a potent remedy to building equity in markets. Market information would theoretically benefit farmers in terms of bargaining power and ability to engage in value-added processes, sorting, and grading. Market information needs include:
- End use of products and final consumers
- Quality standards of final market
- Price information in market channels
- Market consumption trends
- Accurate production data

Access can also be thought of in terms of distance to a market. Distance to market can be considered either simple geographic access or the actor's location on a commodity chain

in reference to the final consumer. Distance to market, in either case, is often one of the main hurdles for farmers to overcome in realizing extra value in the products. Access to market information and more permanent linkages may reduce the producer's distance from the market by circumventing certain market channel links, lowering transaction costs, and making the products more directly acceptable and reliably delivered to final markets. Geographic distance to market involves: geographic location in relation to the market, poor transport infrastructure (costs), amount of taxes or bribes paid, and the number of administrative districts (and thus transactions) a commodity must pass through to market. In the case of crops like Areca nut, price differentiation based on geographic location was obvious. There has not been substantial work gathering price data for different commodities in the region, so little is known about price correlation in different market channels.

Value-added

There was little value-added processing, sorting, or grading for market. When value-added processing was performed, it was not optimal in terms of methods used. For example, fermentation of cacao beans is a standard practice to raise the cacao quality in most world cacao regions. However, here only a simple drying of the beans takes place, thus undermining the ultimate quality of the end product. Improving value-added processes or increasing fruit processing capacity in the region (syrup production etc.) would increase commodities shelf-life and thereby facilitate storage and resell.

Conceptualizing the Market

As mentioned before there were multiple problems in ways in which the market was conceived of and data was regionally collected.

- Simple conceptions of market transactions at administrative levels.
- Lack of an understanding of actors or proper documentation of their activities.
- Too much focus on inputs and accessing inputs rather than accessing markets or building market information.
- Little focus on the reciprocal flows or socio-cultural embeddedness of commodity chains: credit networks, social obligations, etc.
- Little understanding of farmer risk management for market instability (diverse livelihoods, aversion to land collateral loans, etc.).
- Lack of coordinated geographic management of production areas.

A more complex understanding of market structures and channels socio-cultural embeddedness, geographic extent, and reciprocal flows would allow better regional management of market transactions, more innovative approaches to group formation and cooperation, a more strategic understanding of how to intervene to improve market interactions in terms of the size, quantity, quality, or social equity of transactions.

Seedling Problems

The seedling market in Aceh Jaya and Aceh Barat is limited in the sort term by programs' reliance on genetic materials coming from Medan. Many organizations have commenced projects that encourage local nurseries and tree improvement/propagation. However, most of these organizations also admit that their efforts are severely constrained by lack of local technical expertise, particularly in the domain in perennial agroforestry systems. If contract obligations to buy seedlings from distant nurseries stand in the way of supporting local nurseries, these contracts should be revaluated. Little is known about local tree seedling availability, reliability, or genetic improvement. While USAID ESP and some NGOs have made advances in establishing local nurseries and sharing this information with each other, there is no clear way to access this information from the public domain or to synchronize this information with government agencies' projects. Long term limits to the seedling market will be market related and related to introduction of new genetic material as demand fluctuates for certain species. Anticipating these demands is a difficult task for commercial nurseries that have little access to outside market information. Perhaps the best way to think of long term demand in this region is through improving commercial tree nurseries' local access to improved genetic materials and by promoting smallholders to grow their own nurseries to reduce costs and meet their own demands.

Summary

As mentioned above, problems of input and input access dominate conversations on production ability precisely because little data or research is available to explore and document market structure and channel problems. As well, the focus on improving inputs tends to visualize the market as an equity engendering, geographically dislocated phenomena. Input problems are serious, but they must be considered in relation to a wide array of market problems that involve economies of scale, lack of access to markets due to market information or geographic location, lack of value-added processing techniques, and lack of understanding of market transactions, production data, price data, or price correlation. Moreover, futures contracts (loans) that farmers engage in with traders and collectors guarantee low prices for the farmers in exchange for immediate cash. These flexible, informal loans seem to be applied mainly to household consumption. Alternative, flexible financing (without demands for land titles for collateral) that can encompass both household consumption and investment in productive, agribusiness resources is a critical need for small enterprises and for small farmers in the region. Access to other forms of finance (either through individual or collective groups) could feasibly allow farmers to break from futures contracts and engage in market transactions that can benefit from economies of scale, increased acess to market information (seasonal price premiums, final market prices, etc.), value-added processing, and better regional management of production and market structures.

Seedling markets also would benefit from better market information, economies of scale, and better regional data to allow for coordination and management of production and market aspects. The main preoccupation for tree nurseries is now locating the genetic material which will be in demand over the next 5-10 years in the region and increasing seedbanks and other local sources of improved genetic materials.

Recommendations

As this research has shown above, there is a severe lack of market information throughout this region that cannot be built through rapid market analysis procedures. The long term feasibility of projects in this region will depend on improving conceptualizations of the market and gathering accurate production and market data to facilitate input access, market access, producer economies of scale, value-added processing, and improved management capacities. Problems, related recommendations (activities), and the desired outcomes of activities are listed below.

1) Lack of knowledge of local sources of tree improvement materials:
   a) Identify local sources of tree improvement materials (grafting material, seed banks, seed orchards, etc.). List these in an excel file.
   b) Help publicize and distribute the database to stimulate further demand.

2) Lack of seedling market information:
   a) Gather seedling market information:
      i) Identify key buyers and engage government and NGOs
      ii) Find out market demands for seedlings: NGOs, Dinas, BRR, etc.
      iii) Centralize nursery information: Database of nursery resources to support small, mid, and large nurseries. Identify through agencies already in the field and field visits.
   b) Help publicize and distribute the database to stimulate further demand.
      i) Identify key buyers and engage government and NGOs to buy locally available products.

3) Lack of local fruit tree nurseries or management skills:
   a) Develop fruit tree nurseries based on priority species for Aceh Jaya (citrus, sapodilla, rambutan, durian, mango, cacao, and coffee.).
   b) Develop fruit tree nurseries based on priority species for Aceh Barat (durian, rambutan, langsat, banana, and mango).

4) Lack of market data:
   a) Perform a detailed analysis of durian, citrus, and rambutan production:
      i) Survey to collect information on farmers' inventory, quality, and market transactions (number, size, frequency)
      ii) Market information: Prices, end use, key producers/buyers/distributors, seasonality, etc.
      iii) Market structures
      iv) Market channels most frequently used.
      v) What has changed since the tsunami?
      vi) What production levels can be maintained in a sustainable livelihoods approach?

5) Unknown potential for high value crops:
   a) Identify fruits with high market demand
   b) Identify possible regions of growth

c) Research possible introduction or expansion of salak (high market value), mangosteen, nutmeg, and other tree crops in the region.

6) Lack of information in Pidie: Extend this study to gather additional market and production information and analyze feasibility of extending production, processing, or marketing for specific fruit in Pidie (an ICRAF NOEL site).

7) Lack of knowledge of exporter and importer prices: Interview exporters and importers in Banda Aceh and Medan to learn about market prices and quality standards, social networks, and other aspects of market interactions.

8) Fragmented collective group activities need support to overcome the lack of value-added processes and benefit from economies of scale by:
   i) Access market information: through collection and distribution of market information.
   ii) Inventory: through giving training in specific inventory skills and verification processes.
   iii) Storage: commodity specific methods.
   iv) Value-added processes: analyze final market consumption and whether value-added processes could be introduced by collectives.
   v) Trainings in bargaining and arranging mass transactions (lower costs of multiple individual transactions)
   vi) Transport studies
   vii) Identify permanent market linkages that can be reliably integrated into new market channels
   viii) Look at how financial credit is being used by farmers and traders. Is it for consumption needs or for expanding the business?
   ix) Explore flexible public-private investments and train for inventory based collateral for credit, risk management, and funding temporarily some household consumption

9) Lack of coordination of market knowledge requires organizing agencies and NGOs involved with livelihoods programs to collect market information.

10) Lack of final market knowledge: Identify final market quality standards for different fruits through a seasonal study.

11) Lack of success story models: Document successful collective efforts to increase price stability, increase farmer gate price, and improve access to inputs (patchouli oil farmer collectives).

12) Strategic information is lacking: Identify strategic product entry points through collection of general market information on consumption and production (for example, a local expansion in the soft drink sales would indicate a possible entry point for syrup manufacturing). Identify underserved markets.

13) Explain how and why durian production expanded in Aceh Barat.

14) Identify and disaggregate conflict and tsunami impacts on the market and production (resource access) aspects of tree crop production in the region.

15) Explore gender issues in market structures and market channels.

Conclusions

While the priorities of farmers (price stability, higher percentage of the end market prices, and access to improved planting and grafting materials) were specifically mentioned in reference to tree crops, they seem applicable to other agricultural commodities in the region. Issues of price stability and equity indicate other underlying and interlinked problems deeply embedded in a fragmented rural production sphere. It is unclear whether the fragmented nature of rural production in Aceh is related to either the tsunami or conflict; however, it is of primary importance to tackle this problem in addressing market inequities.

In the short to midterm, access to improved planting and grafting material is within the ICRAF NOEL project plan. Yet long term access to improved materials, price stability, and higher percentages of end market price will ultimately require not just better material or market information, but collective organizations. Temporary increases in percentage of market price can be arranged through better price negotiation skills, product quality improvement, market information access, and strategic moves on the commodity chain. Yet, long term higher returns and price stability can only be guaranteed through supporting collective organizations that can negotiate prices, share risks of cyclical failures, access collective financing, lower transaction costs, distribute information and inputs, expand markets, use value-added processing, maintain storage facilities, and take advantage of other economies of scale. Collective organizations can also play an important role in changing some of the detrimental practices that lock farmers into unprofitable market channels. For example, many of the farmers in the survey (and throughout Indonesia) currently use the commodity chain to access microfinance loans for their immediate household consumption needs instead of expanding their business. These loans lock the farmers in an unprofitable cycle wherein innovation is discouraged by low price premiums. Other than collectives, innovative approaches to rural development might include government support for farmer storage initiatives, government buying market excess to keep prices high for farmers, introduction of strategic processing facilities, or cost-benefit analysis of implementing rural auctions for certain commodities.

Data on agribusinesses in this region is deficient. Research to support agribusiness should bear in mind that that producers' access to inputs, higher profit margins, and price stability rely on changing microfinance options (for household and small businesses). Cooperation between organizations, agencies, and farmers themselves to gather market data would greatly enhance the possibility of collective organization, new finance options, and ultimately accomplishing the priorities of perennial tree crop producers.

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