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Pro-Poor Horticultural Growth in East Africa and South East Asia

Overall project report

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Abstract

There is little insight into how household poverty in rural and peri-urban areas is affected by developments in the markets for fruit, vegetables and flowers. This study extends the knowledge, and feeds the debate on agricultural growth policies. Field data on a selection of horticultural commodities was collected in Uganda and Vietnam. Background material is derived from two overview studies on the horticultural sector in both countries, and three business cases of supply chain development in Thailand. In addition, our data and analyses reflect on the poverty-alleviating impact of development assistance and trade policies by the European Union.

The growth prospects for the production and marketing of fruit and vegetables, flowers and spices are favourable in both Uganda and Vietnam, the two low-income countries under study. The rising demand for horticultural products creates a substantial expansion of the rural economy, and supports the livelihood strategies of many rural households. The incidence of poverty among the growers and workers in the horticultural sector lies far below national averages. To ensure participation of the poor and vulnerable households in this prospected growth, support from various stakeholders, including the donors of development assistance, is required.

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1 Introduction

1.1 Goal

There is little insight into how household poverty in rural and peri-urban areas is affected by developments in the markets for fruit, vegetables and flowers. This study extends the knowledge, and feeds into the debate on agricultural growth policies. In addition, our data and analyses reflect on the poverty-alleviating impact of development assistance and trade policies by the European Union.

1.2 Research questions & methods

This study, and others, provides a positive outlook on the growth of horticultural production and distribution and marketing in the low income countries of Uganda and Vietnam. Will poor and vulnerable groups in society share in the benefits of the foreseen economic expansion? The data collected show that, for many resource-poor agents, these activities make substantial contributions to their livelihood security, certainly on the short term. Little evidence was found that alternative job positions or entrepreneurial activity provide better opportunities for poverty alleviation in the rural and peri-urban areas.

Uganda and Vietnam were selected as study countries. Both are low-income countries, and neighbour countries of nations (Kenya and Thailand, respectively) that are more specialised in horticulture. We explore what conditions must be fulfilled at an early stage of sector growth to maximise poverty alleviation in the longer run, along two central themes:

Poverty alleviation via export horticulture vis-à-vis domestic markets. A survey on marketing chains of 5 tropical commodities in Uganda explores whether the economic impact differed between export products and domestic marketing. Data on specialised horticultural agents (25 growers, 14 traders, and 14 farm workers) informed expectations on the household impact.

Types of marketing arrangement (or supply chain) in relation to poverty alleviation. A representative survey on marketing chains in Northern Vietnam that supply roses to consumers in Hanoi, explores (a) if poverty alleviation is related to the structure of supply chains, and (b) the contributions of horticulture in escaping poverty. Data comprises 65 farms, 15 wholesalers, and 66 retailers. Value chain analysis across 15 marketing channels is combined with a qualitative survey to analyse poverty alleviation, and to build hypotheses on where households would stand if it were not for their involvement in horticulture.

Sector studies on both countries and three business cases of supply chain development in Thailand provide further background material.

Four activities are identified for potential involvement of the poor: farm work on export farms, growing in smallholder setting, local trade services, and retail in stalls and on street markets. The results point to the importance of domestic fruit and vegetable

markets for improvements in the livelihood of the poor. Combinations of activities and market channels define focal points for government or donor involvement that aims to support pro-poor growth.

1.3 Organisation of the report

This report is organised as follows. Chapter 2 provides a general outlook on the developments in the horticultural sector (subsectors fruit, vegetables and flowers) in Uganda and Vietnam. In both countries, the sector is at a fairly basic stage compared to neighbour countries. We analyse three cases of business development to provide an indication of what are the key success factors for sectoral growth, and what impact should be expected in terms of poverty alleviation. Chapters 3 and 4 are the core of the report. Both examine the relations of horticultural development and poverty alleviation along different lines. Chapter 3 reports on the cross-commodity analysis on Ugandan horticulture. Chapter 4 analyses the different poverty impact across a variety of marketing channels for roses. Chapter 5 highlights the critical findings and recommends areas of intervention.

2 Horticultural growth

2.1 Prospects for horticultural growth in Uganda

2.1.1 Potentials

The horticulture sector in Uganda has great potential in the following areas:-

Export growth
There is significant growth potential for exports of Ugandan horticulture. Uganda has a relatively low market share for almost all horticultural products, and, because buyers generally like to spread their supply base over several countries, Uganda has an opportunity for rapid growth. The value of horticultural exports can grow to US $75-100 million FOB by the end of the decade, based on products that are already being exported in relatively small quantities. In the long run, according to IDEA estimates, existing exports could be increased by at least ten times to US$300 million with sufficient investment. This growth would require private sector investments in modern production units; private and public investment in training and research; and public sector investment in facilitating services at the airport, roads etc.

There is significant growth potential for exports of Ugandan floriculture. Currently, EU floriculture imports are valued at more than US$1 billion and are growing 2-4% per annum. Uganda has less than 2% of market share. Because of its abundant supplies of water, lower production cost per stem, and year-round uniform production conditions, Uganda has distinct competitive advantages over other African and Southern hemisphere countries for certain types of roses, gerbera, foliage, tropical flowers, and chrysanthemum plant cuttings. Additionally, the market for tropical flowers and foliage is largely untapped and has tremendous growth potential. Recent improvements in codes of practice, quality assurance, airport handling, and private sector research have had a positive impact on the image of Uganda, and have fostered many new market linkages.

Vanilla production
There is great growth potential for exports of vanilla from Uganda. Vanilla is the highest value crop ever grown in Uganda. Although the exorbitant world prices for vanilla are expected to decline in 2002, vanilla will remain a very attractive crop for smallholders in the future.

Growth of regional and domestic markets
There is great potential for increasing regional exports of horticultural products from Uganda into neighbouring countries of Kenya, Sudan, DRC, Tanzania, and Rwanda. Further urbanisation processes will also give a boost to the development of the domestic market for horticultural products.

Processing
Although processing of fruits and vegetables is almost non-existent in Uganda, there is good long-term potential for it. Small market niches exist for solar-dried banana, pineapple, mango, papaya, and chilli as well as passion fruit juice and concentrate. Uganda is still too small a supplier to invest in the promotional efforts needed for

product differentiation. However, as quantities increase and quality becomes more consistent, there will be a need to differentiate Ugandan products in the market place in order to add value.

High-value niche markets
Because of Uganda's dependence on airfreight for extra-regional horticultural exports, the sector is restricted to very high value products that can support the cost of airfreight. Uganda is therefore not competitive in the high volume markets for bulk fruits and vegetables. However, despite this disadvantage, because of Uganda's natural resource, climatic, and geographical advantages, competitive advantages do exist in a number of niche markets.

The industry has great potential in the organic niche market, given Uganda's predominantly organic production that has evolved rather by default due to lack of agricultural inputs. There is a vibrant organic movement world-wide that is prepared to pay premium prices for organically produced products.

Growth and expansion of existing products
Although diversification and identification of new products is useful, in the short term Uganda should focus on achieving maximum growth of existing products. Current qualitative and quantitative market indications suggest that there is no real need to find "new products and new markets." Products currently exported that have growth potential are small/intermediate roses, gerbera, tropical flowers and foliage, plant cuttings, fresh chilli/hot pepper, passion fruit, okra, baby vegetables, vanilla, sun-dried tropical fruit, and some others such as papain from papaya. Maintaining adequate continuity and quality of product are the horticulture industry's most significant issues.

Variety development and seed production
Development, multiplication and dissemination of high yielding varieties of horticultural crops and production of seeds and planting materials.

Quality improvement and control
There are few institutional or legal barriers to the main markets for Ugandan products. Though MAAIF does need to continue reforming and streamlining the registration process for agricultural chemicals, essential controls on imports and exports of products are in place under MAAIF and do not need major modifications. There are no serious market constraints facing these horticultural crops, except the need for continuity and quality of product.

2.1.2 Challenges

Like most agricultural sub-sectors, horticulture is affected by several constraints that have limited optimal and efficient utilisation of resources including those within reach of the smallholder farmers. The main constraints are highlighted below:

Lack of improved varieties
There is no organisation involved in quality seed production or planting materials of fruits and vegetables and their distribution either in the private or public sector. The availability of quality seeds of desired varieties has always been uncertain. Some farmers retain seeds but do not preserve them properly. Limited awareness about appropriate nursery management has not been widely undertaken. Private nurseries for production and supply of quality planting materials are very few.

Land preparation
Land preparation is generally done using manual tools like the hoe and occasionally with oxen and as such not deep enough to allow good root development. In addition, land is rarely ready in good time due to inadequate tools for preparation.

Limited use of recommended technologies/inputs
Planting vegetable on raised beds is the recommended technology but is hardly practiced. Rotation of different crops on a piece of land is hardly practiced. This is causing severe incidence of soil borne diseases. Other diseases and pests are experienced due to poor crop management. Insecticide and pesticide use is limited, which is good since this limits the chance of residual effects. However, where they are used, the safety measures are not observed. Further, application of pesticides is conducted according to a fixed time schedule, ignoring the level of incidence and degree of damage. This results in marketing of fruits and vegetables, contaminated with chemical residues.

Inorganic and organic fertilizer use is not common. However, continuous mining of the soils has resulted in reduced inherent fertility hence low yields. It is important to note that input use in commercial activities such as floriculture enterprises is done according to existing recommendations. The cost of inputs is relatively high making it very difficult for resource-constrained farmers to afford them. Some of the chemicals used in floriculture are 10-30% higher in Uganda compared to Kenya and Zimbabwe prices.

Poor post-harvest management/Quality Control
Harvesting, sorting, packaging and transportation are not done in a proper manner. As a result, there is high incidence of post harvest losses, especially for the perishable commodities. This has made producers make do with low prices to their disadvantage. Quality control in horticultural production is not organised centrally. The lack of assurance of quality by producers has continuously led to them contending with very poor prices. In some cases, if a grower or exporter does not give the customer the agreed quality of product, they are simply not paid.

Extension service
The extension service delivery has been decentralized to the district. At the district level, the District Agricultural Officer is the head of extension services and is supported by one Deputy District Agricultural Officer and 5 – 8 Subject Matter Specialist (SMS). One of the SMS is responsible for horticultural crops. There is one Agricultural Officer in each county. There is one Agricultural Assistant per 1000 farm families who has to deal with all aspects of farming including livestock, plantation crops, food crops and horticulture. The situation is made worse by poor facilitation of the extension workers. In essence, the impact of extension services on production of horticultural crops is not visible.

Though many of the companies attempting to develop horticultural exports lack the appropriate experience, communication skills, and selling talent, current public sector investment in education and training in horticulture is negligible. Feasibility studies, business planning, and financial management are specific areas that will need intensive technical assistance for years to come. The USAID ADC/IDEA Project has focused intensively on horticultural training, but this is only a beginning. Customized training in target crops is an area where joint private, public, and donor activities can pay large dividends. Government could provide grants to organizations such as the Uganda National Vanilla Association (UNVA) to increase their extension services in return for a formal commitment to Government to implement specified elements of its strategy.

Limited access to information
There are no technical bulletins or handouts for reference by farmers on general aspects of production of horticultural crops. There exists insufficient market information for export. Currently, the collection of export statistics is incomplete and inadequate.

Poor Infrastructure
Most of the infrastructure needs to be improved to effectively support the horticultural sector growth and expansion, such as roads, competitively priced and reliable power, and an efficient airport.

Finance/credit
Finance and credit are perennial problems for agribusiness investors, due to the intrinsic risks involved. Procedures and processes to access the financial services have not been streamlined even for those who can afford.

Lack of Expertise/Technical skills
Although the daily cost of labour is highly competitive, labour efficiency is low at all levels. Most investors have no understanding of the benefits and techniques of a permanent training policy. At national level, training is also weak. Makerere University offers (since 2004) horticulture as a separate degree course, but has limited facilities and equipment to run it properly. In the related area of horticultural research and technology transfer, there is minimal public sector capacity at present.

Lack of private sector investment
Investment in new farms and processing facilities is essential. For example, only one of the vegetable exporters has cold chain facilities and there are only two professional pack houses (plus a few rudimentary ones that do not meet international standards). In addition, if export quantities increase significantly, major improvements will be needed in chemical application techniques, water quality, and pack house hygiene. Also, based on experiences in Kenya and Zimbabwe, specialized products require investment in integrated production and market systems by large-scale commercial growers with links to organized groups of out growers.

Although the GOU has been responsive to industry lobbying, has shown public support for the industry, and has promoted investment in the sector, there is still room to improve implementation of taxation and investment incentives. Furthermore, public sector investment in infrastructure would encourage private sector investment.

Limited research in horticultural sector
Despite its importance to the Ugandan economy, NARO focuses relatively little of its research on horticulture, largely because it is not considered an important food or cash crop for the majority of farmers. However, farmer associations such as the Uganda Flower Exporters Association (UFEA) have developed strong research capacity. Government support to these initiatives is required.

NARO has an important role to play in producing “elite” stocks of seed and plantlets for some target crops that have been developed in Uganda and cannot be sourced from overseas suppliers, e.g., unique varieties of hot pepper and passion fruit. However, multiplication of these materials should be carried out commercially by private sector nurseries, accredited and monitored by NARO/MAAIF. Evaluation of new varieties should be a joint effort between NARO and the private sector. Finally, NARO should continue its work on Integrated Pest Management and upgrade its expertise on organic techniques.

2.2 Prospects for horticultural growth in Vietnam*

2.2.1 Horticulture supply chains in general

The supply chain is the connected series of activities, which is concerned with planning, co-ordinating, and controlling material, parts, and finished goods from suppliers to the customers. It is concerned with two distinct flows through the organisation: materials and information. The scope of the supply chain begins with the source of commodity being supplied and ends at the point of consumption. It extends much further than simply a concern with the physical movement of material and is just as much concerned with supplier management, purchasing, materials management, manufacturing management, facilities planning, customer service and information flow as with transport and physical distribution (Steven, 1989). The supply chain encompasses all activities associated with the flow and transformation of goods from raw materials stage, through to the end user form, as well as the associated information flows (Handfield/Nichols, 1999).

In this study, the supply chain of horticulture products is defined as a set of production, distribution and marketing process of the horticulture products. It provides the perspective for horticulture growers to be able to participate in the commercial network or relations with processors and marketing agents. Horticulture supply chains comprise of many actors including input suppliers, growers, pickers, packers, processors, storage and transport facilitators, marketers, exporters, importers, distributors, wholesalers, and retailers. Each actor will add more value for the products when doing his task. Supply chain development can thus benefit a broad spectrum of society, rural and urban in developing countries. Therefore, to quantify the impact of horticulture supply chains all actors within the chain should be taken into account.

2.2.2 Horticulture supply chains in Vietnam

The success of the horticultural sector is largely based on the efficiency and flexibility of the marketing system. Though also grown widely for subsistence purpose, most horticultural products contribute to the generation of income at household and country level. A bulk share of the potential demand of horticultural products is in urban areas and in foreign markets. This underscores the importance of efficient marketing strategies for various commodities. The current distribution chain of horticultural commodities in Vietnam varies depending on the commodity and its level of commercialisation. The variation is further determined by whether the commodity is for rural, regional or for overseas consumption. The following paragraphs further define the supply chain of the three commodity groups identified for the sector analysis study.

Fruit supply chains
Most of the fruits produced in Vietnam are consumed locally and are produced by smallholder farmers. An extensive survey by IFPRI among 954 commercial fruit farmers in 2000†, in 19 provinces all over Vietnam, found that the average area of a

* This section is an excerpt from a complete sector study authored by Maarten Siebe van Wijk, Amanda Allbritton, and Dang Viet Quang. The report is forthcoming on the project website.
† The collected data cover the period November 1999 to October 2000

fruit farmer ranged between 0.7 hectares for a banana farmer to 5.3 hectares for a mandarin farmer. But in more recent years also larger scale professional fruit production companies are emerging. One example is the Hong Hau dragon fruit company in Binh Thuan province, currently with 100 hectares and expanding to 300 hectares and a staff of 300 persons
(See: http://www.hoanghau.com.vn/en_gioi_thieu.htm).

After harvest the large majority of fruits are either transported to rural or urban market centres by farmers themselves or bought by collectors and wholesalers at the farm gate. This last marketing channel is by far the most important. In the IFPRI study 50% of produce was sold to wholesalers and 30 percent to collectors (IFPRI, 2002). Only pineapple growers sold almost all their output to state-owned processors, while also litchi and longan producers in the North also sold to private processors. Little is sold directly to retailers or consumers, except by farmers in Hanoi and Nghe An province. Farmers also hardly sold directly to exporters, except for litchi farmers in Hai Duong province. Farmers only kept 2% of the fresh produce for further processing or home use (*ibid.).*

Domestic supply chains within Vietnam cover large distances as a result of the different agro-ecological zones. Dragon fruits, rambuttan, mangosteen and all other tropical fruits are transported by truck almost 1800 kilometres from the South to the main wholesale market Hanoi. More temperate fruits are shipped in the opposite direction to the main wholesale markets in HCMC. The trucks take about 40 hours to travel this distance and in the large majority have no cold storage.

Vegetable supply chains
Also most of the vegetables produced in Vietnam are consumed locally and are produced by smallholder farmers. The same IFPRI survey among which also included 551 vegetables farmers in 2000[‡], in 11 provinces all over Vietnam, found that the average area of a vegetable farm ranged from only an average of 0.3 hectares for a specialised cabbage farmer to 0.63 hectares for a specialised cucumber farmer. The small size of the vegetable farms is also confirmed by the AVRDC study, with an average farm size of 0.25 hectares for a vegetable farmer in the North and 0.5 ha for a vegetable farmer in the south.

The marketing of vegetables is more or less the same as for fruits. Also for vegetables wholesalers and collectors are the most important marketing channel. In the study of AVRDC in the South, 81% of the total output sold was bought by collectors, of which 8% was bought while the crop was still growing on the field. About 16% was sold to wholesalers at the wholesale market by farmers themselves. Hardly any vegetables were sold to retailers or consumers (AVDRC, 2002). According to the same study in the North, farmers in the 1998/1999 season sold the vegetables on the markets themselves. About 83 percent of the total harvest was sold in this way. Unfortunately the study did not specify to whom these vegetables were sold (wholesalers, retailers or consumers). Only 2 percent of the vegetables were sold to collectors. But this situation seems to have changed in recent years as detailed one year farm monitoring data among 64 peri-urban vegetable farmers in Hanoi Province reveals. From September 2002 to the end of August 2003 at least 46 percent of the most important vegetables were sold directly to collectors. For some vegetables figure was even 64 percent (Wiersinga, 2004).

[‡] The collected data cover the period November 1999 to October 2000

Farmers hardly sold directly to exporters, except for cucumber farmers in Hung Yen province (IFPRI, 2002). Although they were not covered by either the IFPRI or AVRDC study, there are also farmers who supply chillies, baby corn and shallots directly to exporters.

Also for the vegetables domestic supply chains within Vietnam cover large distances as a result of the different agro-ecological zones. In the South, the areas close to HCMC are the main year round suppliers of leafy vegetables, while the temperate Dalat district (300 kilometres to the Northeast of HCMC) supplies fruit vegetables (tomato, bell pepper etc) and lettuce year round.

In the North the study of An *et al* (2003) gives good insight from which locations the most important vegetables come during various periods of the year. Based on their survey the authors conclude that:

- During the whole year non bulky, highly perishable leafy vegetables are supplied by areas less than 30 kilometres from Hanoi
- During the winter season, bulky and mildly perishable temperate vegetables (fruit vegetables and crucifers) are produced close to Hanoi, but in the hot season more temperate sites far from Hanoi become the main suppliers. These areas are Dalat in the South of Vietnam and Son La province in the Northern Uplands and in China.

Flower supply chains

The main destination of flowers grown in Vietnam is the domestic market; only in Dalat district (Lam Dong Province) there are some flower companies who produce flowers for the export market. The largest flower company is the Dalat based HASFARM[§], which currently employs 800 people and had a turnover in 2003 of US$ 7.1 million. Hardly any flowers are exported. Most of the flowers are produced by small farmers.

2.2.3 Marketing channel actors

Market channels vary widely depending on the commodity, the location of the final consumer relative to the production area and the degree of processing. It is important to distinguish between market channels to serve rural consumers, urban consumers, and the export market. The diversity in the channels is reflected in the number of participants involved in the marketing of various commodities. The participants in the marketing process include input-suppliers, producers, intermediaries/ wholesale traders, processors, transporters, retailers and consumers (Fig. 3.3).

[§] For more information: http://www.dalathasfarm-vn.com/

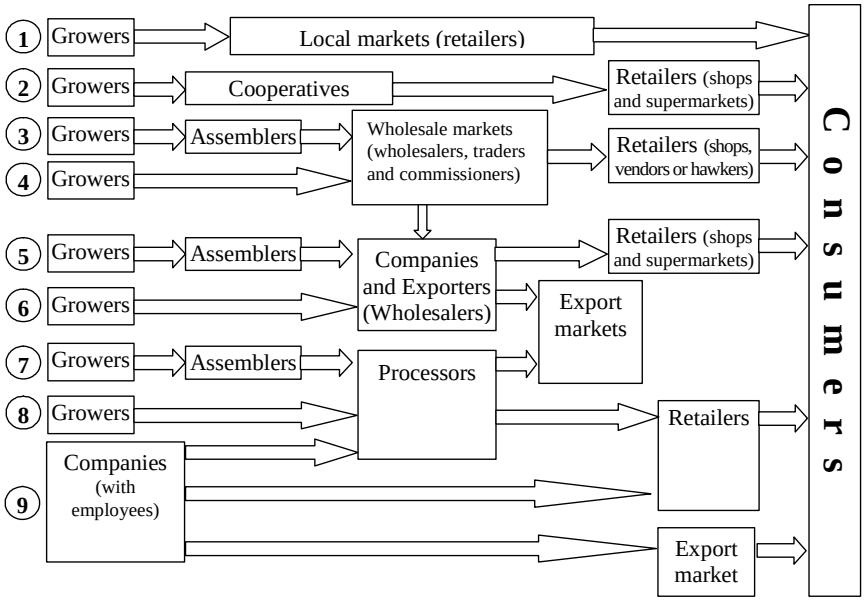


Figure 1. Overview of different horticulture marketing channels in Vietnam

Input-suppliers

Producers require various production inputs such as seeds, seedlings, fertilizers and pesticides. Local stockists and traders are the major actors and the supplies of these inputs. Only in the North service cooperatives play a role in supplying seeds, pesticides and equipment. For vegetable seeds farmers still rely mostly on their own or neighbour seeds.

Horticultural Producers

Horticulture producers are mostly smallholders, responsible to ensure that the horticulture commodity is available for the initial transaction to take place. When Vietnamese farmers returned to their family-based farming systems in the early 1990s after long years of working in a centrally planned economy, their farming practices changed dramatically. Farmers in peri-urban zones switched from rice production to horticulture. The large majority of the 1505 commercial fruit and vegetable farmers interviewed by IFPRI started their horticulture specialisation only in the early nineties. After having experienced the top-down government led cooperatives, farmers are not so eager to work in cooperatives any more. But despite this problematic past new more bottom-up approach farmer groups and cooperatives are starting again (Wijk *et al.*, 2005).

Collectors

The collectors or rural traders are involved in rural purchases and transportation arrangements and sales at the farmer field. They go round the farms buying horticultural produce; in some cases they are involved in actual harvesting to meet the targeted volumes for the day (See Wiersinga, 2004). The collectors negotiate the price they want to buy the produce from farmers. Wiersinga distinguishes two types of collectors, the seasonal collector and professional collector. The seasonal collectors are farmers themselves and collect vegetables from other farmers. The professional collectors are fulltime collectors all year around. In many cases collectors they work on commission for a wholesaler. The collectors sometimes double up as wholesalers once the commodity has reached the market place.

Processors

Processing of horticultural products plays an important role in attempting to add-value to the product in the supply chain. Fruit and vegetables juices, jams, frozen and packed vegetables, cut and pre-packed salads are some examples. Processing is still a minor activity in the horticultural sector in Vietnam, but because of its centrally planned past, probably larger than in other developing countries. One of the largest state owned processors with freezing and canning capacity is the Vietnam Fruit and Vegetable Export Company (VEGETEXCO)[**]. VEGETEXCO has 12 canning plants (capacity 70,000 tons/year) and 5 freezing plants (capacity of 20,000 tons) which according to IFRI (2002) were underutilised. IN addition there were 22 provincially-managed state enterprises involved in fruit and vegetable processing, about half which are located in HCMC and Dong Nai. Finally, there are about 18 processing plants built by private companies, including 100 percent owned foreign enterprises. Most of the survey private processors operated only on a seasonal basis, with most processors only producing two types of products using only one major type of fruit and vegetable (IFPRI, 2002).

Transporters
They facilitate the movement of the commodity from the production point to the consumption end. In Vietnam transportation of produce from site of production to wholesale or retail markets is mainly done by motor bike. Relatively cheap motor bikes can be bought (from US$ 500) with which large distances can be covered and are strong enough to use on dirt roads in mountainous areas. With motorbikes farmers and collectors can transport 200 to 250 kg (Son, 2003). Of the 83 domestic large traders in the IFPRI survey, 73 percent used large trucks, 23 percent minivans and 11 percent boats and ships to move their produce. In 2000, less than 17 percent of the fresh fruits and vegetable traders used refrigerated trucks. Overall, 83 percent of the firms in the sample rent transport services, which according to the interviewed trades provided good quality services.

Traditional wholesalers
These are the individuals found at the market place dealing with bulk quantities of produce. The wholesalers sell the produce to the retailers who then sell to consumers. The wholesalers buy the produce mostly from collectors and are crucial in determining the price at other levels. Their main buyers are retailers, institutions and processors.

Modern wholesalers
Since 2002 the traditional wholesale sector for fresh produce in Hanoi and HCMC[††] has been confronted by a modern type of wholesaling through the opening of the METRO Cash & Carry stores[‡‡]. These cash and carry stores are acting as modern alternative for the wholesale market, as it sells to retailers, shops, hotels and restaurants. METRO tries to source directly from suppliers and their 1 ha large clean and air conditioned stores are a sharp contrast with the traditional wholesale markets. But still the large majority of fruits and vegetables are sold through the traditional wholesale markets (van Wijk *et al.*, 2005). By 2006 METRO will have opened 8 stores in Vietnam with a total invested capital of US$ 150 million.

Retailers

[**] See: http://www.vegetexcohcm.com/ and http://www.vietnamcanfood.com/

[††] Since 2004 METRO also opened a cash & carry in Can Tho city and from August 2005 will also open a sore in in Haiphong

[‡‡] See for more info: http://www.metro.com.vn/metroen/

The overall fruit and vegetable retail system in the urban areas of Vietnam consists out of a mix of the traditional marketing system and modern system. The modern system is represented by hypermarkets, supermarkets, convenience stores The large majority of fresh vegetable sales are still sold through the traditional channels.

Traditional retailers
The traditional retail system for fresh vegetables consists out of two types of markets, official markets and unofficial (street) markets. On both types of markets there are both fixed and mobile (hawkers) vegetable retailers. In addition to selling vegetables on fixed markets, the hawkers also sell vegetables directly at the doorstep of consumers (Cadilhon and Tam, 2004). Official markets have been set-up, or formally approved, by either the provincial or district level government. Unofficial markets are not approved by the local government and at best are only tolerated. As described by Cadilhon and Tam (2004), on these unofficial markets sellers will come together everyday on a particular street in a certain neighbourhood to sell vegetables to consumers who live nearby. The past two years both in Hanoi and HCMC the city authorities are becoming stricter and closing unofficial street markets in order to diminish traffic jams and possible unhygienic conditions (Nguoi Lao Dong, 2004; Cadilhon and Tam, 2004).

The retailers stock very small quantities of the commodity, mainly due to high cost and limited demand among the users. The units of measure at the retail point vary depending on the clients and the quantities the retailers are able to afford. The main buyers from retailers include individual households, hoteliers and institutions dealing in relatively small quantities.

Modern retailers
Since the first supermarket opened in 1993, the development of the supermarket sector really took of after the entry of three foreign owned chains, Seiyu from Japan, Big C of the French Espace Bourbon Group and Metro from Germany. In 2005 two more foreign owned chains will open supermarkets in Vietnam, Parkson from Malaysia and Dairy Farm from Hong Kong (Ngoc Son, 2004). These foreign chains bring in large amounts of capital, for example METRO has built 4 huge cash & carry stores, invested US$ 120 million and employs 1200 people in Vietnam. By 2007 it plans to have eight stores across Vietnam (Rowse, 2003). The French Bourbon group has opened already four hypermarkets in Vietnam, employs 1500 persons and plans to open 8 more by 2008.

The attractiveness of the Vietnamese market for foreign chains is reflected by ATKearny's 2004 global retail development index, which ranked Vietnam as the 7th most attractive emerging market country for investment in the retail sector (ATKearny, 2004). The main reasons for its high position are its fast growing economy, high urbanisation growth rate and current low saturation level of modern retail. Only an estimated 10 percent of the total annual US$ 20 billion retail sales are currently made through modern retail outlets (Ngoc Son, 2004), while its total retail sales increased by almost 40 percent between 1999 to 2003 (ATKearny, 2004).

According to research by Loc (2002) in the autumn of 2002, only 22 shops and 13 supermarkets in Hanoi sold fresh vegetables, while in HCMC there were only 2 shops and 19 supermarkets selling fresh vegetables. The average amount sold per day in supermarkets in HCMC was much larger than in Hanoi. On average 1 ton per day was sold in a supermarket in HCMC, while in Hanoi this was only 180 kg per day. Based upon the data in the report of Loc (2002), one can calculate that share of vegetables sold through the modern retail sector in Hanoi city was around 2%, while for HCMC this value was just above 1%. Cadilhon (2003) mentioned that less than

7% of all fresh foods in HCMC are sold through the modern sector. As vegetables are just one the fresh products, these two figures are more or less in the same range.

Food caterers
One of the important and fast growing actors in supply chains are the food caterers. These are a wide range of restaurants, hotels, the canteens of factories, hospitals, schools and other institutions. A very important trend in Vietnam is that its population is eating more and more outside their house. Based upon data of the Vietnam Living Standard Survey (VLSS) Figuié en Bricas (2003) point out that in 1997-1998 already 20% of the urban food expenditure was made outside the home. For rural areas this was only 5%. This is in stark contrast with the situation before the policy reforms in the late eighties. During that time Vietnamese experienced food rationing during which street food and restaurants were inexistent (Figuié and Bricas, 2003). Although no data are available Figuié and Bricas (2003) claim that when the first VLSS was implemented in 1992-1993 consumption outside the households was very low. For 1998 Figuié and Bricas (2003) estimated the total food market in Vietnam to be US$ 5.7 billion, of which US$ 0.72 billion was consumed outside the house.

Consumers
Different types of consumers are served through different market channels. The consumers in the domestic market and the regional market are served by various channels depending on the type of commodity, the location (urban versus rural) and wealth status (from the poor to guests of five start hotels and resorts) of the consumers.

2.3 Three cases of business development in Thailand[§§]

2.3.1 Driving forces for horticultural development

Several driving forces, domestic as well as international, have triggered the horticultural developments in Thailand during the past 15 years.

Consumer demand
The increase in consumer demand in Thailand is heated by the following developments:

- Population growth:
- Rising incomes, women entering the workforce and changing food habits
- Diet promotion

Scarcity of land resources
Despite the country's vast natural resources, the per capita availability of arable land is decreasing with the increase in population. There is an increased pressure on domestic food production and supply to meet the needs of growing population. High yields per unit area can be achieved in the small farm sector through the production of crops like vegetables, which have far greater productivity than other crops. The yield per unit area can be increased many times by application of modern technologies and better crop husbandry techniques (e.g. irrigation, use of high quality seed and the application of appropriate agronomic techniques). The annual increase in vegetable production (about 2.1 percent) is, however, not enough to keep up with

[§§] This section was authored by Sigrid Wertheim-Heck and Marcel Stallen.

a population growth of 1 percent. Due to this increase in domestic demand and the competition for land resources, farmers are being obliged to improve yields through the use of more efficient technology, such as better agronomic techniques, improved seeds and other planting materials.

Export
Shifting international demands like year round availability of a broad assortment of products have lead to global trade relations. Within those global trade relations several driving forces affect the way horticultural chains operate within developing countries. These driving forces are:

- Consumer demand
- Technological changes,
- Agro-Food System Structural Changes:
- Food safety issues

Foreign Direct Investment
In addition to the above-mentioned factors, Asia has benefited from a strong influx of foreign direct investment (FDI). For example, Asia's supermarket sector has thus become increasingly multi-nationalized (foreign-owned). There is a strong move towards consolidation in the sector, mirroring what is occurring in the more developed regions. This consolidation is taking place through both the acquisition of local chains and by out-competing local supermarket chains and simply taking their place. Large amounts of FDI finance this process. For example, in the first eight months of 2002, five global retailers (British Tesco, French Carrefour and Casino, Dutch AHOLD and Makro and the Belgian Food Lion spent U.S. $120 million).

Government policies
Government program 'Vegetables, Pesticide Safe Production'
Since 1995 the Ministry of Agriculture and the Ministry of Public Health have been running a program called 'Vegetables, Pesticide Safe Production', which included a 'Hygienic Fresh Fruits and Vegetables Pilot Project for Export'. The aim of this program is to protect the consumers within the country and to promote exports. A surveillance program for pesticide residue analysis was set up by the Department of Medical Sciences (DMSc.) and the Food and drug Administration (FDA) as early as 1994. At the same time private industries, especially international retailers and processing industries have made substantial efforts to assure quality and safety through the implementation of HACCP and private grades and standards like EUREP GAP and SQF.

Royal program
His Royal Highness of Thailand King Bhumipol has launched a programme to encourage vegetable growers to produce vegetables without the use of any chemical input. There are several projects which are now being initiated by the Ministry of Agriculture and some private organizations to produce and market chemical-free vegetables. The DOA is also offering assistance to farmers by providing insect-proof net-houses to grow vegetables without spraying. However in spite of some promising results the practicability of spreading this concept countrywide is somewhat questionable as it could only be practiced on a very small scale. The use of IPM [***] and bio-pesticides has much wider scope. Another novel approach that the DOA is planning, involves the development of indigenous vegetables that already have built-in resistance to most pests and diseases. The use of the local gene pool material in future breeding programs of the private and public sectors is therefore worth

[***] IPM: Integrated Pest Management

exploring, opposed to imported varieties of commercial vegetables that seed companies supply.

Horticultural development plan
Only recently the importance of horticultural crops especially fruits and vegetables are being noticed by the Thai government. The development of the industry was included in the National Social and Economic Development Plan since 1981. The ultimate challenge is to ensure safe, secure and nutritious food in the next millennium. In short the Horticultural development plan covers the following issues:

- Empowerment of farmers and farmer organizations
- Promote and support the concept of self-sufficient agriculture
- Promote economy crop to compete in the world market
- Product efficiency
- Cost reduction
- Improvement of product quality
- Improve tracking and tracing
- Application of crop management system
- Development of ICT
- Agricultural economic zoning
- Collaboration and cooperation with other agencies
- Promotion of contract farming system, thus farmers can secure markets and prices for their products

2.4 Three business cases Thailand revisited

Three business cases of horticultural development in Thailand were selected for further analysis to evaluate the socio-economic impact of these projects on small holders and pro poor development.

These projects are summarized below:
East-West Seed International evaluates the activities of an input (seed) supplier on the domestic Thai market.
TOPS evaluate the activities of an output oriented retail company in the domestic Thai market.
Thai Fresh evaluates the activities of an output oriented export company targeting the European and Japanese markets for exotic vegetables.

Although two of the three cases involve a chain of which the products don't cross borders physically, all selected case studies include public and private partners from Thailand as well as overseas partners.

The three cases can by characterised as follows:

1. East-West Seeds - Input supplier
2. TOPS - Collaborative supply chain
3. Thai Fresh - Vertically integrated supply chain

Focus / **Orientation**	**Domestic**	**Export**
Input	East-West Int.	
Output	TOPS Thailand	Thai Fresh

Supply chain development:

With regard to the input oriented case (East West Seeds, EWS) their activities didn't include a redesign of the traditional supply chain, but instead EWS blends in as much as possible with existing structures.
Of the two out-put oriented cases the first project represents the conduct of a retail company (TOPS Thailand) and the second the conduct of an export company (Thai Fresh) in supply chain development and re organizing the supply chain.

Economic climate.
East West started its activities in the Thai market as early as 1984.
TOPS Thailand operated as a retail company in a period of economic recession in Thailand, but economic boom in the western countries, 1995- 2002.
Thai Fresh is present in Thailand since the early 1980 and their export program on exotic vegetables started in a period of economic growth in Europe from 1999 onwards.

2.5 East-West Seed International – Input supplier

Currently three types of vegetable seeds are produced in Thailand:
- Open-pollinated seeds
- Pure line seeds
- F1-hybrid seeds

Coming from three different sources:
1. Farm farmers' saved seed: Most farmers save their own seeds or buy seeds from neighbouring farmers to reduce production costs. Most of those seeds are self-pollinated crops and include vegetables such as yard long bean, chilli pepper, eggplant, garlic and shallot.
2. Seed from government institutes: There are two government institutions that directly sell vegetable seed to farmers, however the quantity and variety of the seeds are rather limited:
    - Department of Agricultural extension (DOAE): The DOAE sells seeds that are developed by the DOA. Contract farmers under supervision of the DOEA produce open pollinated varieties, among them are yard long bean, chilli, Chinese cabbage, sugar pea, etc...
    - University and other educational institutes: especially the universities have research and breeding programs for various vegetable seeds. They produce good quality seeds, both open pollinated varieties and F1 hybrid seeds. Seeds that have been produced are leaf mustard, chilli, tomato, watermelon, sweet corn, baby corn, okra, etc.
3. Commercial seed companies or seed dealers; those seeds are either produced in Thailand, or imported from abroad. East West Seed International is such a commercial seed company. Today East West is one of the world's leading breeders and distributors of tropical vegetable seeds. East West started its operations in South-East Asia as early as 1982, by pioneering localized hybrids and introducing many grower-friendly quality seed standards.

Several developments founded the activities of East West Seed International in Southeast Asia:
- Size and growth of total population: The South-eastern Asiatic countries are a potential mass market there is an increased pressure on domestic food production and supply to meet the needs of growing population.
- Imbalanced diet based on cereals: The shortage of vegetables in the diet of the local population

- Scarcity of land resources: Despite the country's vast natural resources, the per capita availability of arable land is decreasing with the increase in population.
- Little competition: hybrid seed used mainly imported from abroad, which proved often not suitable for local circumstances
- Ambition and strategy of the founders of EWS

When East West started its operations in Thailand in 1984, the vegetable seed industry was little more than a seed trading system. Vegetable plant breeding was simply not done. Some seeds of Western vegetable types were imported from abroad, using varieties that were not adapted to the regional circumstances. Most seeds used by farmers were unselected by products of fresh vegetable farming. The commodity seeds concept long prevailed and the government seed programs mainly focused on seed germination rather than varietal quality. A development program of local hybrid vegetable varieties did not exist. Hybrid varieties have the following features and advantages above traditional varieties: higher yields; better disease tolerance; better taste; improved quality and an extended growing season.

The conviction of East-West Seed International (EWS) was (and still is) that by introducing intensive breeding programs to develop vegetable seed markets a successful business could be build, through improving the income of local farmers.

2.5.1 What has been done?

East West Seed (EWS) started its operations in Southeast Asia in the Philippines (1982) but soon expanded its activities to Thailand and Indonesia (1984). Their goal was value creation by plant breeders for real farmers and real consumers. East West saw its primary economic function in creating added value for the farmer – whether in terms of higher yields, better and more uniform quality products, more disease tolerance, or extended growing seasons.
Lert Phan Farm (established in 1984) was Thailand's first commercial vegetable plant breeding farm. The very concept of hybrid varieties was completely new to farmers. Traditionally, farmers maintained their own seed stocks from previous years. The concept of having to buy seed each year, particularly the relatively expensive hybrid seeds, was completely new to them.
At first farmers reverted to saving seed from hybrid crops. Experiencing the big drop in yields and uniformity, they were disappointed to the point of not wanting to buy the expensive seed again. In many cases it took several years to teach farmers the advantage of hybrid varieties.
In 1986 a modest office, processing plant and experimental farm was established in rural Bang Bua Thong (Northwest of Bangkok). As the first breeding successes began to roll in, enthusiastic farmers welcomed hybrid bitter gourd (bitter but vulnerable Asian home-garden vegetable, largely unknown in the West) in Thailand. Once they realized the gold mine hidden in a new high-yield variety, seed could not be produced fast enough. Many other crops soon followed the same path
(Source: Vegetable breeding for market development, East-West Seeds 1982-2002)

2.5.2 Positive results

In terms of improved plant characteristics, some rather clear achievements have been made by EWS with their hybrid vegetables seeds over the last two decades:
- Extended growing season: hybrid varieties mature up to 15 days earlier than local varieties

- Quality improvement: higher and more uniform level: improved consumption quality, extended shelf life and improved shipping quality
- Yield improvement: quality seed out yield traditional varieties by 50-100%
- Using good quality seed is a primary condition to increase crop yield. The better adapted the seed is to its growing environment, the higher is the improvement in yield and farmers' incomes, as well as being the catalyst for agricultural development. However, yield improvements are only for 50 percent the result of the usage of quality seed. The other 50 percent is the result of better production systems (usage of chemical fertilizers, technical improvements like drip irrigation, etc.)
- More advanced production systems: In the traditional situation seed was mostly farm saved. The seed was of low quality, but also very cheap and therefore farmers used the seed generously and didn't care much about intelligent crop production systems. Because farmers tend to be more cautious with the expensive high quality seed, they consequently invest more effort and money in the total production system, which at the end pays itself back in income multiplication
- Number of people benefiting from the activities of East West Seed along the value chain: The approximate number of people involved in the value chain triggered by quality seeds in 2002 for East-West Seed Thailand:
    - A research and development team of 50 delivers seed to
    - 5000 seed production farmers who produce seed used by
    - 500,000 vegetable farmers to feed
    - tens of millions of consumers

(Source: Vegetable breeding for market development, East-West Seeds 1982-2002)

- Income improvement of farmers: The experience of East-West Seed in Southeast Asia has been that farmers earn 5 to 50 extra dollars for every dollar they pay extra for quality seed. An income improvement, which is based on the combination of yield improvements and higher (premium) market prices. This dramatic economic benefit is achieved most regularly with hybrid varieties, but also certain well-selected and well-maintained Open Pollinated varieties (e.g. kangkong, yardlong bean) have achieved the same level of performance:
- Since, by definition, F1 hybrid seed cannot be multiplied, growers can no longer save their own seed, but must constantly source new seed from the owners of the inbred parent lines. However, growers actually benefit greatly from this apparent negative development for the simple reason that breeders are thus able to earn the revenue needed to continue variety development targeted at increasing farmer's revenues. This benefits vegetable farmers more than traditional methods of variety development.
- Retail trade (suppliers of technical equipment and systems, fertilizers, etc) and the transport sector indirectly cashes in one more advanced and holistic crop production systems.
- The improved yield directly benefits the diet of the local population

2.5.3 Critical success factors

- Rather than importing seeds, East-West started the breeding process by importing well-trained plant breeders from Wageningen Agricultural University to supplement the work of local breeders and technicians.
- Rather than aiming at short term profits, East-West Seed invested 3 to 5 years in breeding research and development. Only after several years of breeding under

local circumstances, breeding can yield the desired result: quality seeds adapted to local needs and production conditions.

- At the start of its activities, East-West focused on intensive vegetable production areas, where the products reached the central markets through the intervention of middle men. This focus was important to create an economic sound basis for the costly and time-consuming breeding research and development activities. Once this economic basis is safe and sound activities can be expanded to more remote areas, where farmers directly sell their products on local markets (without the intervention of middle men).
- '*Why should I pay so much for high quality seed?'* is an ever returning question. Demonstrations are one of the answers on this question and prove by experiment is the best publicity and sales argument! Consequently the products will sell themselves. East West has seed officers in all Thai regions to stay in contact with the local farmers: They learn on farmers' their needs and wishes and in return they teach and demonstrate the use of high quality seeds.
- Farmers are less reluctant to pay for high quality seeds, when they are already used to investing in input materials such as trellising.

Box

Kangkong (Ipomoea aquatica)

Kangkong (Ipomoea aquatica) is a common inexpensive fast growing, heat loving vegetable that is easy to grow. In Thailand kangkong is now an important market vegetable crop based largely on a sowing system rather than the old ratooning system of vegetative propagation.
When East-West started operations in Southeast Asia, kangkong seed was a cheap commodity. In Thailand kangkong was produced mainly near Bangkok for both local and export markets. Market prices of seed (sold in bulk) were less than $1/kg. No one in the seed industry believed growers would pay premium prices for improved genetic and physical seed quality.
In 1989 East West introduced the new variety "Lehrt Phan" (which means 'superior variety') and the results spoke for themselves:

	Before introduction (results with local varieties)	***After introduction of ' Lehrt Phan'***
Farm gate price (Thai Bath per kg)	*4*	*5*
Yield (kgs per hectare)	*13,000*	*17,500*
Seed costs (bath per hectare)	*5,600*	*7,500*

This income improvement can be measured with the so-called 'quality seed multiplier': extra dollars revenue farmers earn for each dollar of seed costs.

Quality seed multiplier for Kangkong 'Lehrt Phan' variety:
((5 x 17,500) – (4 x 13,000)) : (7,500 – 5,600) = 18

Kangkong was and still is one of the top 10 leading vegetables in terms of planting area in Thailand. The total area under Kangkong in 2001 was 14,543.2 hectares (2.95% of total planting area). It is grown throughout the country and has no specific season for growing. (Source: Market survey vegetable)

The possible impact on the income improvement of small holders is evident: A broad range of farmers throughout the country could benefit the seed multiplier of 18 USD for each USD invested, when using the Lehrt Phan variety.

Examples of potential impact on income improvement of small holders[†††]:

Crop	***Planting area (hectares)***	***%***	***Production (tons)***	***Quality Seed Multiplier***
Kangkong	*22,708.8*	*4.61*	*147,337*	*18*
Yardlongbean	*19,657.44*	*3.99*	*170,825*	*42*
Cucumber (small)	*18,070*	*3.67*	*198,663*	*19-41**
Wax gourd	*4,812.32*	*0.98*	*63,561*	*32*

** According to production method used:*
- *Ground production method: 19*
- *Trellis production method: 37*
- *Trellis and fertigation production method: 41*

[†††] Since figures about the number of farmers involved in the production of a certain crop aren't available, planting areas are the best indication.

Difficulties on the way

- Some of the growers, who planted the early test hybrid bitter gourd seeds, thought they could gain financially by planting a second generation of the hybrid, either for fresh production or for supplying higher quality seeds to others. They were simply following the practices of generations. They didn't fully understand what a hybrid is. This taught East-West the importance of education in a developing market to explain the nature of hybrid seeds to growers. It also highlighted the importance of testing in farmers' fields and the difficulties in getting good information from growers.
- At the start it was difficult to understand local farmers' habits and needs. From public organizations only limited reliable information was (and is) available. The need was felt to study the market and to obtain the necessary knowledge of local production conditions, to formulate sound breeding objectives. East-West's network of field officers throughout the country has proven its value for this purpose.
- Little to no reliable information is available from public organizations concerning agricultural production, in particular domestic production. It's not clear how many farmers are involved in the production of a certain crop. Example: Kangkong is a very important crop for the domestic market in terms of planted area. However, no figures are available about the number of farmers involved in Kangkong production.

Drawbacks

- Produce: Market access for vegetable farmers in remote areas is particular difficult because the majority of the vegetables is highly perishable. The possibilities for improvement of markets access highly depends on the type of crop: the less perishable products have more opportunities in the remote areas, where as the more perishable products should be produced closer to its customers (peri-urban horticulture).
- Role of the middlemen: In general it is assumed that middle men are hampering agricultural development. They earn a lot of money while nothing in return is done to develop agricultural practices. However this image should be adjusted. In particular in remote areas producing for domestic consumption it is difficult to compete for transport costs with middle men. Whereas professional transporters have to return from the central markets with empty trucks, the middlemen informally pick up people and baskets with all kinds of products along the road. In the areas with intensive vegetable production it might be worth while to organize professional transport, especially when the produce is meant for export. But in the remote areas middlemen are indispensable to guarantee market access for small growers to the central markets. Besides, the monopoly position of middlemen should be fine-tuned by the fact that there's a hard competition going on between the numerous middlemen.
- Lack of control: In most Southeast Asian countries pesticide use regulations is satisfactory on paper mainly. The problem, however, is that there's hardly any control on those rules in the farmers' fields. As a consequence farmers tend to use pesticides that are not formally registered for a particular crop and are not allowed. For example: in areas where a lot of cotton is cultivated, pesticides allowed for cotton production only are also used for vegetable production.

Future steps

- Southeast Asia has a huge potential for small scale vegetable production for the domestic market. Next step will be to open up the more remote areas.
- Export production: East West has so far been focused on vegetable breeding for local consumption. Currently East West Seed is working on export quality products and market these products under a brand name. The aim is to produce pesticide free vegetables: 'green and clean' for demanding EU markets.
- Thai supermarket chains in Bangkok now also target for pesticide free vegetables, but the production of safe fruits and vegetables is still too low to meet the demand. This is another opportunity for the future.

2.6 TOPS - 'Best in Fresh'

2.6.1 From chain optimization towards integral chain care

TOPS is a one-stop-shop supermarket having a wide range of fresh products. Most of the TOPS supermarkets are located in the Central and Robinson department stores in the major Thai cities. Stores range in size from 1,500 – 5,000 square meters in floor area. There are also free-standing supermarkets that range in size from 800 – 4,000 square meters in floor area. TOPS is committed to providing high-quality products at great prices to the modern family.

The TOPS – project focused on a so called collaborative supply chain. Within a collaborative supply chain all the chain partners are in close contact. Information flows top-down and bottom-up through a transparent and organized supply structure in order to have high quality and safe fresh products at a modest price in the stores.

Driving forces

- International economic situation: growth opportunities AHOLD in Thailand. In the Western markets where AHOLD and other retailers were active the economic growth came almost to a hold, whereas Southeast Asia had double digit economic growth rates up to 12%. Singapore, Malaysia, Thailand and the Philippines were among the so called 'Asian Tigers'. In 1995 Asia seemed an attractive challenge for AHOLD's international ambitions.
- Agro-Food System structural changes and the spectacular rise of supermarkets. During the economic boom in Southeast Asia, international retailers mainly focused on the introduction of hypermarkets, with a strong non-food assortment. Royal AHOLD saw in this hypermarket landscape a market opportunity in the introduction of a supermarket format dedicated to food, with typical Asian style food courts.
- Consumer demand is more and more oriented at food safety issues:
    - Government campaign: The Thai government launched a campaign in promoting food safety awareness among the local citizens. This campaign heated domestic consumer demand for fresh and safe fruits and vegetables, although confined mainly to the well off and better educated consumers in the big cities. However, awareness of food safety issues is growing day by day in Thailand.
    - Negative international publicity: Food safety awareness is further fuelled by international food safety scandals. Thailand has had (and still has) problems with food safety, although not so much related with vegetables and fruits, but mostly with meat. However for the public it is all one and the same. As a consequence Thai consumers have become more and

more aware of food safety issues and consequently domestic demand is changing towards safe foods.
    - Tourism: Another driver behind the growing awareness of food safety issues is tourism. Tourism is an important economic sector and more and more hotels and airlines want to assure their clients that the food offered by them is fresh and safe according to international standards.
- Export potential of exotic fruits and vegetables meeting international quality and food safety standards has fuelled the Thai governmental interest in active participation in the development of a safe and modern Thai agricultural sector. Most of the export goes to the USA, Japan and Europe; all countries with strict quality and food safety import requirements. The Thai government realizes that in order to export to those markets Thai produce has to live up to the international product standards and several food safety certification programs are launched by the Thai Government.

Background

In 1996 Royal AHOLD established a joint venture with the Central Retail Corporation in Thailand and started to operate more than 30 TOPS supermarkets, most of which were located in Bangkok and Chiang Mai.
A value chain analysis of perishable products, especially fruits and vegetables, revealed that chain performance was far from optimal and not competitive. Among the limiting factors were the following:

- unstable supply (low service level)
- long lead times and no cooled transportation and storage upstream
- high handling costs, with too many (small) suppliers
- uncertainty of product quality
- insufficient product specifications
- lack of quality control in both the existing upstream and downstream channels
- limited insight into and influence on production methods
- no tracking and tracing ability

For perishable products, roughly 250 suppliers were delivering goods directly to the backdoors of TOPS' supermarkets at least three times a week. Products were often out of stock and shrinkage in the store was high. The lead time between the farm and the supermarket shelf was up to 60 hours, and due to the lack of pre-cooling and cooled transportation, post-harvest losses were high. Buyers were generally not aware of the origin of the produce. There were no means for tracking and tracing of produce. Farming practices were unknown to the retailer and quality and safety measures along the supply chain were not transparent (if they existed at all). Besides producers were ignorant of consumer demands and wishes, since market information didn't reach the farmers. There were no clear, uniform product specifications that could be communicated through the supply chain.

Furthermore, fruit and vegetables had serious problems with high residues of agrochemicals. These problems consisted of residues from outlawed chemicals like DDT and residue levels that far exceeded the MRL values as established by the WHO and FAO in the Codex Alimentarius.

When matching this situation with the actual demands of customers (quality, freshness and safety of produce, broad assortment and high availability at an acceptable price), the major challenge was to improve supply-chain performance from farm to fork.

2.6.2 What has been done?

Since none of the fresh goods suppliers performed value-added functions needed to meet consumer demand, it was decided to build a distribution centre in Samuthsakorn that would also perform functions like quality control, washing, packaging and processing. This value-added centre was a complete green-field operation located on the outskirts of Bangkok city. The so-called "World Fresh Production and Distribution Centre" was a 24-hour a day, 7-days a week operation where employees worked in three shifts.
Because supply was so fragmented and farm and post-harvest practices so opaque, a substantial number staff were involved in quality control at the point of entry and with residue analysis at the lab. However, this 'end-of-pipe' quality control resulted in a high percentage of refusals, which caused unstable service levels for World Fresh and losses to suppliers who then had to find alternative buyers for their substandard produce.

Between fall 1998 and spring 2002, the emphasis of the development strategy changed from chain optimisation (reducing post-harvest losses, reducing shrinkage, lowering handling costs) towards integral chain care (HACCP, good agricultural practices and certification). The goal became to provide Thai consumers with high quality, safe and fresh produce with high availability and at affordable prices. Food safety became leading, but the logistics played a crucial part, since economically it wasn't feasible to raise consumer prices.

Initially the tactic behaviour of TOPS was to check the produce at the distribution centre for residues and reject the produce that was exceeding the maximum residue levels. This was costly in terms of the number of employees involved in quality checking and in terms of waste of the rejected produce. A strategic long term solution was sought in the development of a preferred supplier network that could introduce and maintain good agricultural practices and proper phytosanitary handling procedures along the upstream levels of the supply chain. Preferred suppliers were carefully selected.

Selection criteria were:

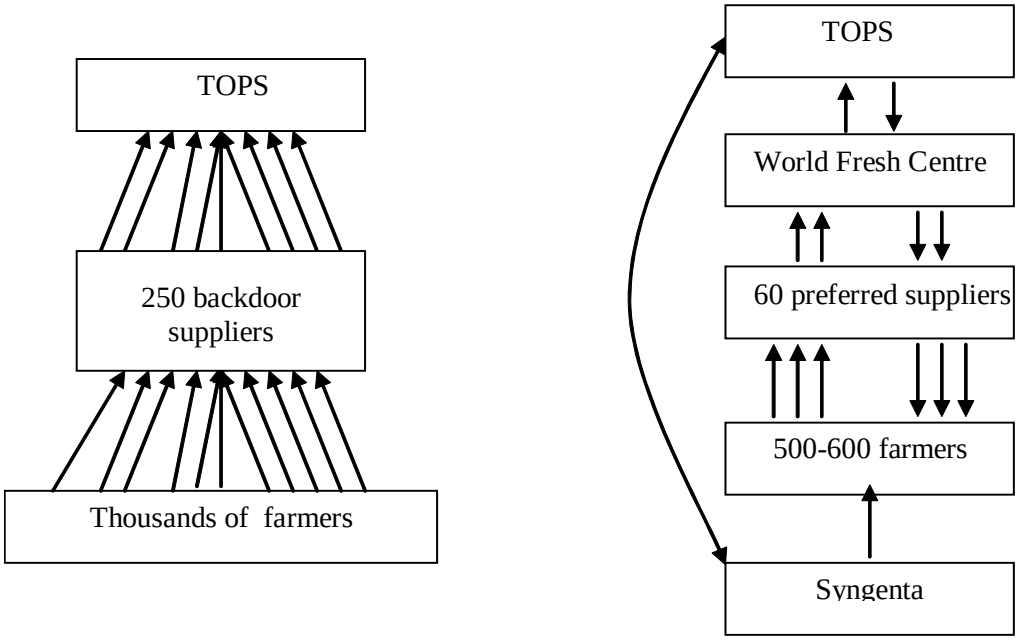
- Product specifications: food safe and high quality products
- Scale of supplier: delivery of ordered product volume according to quality and safety standards
- Certification: willingness to participate in the certification program: In order to guarantee their Thai consumer a consistent quality and safety of fresh products TOPS decided to link up its network of selected preferred suppliers to the certification program of the Thai Department of Agriculture called the "Hygienic Fresh Fruit and Vegetable Project" that had started as early as 1991.

Once a group of preferred suppliers was selected a link was made with the food safety certification program of the Thai Department of Agriculture (DoA). The DoA would conduct a soil analysis, test upon residue levels and provide the certificate once the grower or supplier was meeting the requirements. In case the supplier worked with sub-contractors he would be responsible of controlling his supply chain backwards. By the end of 2001, 40 out of the 60 preferred suppliers were certified, covering about 80% of the fresh products.

These preferred supplier relations between wholesalers and buyers from supermarket chains were a relatively new phenomenon: Generally most of the

contacts between buyers and suppliers were based upon personalized relationships in which family relationships and individual motives could prevail above the company (TOPS) benefit. In the TOPS Thailand case the chain leadership was with the retail organization. The retailer's private specifications (positioning Best in Fresh) regarding food safety and quality were guiding the required performance of the whole supply chain. The product requirements were delegated to the TOPS distribution centre. The distribution centre informed the suppliers about the specific demands of the retailer regarding food safety and product quality but also about when, what in which quantities had to be delivered. Thereupon, the suppliers demanded the specific product qualifications from their farmers.

However, a quick scan of the existing farmer extension services learned that farmers could not rely upon the public extension network as the main source of information on the proper use of agrochemicals. Therefore TOPS established a strategic alliance with the international input supplier Syngenta which could provide the farmers with quality seeds, crop protection products, training in the field of integrated crop management and harvest planning.



CHAIN BEFORE REDESIGN *CHAIN AFTER REDESIGN*

Figure 2. Redesigning the TOPS supply chain

Positive results

- Service level: The results of the project were clear: in 2001 the service level of the 60 preferred suppliers was 98% (on time delivery of good quality and safety products in the volumes ordered by TOPS). A few years earlier this service rate was only 30% through 250 suppliers delivering at the backdoor of the TOPS' supermarkets.
- Consumers: Availability of high quality and guaranteed safe fruits and vegetables for the same price level as before.
- Employment: TOPS created employment in its post harvest activities like washing and packaging of the produce. Besides, a substantial number of staff was involved in quality control at the point of entry and residue analysis at the lab.
- Income: The 500-600 local farmers participating in the TOPS supply chain have benefited an improved quality of life: better quality products against better market prices and secure income.
- Training & information: Farmers have been educated in a more holistic approach of producing vegetables and fruits. Not only knowledge about crop protection and the use of inputs, but also knowledge on what the market requirements are is very important for the farmer.
- Cost reduction: the combination of high quality seed input and intelligent pesticide management, mostly didn't involve higher costs for the farmers, but often lowered the costs. Traditionally farmers tend to use pesticides reactive instead of preventive. Without in dept knowledge of crop protection systems farmers spray often more than needed. But when growers are able to plan well and foresee what is coming, they can often save one or more treatments.
- Market extension: The first group of preferred suppliers was called the pioneer suppliers. Many of them have extended their market: not only selling to TOPS but selling to other retailers as well. Some of them have built up their own facilities meanwhile. One of the suppliers has created temperature control storage and even equipped own laboratory for quality control. This supplier only supplies locally, but has extended its market size tremendously: serving not only TOPS, but a lot more customers throughout Thailand.
- Certification: end-product certification

2.6.3 Critical success factors

- *"The best lesson learned is how we co-operated with the suppliers to develop product quality, safety, logistic distribution and packaging. The retailer supplier relationship wasn't always two-way traffic. This project was very challenging in working together to really help and understand each other and to bring mutual benefit. The suppliers welcome this initiative. Before they have never been involved in this kind of co-planting. Because normally retailer supplier relationship is sort-of one-way communication from the retailer to the supplier and mainly focused on price. We have tried to achieve to also educate the suppliers and their farmers about the product quality type of products that their customers really want (based on our experience being close to our customers) and how to offer consumers the highest quality and safety." (Source, Boselie et al , Best in Fresh…..)*
- International partner: bringing knowledge from the West, retailers play an important in up-coming markets.

- Integral chain management: Cooperation between retail (output interests) and Syngenta (input interests).
  "The realization that if you create better quality conditions its important to have optimal chain conditions to preserve the quality, was vital in this project. It was not only upgrading the quality in the field, but also making sure that the quality preserved throughout the chain." (Source: Boselie et al , Best in Fresh…)
  Awareness raising and training (including HACCP): "the garbage-in-garbage-out" principle in food chains means that food safety assurance should take place from farm-to-fork. Creating the awareness that what consumers find in the supermarket is indispensably linked with other links in the chain is a first step towards improvements.
- Cooperation with the government: Public private effort: food safety touches upon the responsibility and mandates of both public and private agents. Cooperation is indispensable in this field.
- Awareness: Awareness raising that agricultural development is indispensable for income improvement, growth and export increase.
- Export: An effective incentive for the realization of international acknowledged certification is export. Scandals with food quality at export markets, even when not related to horticultural products, will stimulate government activities to develop a sound certification system. When certification is limited to the domestic market government agencies tend to say that residues are not really a problem since nobody will suffer from small MRL violations. But at the export markets it's a different piece of cake and a matter of earning money yes or no.

Difficulties on the way

- Mentality of the suppliers: At the start of the project the communication was quite difficult. A lot of issues were completely new to them. For example integral chain management was something complete new to all local chain members involved. As a consequence suppliers had to be educated: The idea that when a retailer orders 100 products, the supplier has to deliver 100 products at the agreed time and according to the agreed product requirements was also rather new.
- Mentality of the farmers: Thailand has never been colonized. The agricultural sector is very fragmented and the majority of the farmers cultivate less than 1 hectare, and lack proper education. Besides the individual farmers stick to their autonomy and are not very willing to co-operate. This makes it all very difficult to organize and develop the Thai agricultural system. Although farmers are willing to develop themselves, they are very difficult to reach. It's hard to untie the relations between the small holders and their agents.
- Short term perspective: Most of the suppliers and farmers have a short term view. Especially small holders, which are mainly subsistence growers, are preoccupied with the earnings of that day. However, for real and long term agricultural development it is essential to look further ahead and thinking about the needs of the next chain member: knowing what their target is, is very important for farmers.

Drawbacks

- Certification: Despite all progress, the TOPS-DoA certification program leaves space for improvement. The supermarkets are still facing recurrent incidents with MRL exceedings and residues of banned chemicals: The DoA capacity for follow-up inspections on the farm is in-sufficient. The DoA has only limited staff members in the laboratory and a limited number of staff for check ups in the

fields. Besides the limitation in staff, the inspection is geographically hampered due to the small-scale character of farms and the fact that they are widely dispersed. Besides, the DoA being both the initiator of the certification program and auditor does not meet the condition of independent third party certification.

- Schizophrenia between export and domestic products: Thai government is more flexible with food safety standards for the domestic than for the export market: *'why spending money for products that will be sold anyway?'*
- Climate: It is hard to live up to the international (constantly sharpening) food safety requirements due to the Thai climatological conditions.
- Resistance to pesticide reduction: Relatively simple interventions like introducing improved spraying nozzles that optimize and reduce the use of chemicals, are not enthusiastically supported by pesticide sellers.
- Impact: The TOPS project only covered the supply to 40 supermarkets and because of its small scale it has a limited impact only.
- Exclusion of farmers: Product requirements force the introduction of integral crop management systems, which are far more demanding (in farm- or firm-level investments in new technologies, new management and marketing practices, and organization and coordination) than the local traditional production systems. This brings both big opportunities as well as big challenges to suppliers in emerging economies. Selecting "main or preferred supplier" automatically means disqualifying others. In practice this often results in a situation where smallholders become unable to supply to high-end supermarkets. Participation in the supply chain is being hampered by the scale of the ventures, the mentality of the growers and the necessary investments.
- Unclear results on poverty reduction: Improvements in living conditions are visible: farmers and suppliers are better dressed, better housing etc, but it is largely unknown how many people exactly have actually benefited from the developments.

Spin-off

- Educational function: The World Fresh Distribution Centre has had an educational function towards local suppliers and growers: Middle men used to transport the produce from over 15 farmers to the World Fresh Distribution Centre, but if the produce delivered by only one farmer doesn't meet the required product standards (e.g. exceeding MRLs), than all produce offered by the middle men will be rejected.
- Professionalization: the use of product carriers, standardized crates, barrels and roll containers, but also the standardization of product information.
- Expansion to other suppliers: The approach followed by TOPS to start with a core group and then try to extend the model to other suppliers, demonstrating the example of the success case.
- Other supermarkets and exporters have used the TOPS model as a starting point for development of their own integrated quality supply chains.

2.7 Golden Exotics - Vertical integrated supply chain by "coincidence"

Golden Exotics Holland BV is a Dutch company that markets exotic vegetables and fruits from Thailand on the European market under the brand name 'Thai Fresh'. Golden Exotics started its import activities about 15 to 20 years ago. The total range of products is approximately 100 (varying from herbs and spices to fruits and vegetables), with fresh leafy vegetables as main products.
Recently Golden Exotics started devoting itself to the improvement of the cultivation of exotic vegetables in Thailand and developing an integrated quality chain for vegetables 'from farm to fork'.

Driving forces

Export demand and international product requirements are of major importance for the activities and developments of Golden Exotics in Thailand.

- Consumer demand in Europe The demand for exotic vegetables and fruits in Europe has increased enormously over the last few years, especially the demand for high quality products. The demand for exotic products appears to be growing and is not affected by the economic recession in the European economy.
- Food safety: During the last decade food safety issues have become top of mind in Western economic countries and concerns about food safety have considerably grown. Consumer food safety confidence in Europe and Japan has reached all-time low. Transparency in the food chain has become a prerequisite for exporting to western countries. This transparency includes the verification of the composition of the product, its origin, trace ability and safety.
- Export to Japan: Besides the focus on export to Europe, Golden Exotics has also made contact with Japanese vegetable importers. The Japanese standards for the import of food are even higher than the EU standards. To be allowed to enter the Japanese market, export products need to meet the standards of SQF 2000 certification.
- Economic situation: The Thai economy has a current growth rate of 7%. This is extremely attractive for agricultural development in Thailand by exporting companies investing hard western currency. During the last couple of years the Euro has almost doubled its value on the Thai market. In other words, there is more money available to finance future developments.

Background

The dominant export structure in Thailand at the start of the activities of Golden Exotics in Thailand (about 15 years ago) was that exporters bought their products directly from the middle men at the central market in Bangkok. Barely anybody was concerned with food safety issues. Products were selected on external quality criteria only. The most important issue concerned was product loss, on average somewhere between 30 to 50%.[‡‡‡]

[‡‡‡] An attractive export margin could be obtained (including air freight costs), due to premium export market prices in comparison to the product costs at the local market in Bankok. This is still the case with export products.

However things have changed. During recent years food safety issues have become top of mind in Western economic countries. International market access (to Western Europe) for tropical fruits and vegetables is currently dictated by:

- Sanitary and phytosanitary (SPS) requirements as stated in the European Food Safety Law (especially concerning MRLs)
- Private initiatives by European retailers concerning requirements food safety and quality standards for fresh produce (Eurep GAP, SQF, BRC and others)
- Codex Alimentarius: product standards.

2.7.1 What has been done?

The point of reference for the quality and safety assurance program of Thai Fresh United was not, like in the TOPS case, the Thai domestic market, but the international end-markets of Europe and Japan. In order to serve these markets, Golden Exotics Thailand originally purchased its products through Bangkok based wholesale traders. This didn't differ from the operations of any other (local) Thai exporter. However this mode of sourcing was hampered by a number of weaknesses regarding quality and safety assurance:

- The lack of quality control at the farm led to a variable quality of vegetables. Subsequently, this resulted in a relatively high level of rejection of substandard quality at export destination and hence financial loss due to waste.
- The fact that there was no recognized standard of quality in Thailand also resulted in a decreasing access to the European export markets and prevented access to the high value Japanese market.

Step by step Golden Exotics started to distinguish itself from the average exporter through professional added value services. In 1999 Golden Exotics and KLM Cargo established the joint venture 'Fresh Partners', a value added centre at Bangkok's Don Muang International Airport. In this centre value added activities took place like sorting, grading, washing, packaging, cooling and protection.

In Europe there is a increasing demand for exotic vegetables. The market is under supplied and supermarkets, restaurants and exotic shops are keen to source vegetables from Golden Exotics. As long as the Thai producers can meet the EU quality and safety standards, their access to the market is guaranteed. However, with EU food safety and quality demands becoming more and more stringent in the process of pesticide harmonization, many Thai producers risk to be excluded from exports to profitable markets.

The 'Fresh Partners' logistics-handling centre was not sufficient to solve up-stream problems at farm level and domestic transportation. And as a response to these challenges Golden exotics and Fresh Partners decided to establish Thai Fresh United co. Ltd. in 2001. Thai Fresh United is a company that has been established to operate a post-harvest centre in Ratchaburi (operational since 2004). The Thai Fresh United post-harvest centre is cooperating with 10 farmers' groups, each of them specialised in some or more priority crops of Golden Exotics.
It has been agreed upon between contract growers and TFU on quality specifications, volumes and prices for each crop. Thai Fresh United provides growers with extension services (e.g. training in crop husbandry) and required farming inputs so that the farmers can and know how to apply good agricultural practices and integrated crop management techniques. It is the intention to make the FP preferred suppliers shareholders of the TFU companies eventually.

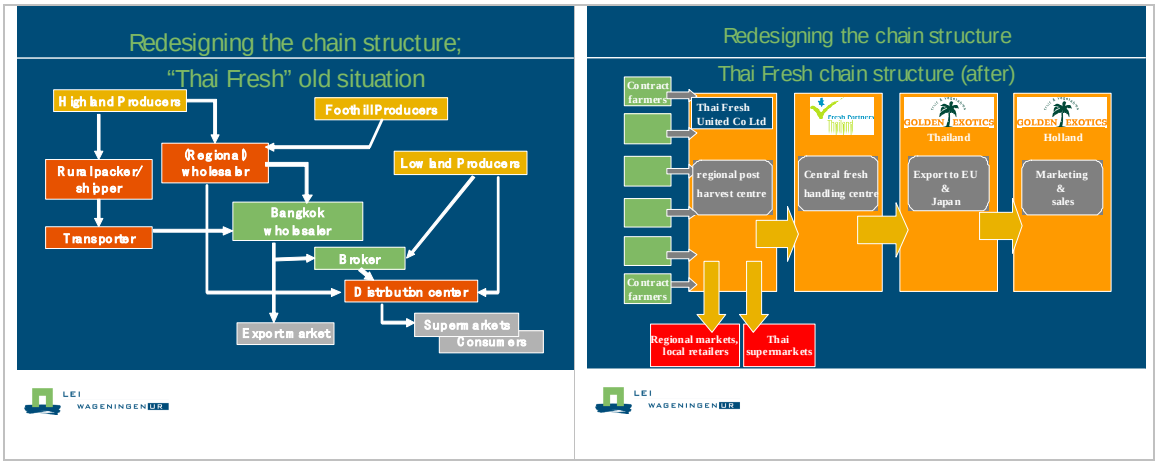


Figure 3. Redesigning the Thai Fresh supply chain

Vertical integrated supply chain: In a vertical integrated supply chain all the different chain activities are under the responsibility of one cooperation. Export production requirements have forced the creation of a vertical integrated supply chain to be able to control and monitor food safety and quality issues.

Positive results

- Certification: process certification! Because the main geographical markets were Europe and Japan, Thai Fresh has chosen to work with accredited, international standards. In the case of Europe the most widely recognized standard is EUREP-GAP, for Japan an increasingly common standard is SQF2000.
- Decrease in the usage of pesticides: Preparations for (EUREP) GAP certification have resulted in the use of less pesticides to control pests and diseases. Also some banned and broad spectrum pesticides have been replaced by more environmentally friendly pesticides. As a whole less pesticide are spilled into the environment (water, soil and air)
- Reduction of product loss throughout the supply chain: The horticultural supply chain has been rationalised and shortened leading to an increased efficiency and about 50 % less losses (due to shrinkage) at reduced costs.
- Access to export markets: The activities of Golden Exotics give small Thai farmers the opportunity to produce crops for export. Besides Fresh Partners and Golden Exotics create more export volume by opening up new foreign markets for Thai horticultural products: more export volumes and new export linkages (Japan)
- Farmer income: Thai Fresh United, Fresh Partners and Golden Exotics are creating new export linkages that connect smallholders to the international markets for exotic products. The direct economic impact for the contract farmer families is that the export market pays a considerable mark-up compared to the domestic market. An average of 50% of the farmers' produce is export quality for which a premium price is paid. Hence it is estimated that the growers' income has increased with at least 30%. This total amount is likely to increase further in 2004 with larger volumes handled by the Post Harvest centre at Ratchaburi. Furthermore Thai Fresh United also takes the responsibility to sell sub-standard products to the local (super) markets.

- Employment: Horticulture is a labour intensive agricultural activity. One of the criteria for selecting the project regions was the high density of rural (under-employed) population in the area. In January 2004 Fresh Partners in Bangkok and Thai Fresh United in Ratchaburi employ over 200 employees:
  All employees, whether at the Fresh Partner facility in Bangkok, or the Thai Fresh United post harvest centre in Ratchaburi, come from the vicinity (Bangkok or Ratchaburi). The majority consists of family members of the contracted farmers, women and children.
- High quality inputs: Contract growers are supplied with required farm inputs through TFU. Through Thai Fresh United the farmers get better and reliable access to improved seeds and crop protection products.
- Training: The related extension services from Thai Fresh United lead to an optimization in the use of those inputs as a consequence of close monitoring and evaluations. In the past the farmers where producing only during several months of the year for the absolute minimum level of income. Golden Exotics not only asks them to grow new and different crops, but also learns/shows them how to grow and protect the crops. Farmers contracted by Thai Fresh United have been trained in crop husbandry, and farm registration and quality control has been delivered. Besides investments have been made by Golden Exotics in training courses for its employees on agronomy, HACCP, EUREP GAP, control of pests and diseases etc.
- Market knowledge: Knowledge of and insight into market opportunities by individual farmers was clearly absent in the pre project situation. Most of the farmers contracted by Thai Fresh United were poor and backward and didn't realize the trends and developments at the (international) market. By living from day to day they didn't realize the export market opportunities that lay wide open to them. Due to the numerous intermediates from farm to fork, market information didn't reach the individual farmers. The closed chain collaboration of Thai Fresh United, Fresh Partners and Golden Exotics is opening up this market knowledge to them. To receive the stable and high income levels as agreed upon with Thai Fresh United, the farmers have to live up to the export quality requirements. They learn about more holistic production systems and have experienced what market prices can be like.

2.7.2 Critical success factors

- Training on the job: Training on the job is essentially true in agricultural development. Thai farmers are very eager to learn and hardworking, but they miss the practical translation of academic knowledge. The Thai educational system can offer the needed knowledge. However the implementation of this knowledge stays behind. The Thai farmers, often struggling for subsistence, can't make the leap forward on their own. They need practical assistance in their fields. This push in agricultural development is enhanced by interference of Western companies.
- Food safety: Food safety is an important incentive for further development of the agricultural sector. Without the specific food safety export requirements, farmers wouldn't feel the incentive to change their way of production. In this respect food safety has a positive influence on continuous development of more advanced and holistic agricultural practices (integral crop management).

Difficulties on the way

- Gradual expansion: It takes a lot of time and energy from Golden Exotics to teach the Thai farmers on improved cultivation methods, which involve paying more attention to the crop and abstaining from the use of dangerous pesticides. As a consequence of all the efforts to be made in the field of training the growers, the number of contract farmers can only expand gradually.
- Dynamics in international import qualifications: Similar projects on certified production and export marketing should be fully aware of the worldwide "battlefield" of private and public quality and safety standards. In addition to the EUREP GAP platform the Global Food Safety Initiative (GFSI) is the leading platform for quality and safety related topic nowadays. New projects on these topics should take these developments into account.
- Dynamics in residue harmonization: External factors such as the residue harmonization process in the EU are threatening for the success of the Thai Fresh project. Tentative solutions have been formulated for MRL related problems and will be discussed with the authorities and hopefully implemented in the near future.
- Supply chain management: Chain knowledge is non-existing in Thailand. A high level of autonomy characterizes the Thai agricultural sector. One of the disadvantages of operating in Thailand is the scattered and unorganized production and a lack of a cooperative spirit. At first Golden Exotics tried to find a local partner in business, but finally it turned out that Golden Exotics had to organize everything themselves from farm to fork and even go into farming themselves.
- Middlemen: It's not easy for farmers to untie their relations with middlemen. The creation of a vertical integrated supply chain was however essential, to be able to control and monitor the food safety and quality of the export crops. As a consequence middlemen lost their dominant position. Due to the fact that the activities of Thai Fresh United are still small scale this didn't meet a lot of resistance, but for further expansion of these type of closed chain relations, middlemen could become a barrier. The role and function of the middlemen is prone for change, in a sense that middlemen also will get more responsibilities in the chain regarding the assurance of food safety and quality procedures.
  '….We have seen this before. With the establishment of the joint venture Fresh Partners we have undermined the position of the so called export forwarding agents, by taking up the air handling ourselves. This process has met a lot of resistance, but has succeeded for 70-80%. The same development will eventually take place with the middlemen. At the moment the middlemen barely take notice of this development, but it is to be expected that in the near future more exporting companies will start sourcing directly from the farm, to be able to control the produce from farm to fork. And besides the fact that trace ability and food safety force these kinds of developments, the growers are clearly benefiting' (personal communication)
- Lack of cooperation: One of the major difficulties in the development of the Thai horticulture is the high autonomy of the small holders and their lack of cooperation.

Drawbacks

- The impact of the activities of Thai Fresh United in terms of poverty reduction of the small growers is still marginal. Only a small group of growers is producing for export markets and within this group of export producers only a few of them are benefiting from the Thai Fresh United activities. Only a few thousand growers are producing for the export market. Compared to the millions of

growers producing for the local market, export doesn't seem to have a great impact on poverty reduction of the total agricultural sector. Only producers with access to capital, technology and logistics are best positioned to reap the benefits of international market access. Concern lies with small-scale producers, who find themselves in a disadvantageous position.

- The dynamics in international import qualifications brings about a lot of confusion and panic reactions from the side of the Thai government. The Thai government still doesn't really know how to cope with the international constantly sharpening requirements. This is partly due to the fact that the Thai government is difficultly positioned, between the traditional local population, which isn't prone for accelerated transformations and the rapidly changing international food safety landscape. The government finds itself in a split position: she doesn't want to push the local population too far, but on the other hand she sees herself confronted with international standards. If international product requirements aren't met, importing countries will refuse whole shipments. As a consequence every change in international product standards is being conceived as a possible threat.

Future steps / spin-off

- Demonstration farm: Currently a demonstration farm at the land adjacent to the Post Harvest Centre in Ratchaburi is being created. A shaded nursery will be utilized for production of high quality seedlings of pepper, eggplant and some other crops. The goal is to supply 120 farmers with high quality inputs (like seeds and fertilizers) and guarantee them year round a fixed price for export quality produce. Besides the farmers will receive daily assistance in crop husbandry. All parties involved are benefiting from this: The contract farmers have year round a stable income and receive a premium price for their produce of export quality. Thai Fresh United has lower costs, because although Thai Fresh United pays the contract farmers a premium price for export quality, Thai Fresh United saves money on middlemen fees and the reduction of product loss. These savings are in return invested in the development of the demonstration farm and the post harvest centre.
- Other countries: Once the business model of Thai Fresh United and Fresh Partners has proven itself under Thai circumstances, it could be duplicated and adjusted to local circumstances in other countries. Within Thailand similar post-harvest centres could be developed for other fresh products (ginger, coconut) and fruits.
- Other farmers and areas: Golden Exotics is experimenting in this project with co-operation with small farmers. When the results are satisfactory, Golden Exotics considers setting up co-operation with other groups of growers in other areas. Therewith creating international market access for farmers who in the past couldn't reach the international standards.
- Scholarship: In order to contribute to the development of rural youth and further the relationship with the contract farmers Golden Exotics is creating a scholarship fund that will enable 5 to 10 children of contract farmers yearly to study.

2.7.3 Lessons learned, conclusion and discussion

The study of three Thai business cases has shown that several driving forces (international as well as domestic, such as consumer demand, food safety

awareness and agro-food system structural changes) triggered the development of the Thai horticultural sector. This development was facilitated by the fact that Thailand has a strong institutional infrastructure. Despite all shortcomings, there is a public structure for education, research and extension. The presence of private enterprises in the field of breeding, crop protection products, logistic service provision, inspection and certification, makes that the industry has a backbone for further and future development. Besides, the existence of a domestic supermarket segment (despite its limited share in the overall economy) has stimulated the development of a quality concept, awareness of food safety and has increased the production volumes.

Pro Poor development

Although the modes of cooperation and coordination throughout the supply chain differ in the degree of direct control, both cases, TOPS and Thai Fresh, have learned that international standards and regulations at the end of the chain are leading the required performance of the whole supply chain; starting from breeding varieties to primary production up to trade and processing, logistical arrangements etc. Increased demand and market developments in terms of consumer concerns about food safety and quality have forced the retail industry and exporters to assure certain minimum product standards. In all three cases these requirements have been translated in a 'farm to fork' approach to ensure total chain control. When quality and safety aspects of produce are less stringent, arms' length trading at spot markets gives buyers and exporters a lot of flexibility to scout the marketplace for the best buy at the best price. The focus of the bargaining process is on price competitiveness which works out to be negative for the growers. However, when the minimum requirements concerning quality and safety are increasing, the need arises to develop more sustainable, transparent but also more complex relationships. Especially in the case of fresh produce it is vital to invest in integrated crop management systems.
Hence it can be concluded that export food safety requirements are a positive driver towards more intelligent and efficient production systems from farm to fork. The new European law on tracking and tracing, active from January 1 2005, will further fuel the optimization of transparent supply chains.

Whatever important these developments may be, for the goal of improving the lifestyle of the small Thai growers, export is rather insignificant. Export comprises only a few percent of total agricultural production. In Thailand about 90% of the total vegetable production is used for domestic consumption, only the remainder 10% is for export purposes (fresh as well as processed) and as a result the number of producers involved in agricultural export (a few thousand) is almost negligible in comparison to the millions of people who earn their income at the domestic market. From this point of view the activities like those of presented in the case of East-West Seed International play a potential vital role in poverty reduction in terms of scale.

The conclusion is that international export standards, in particular regarding food safety, are an important trigger for horticultural development. Export scandals and strict export market requirements, even when not directly related to horticultural products, stimulate government activities to develop sound certification systems. In meeting these stringent export requirements, it is indispensable to reorganize the supply chain in a more effective and transparent manner. This doesn't only improve the food safety of horticultural crops, but in the end will also generate improvements like:

- Higher yields

- Secure farm income
- Premium prices for export quality products
- Additional employment in post harvest activities
- Opening up market knowledge to individual farmers
- Etc.

However, the more prosperous producers with access to capital, technology and logistics are best positioned to reap the benefits. Concern lies with small-scale producers, who find themselves in a disadvantageous position and can mainly cater for the domestic market. This group comprises the great majority of the agricultural (and thus the total) population. In terms of poverty reduction the domestic market is of major importance in terms of scale. The supply of high quality seeds and knowledge transfer in terms of integral crop management systems and adding value activities, are crucial in improving the lives of small individual farmers.

All three cases studies have learned that the active participation of international companies in the Thai horticultural sector was essential for the transition of an internal product orientation to an external market orientation. Thai farmers and extension workers are very eager to learn and hardworking, but they often miss the practical skills to translate academic knowledge into applicable solutions in the field. The Thai educational system indeed offers the needed knowledge, but the implementation lags behind. The Thai farmers, often struggling for subsistence, can't make the leap forward on their own and through the interference of Western oriented companies significant progress was made.

Small holder participation in supply chains

Important issues governing international and domestic supply chains include food safety and quality requirements, market and consumer trends, economies of scale, logistical efficiency and the need to reduce transaction costs. These topics are addressed in integrated supply chains. Product sourcing from wholesale markets and anonymous traders is rapidly being replaced by integrated supply chains with preferred suppliers and relations. Importers, exporters and supermarkets need to control the whole supply chain from fork to farm in order to comply with market requirements
Integrated supply chains are an important tool to achieve the above-mentioned goals and are rapidly being implemented worldwide. Integrated supply chains are implemented not only for the top end retail market and sensitive, risk prone food products, but also for domestic market segments.
There are a number of incentives for investors to develop integrated supply chains, including premium prices for superior quality products, cost reduction, logistical efficiency, economies of scale, and risk reduction.

Some have argued that it is not economically feasible to include smallholders because of high costs (of monitoring), organizational weaknesses, inconsistent quality and irregular supply. However, there are also some obvious advantages to including smallholders, including lower costs in the case of labour intensive products, motivated growers and access to land. Consortium members strongly believe that small farmers can be included if chain leaders (exporters, importers, traders, supermarkets) can expect the benefits to outweigh the costs of inclusion of smallholders. Apart from social corporate responsibility, it is an economic issue to include or not include small farmers.

To minimize the risk of working with smallholders, government bodies are expected to support the proper use of agrochemicals and the development of Good Agricultural Practices. In addition, the level of technology should be appropriate for the given circumstances of the growers. Most importantly, there should be mutual trust between chain partners.
It was learned through these case studies that smallholders can indeed participate in production for high-end consumer segments with labour intensive products. It is important that sound contractual relations be established and there be shared benefits amongst chain partners. Well-organized groups with good leadership, in combination with public support, are also prerequisites for the development of viable smallholder supply chains. With the private sector taking the lead there are good opportunities for increased smallholder participation in modern supply chains.

Recommendations for supply chain development

It was learned that within the context of supply chain development particular attention should be given to:

- Harmonisation of international import qualifications: worldwide "battlefield" of private and public quality and safety standards. In addition to the EUREP GAP platform the Global Food Safety Initiative is the leading platform for quality and safety related topic nowadays.
- Residue harmonization: Thai export is hampered by the residue harmonization process in the EU. Clear and practical applicable regulations have to be formulated for MRL related problems.
- Domestic as well as export production: Focus of Thai government as well as international community shouldn't be focused on export only. The development of the domestic market is vital in poverty reduction.
- Small scale step by step approaches in the fields: A step by step approach is more likely to deliver the desired than ambitious system approaches. The (re)organization of a whole chain at once is conceptual too ambitious. Chain knowledge is non-existing in Thailand. And one of the major disadvantages of operating in Thailand is the scattered and unorganized production and a lack of a cooperative spirit. Thai farmers are very autonomous and their cultural mentality isn't receptive to system transitions.
- Sandwich approach: Cooperation between end of chain (out-put interests) and input suppliers (input interests).

2.7.4 Literature

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3 Export horticulture vis-à-vis domestic markets as engines of pro-poor growth: the evidence from Uganda

3.1 Analytical framework

In discussions on the impact of horticultural industry on economic development in Africa, one often finds a distinction between export horticulture and domestic marketing. The common proposition is that overseas export marketing has greater potential for economic growth as export sales exceed domestic demand both by volume and price.

To examine impact on livelihood development of the poor rather than sectoral growth, one needs to go beyond export earnings into the creation of opportunities for employment and for income generation within product supply chains. For this, we develop a basic framework that specifies three marketing channels for livelihood development according to the amount of value added created in the supply chain, and the scale on which the fruit and vegetables and flowers are cultivated.

A common element of export horticulture is the large amount of value added that is generated through various post-harvest services. Prices for Ugandan hot pepper in overseas export markets exceed domestic prices, a reflection mainly of transport & trade costs, differences in consumer preferences and purchasing power, and product quality. If we ignore transaction costs, more value creation (the amount of value added generated) provides either more jobs or bigger profits. Value creation is generally lower in supply chains for domestic outlets. However, the potential impact on local (national) economic development is related to the absolute share of value that accrues to local (domestic) actors in the chain determines. From this perspective, export horticulture will require scrutiny on the share of profits that remain within the country; with domestic horticulture it should be tested whether there is sufficient value creation for livelihood development of the growers, and traders and retailers involved.

Horticultural production and marketing are labour-intensive industries that provide many wage and income opportunities. In terms of livelihood development, one must ask whether poor workers can become involved, despite their often limited skills level and poor endowments. Having a job or an opportunity to generate income is a necessary condition to escape from poverty, and keeping such opportunity is a must to further reduce vulnerability in the household. There is a well-documented trend towards commercialization of horticulture in Africa, which involves tightening linkages in supply chains and reduced numbers of suppliers (Dolan and Humprey, 2000**)**. These changes will have an impact towards involvement of the poor, basically in terms of increased opportunities for involvement as a wage worker, or contract farmer in an out grower scheme; the position of independent smallholder farmers and small-scale trade (assembling and retail) will weaken in the face of large-scale competitors, unless small-scale actors unite under effective organisations.

In sum, both value creation and the structure of the supply chain are important determinants of the impact of horticulture on poverty alleviation and livelihood development. Policy support should be tailored to specific conditions. This paper explores value creation and organisation structure in several horticultural supply

chains in Uganda, and examines the validity of a three-tiered grouping of marketing channels for livelihood development (see table below). First, high-value horticulture in a large commercial setting, often involving exports of produce sourced from large farms, and with few domestic actors involved ('channel A'). Second, high-value horticulture, marketing of smallholder supply involving domestic traders and post-harvest services mostly on export markets and also domestically through emerging supermarket retail ('channel B'). Third, domestic marketing of produce of limited value, yet involving a large smallholder supply base and many small-scale entrepreneurs in trade and retail ('Channel C'). The following section discusses poverty alleviation in the three channels for development in more detail.

		Value creation	
		High-value	Low-value
Structure of supply chain	Large scale, few actor	A Export horticulture, commercial farms, tight supply chain	n.a.
	Smallholder supply, many actors	B Export horticulture, smallholder supply, expanded supply chain	C

3.1.1 Export marketing, sourcing from large-scale commercial farms

The channel is characterised by few actors who take the role of producers and double as exporters. The main horticultural crops that are marketed through this channel are flowers (roses and chrysanthemum cuttings). Most of the activities undertaken in this channel are concentrated in farms that enjoy expert management. Most of the farms producing flowers in Uganda belong to foreign investors that have come to utilise the good climate found in the country. The Uganda flower industry consists of 19 producer/exporting companies. Most of these are centred near Lake Victoria; some operations are located in Mukono Mpigi and Wakiso districts. One grower has initiated expansion into upland areas, in Ntungamo district. The total area under flower farms is 178 ha, with 145.5 ha under roses, 30.5 ha devoted to Chrysanthemums and 2.1 ha producing potted plants and foliage. Roses and chrysanthemum cuttings constitute the major export products. All the flower growers are members of the Uganda Flower Exporters Association (UFEA) whose main objective is to facilitate production and marketing of high quality flowers from Uganda.

The entrepreneurs in this channel are well endowed with adequate resources to undertake the necessary activities and therefore though the assets given are many and usually expensive, many of the investors are prepared and once the country conditions for an external investor are met, they start the activities. The magnitude of the engagement also requires employment of managers with good experience and knowledge of the production and export processes. The channel provides employment to low-income labourers and various cadres of supervisors in Uganda.

The main assets required to effectively participate in the channel of export production

- Good education.

- Technical knowledge about flowers.
- Good management skills and experience in running a business.
- Capital to invest since the enterprise has high investment requirement (acquisition of land, equipment, buildings, water for irrigation, inputs, cold storage, labour, etc).
- Market information especially on trends, quality requirements and price.
- Landownership as rose flowers are perennial, chrysanthemums have to be re-planted every 4 months.
- All weather roads in order to reduce physical damage.
- Communication facilities to keep in contact with flower importers and input suppliers.

To be engaged in this channel, the labourers are also required to have basic knowledge on tending flowers and are expected to know how to read and write for the purpose of communication. Many poor people have the opportunity to work in flower farms as labourers. This implies that with expansion of the flower industry there are more chances for the poor to have a source of living.

3.1.2 Export marketing, smallholder supply, many actors involved

This channels offers opportunity for labour absorption since it is labour intensive. It also provides opportunity for better organisation and engagement in production for export by the small holder producers – it is only under good management and organisation that the produce can be accepted for export. The channels have developed to fill the gap of the required exports that cannot be produced by the exporting companies. The opportunity to create employment and reasonable incomes is significant in this channel since horticultural products from Uganda have demand in the importing countries. The channels are dominant in horticultural enterprises that can easily be grown by smallholder farmers. The commodities that fall in this category include hot pepper, passion fruits, pineapples and vanilla. Commercial production of these commodities is done by smallholder producers on small acreages, mainly under pure stand or in some cases under intercropped systems with bananas (matooke) and coffee. Hot pepper and vanilla are exported overseas while pineapples and passion fruits have demand in the regional countries as well as international markets. The commodities are exported in the region or overseas.

Entry into these commodities supply chains requires one to have access to different assets that facilitate effective participation. At the production level, the commodities have significant investment requirements. This implies that many smallholder producers may not be able to produce under management conditions that are acceptable to produce export quality, limiting the ability of the poor to participate. Some of the key assets that are needed at production level include reasonable level of education, membership to marketing group or organisation, availability of family or hired labour, access to capital for inputs and ownership of land. The main constraining assets include capital and access to market and market information. While extension services provision could significantly improve the management.

The poor can also participate in the channel in post harvest activities such as collection, and transportation. Some smallholder producers have changed roles and become assemblers, thus increasing their chance to break out of poverty. The main assets needed at assembling are capital to purchase the produce and organise

transportation to the consumption end. At processing stage, the equipments needed are many and expensive for rural standards. Only those smallholder farmers working as groups could have access to such equipment that can be bought jointly with external funds support.

Many producers have found growing these commodities a profitable activity and those who have preformed well belong to village groups/associations, which help them access reliable markets, trainings or capacity building, credit and networking, in addition to enabling them sell their produce collectively. Producers require market information especially on different market outlets and prices, which they obtain through traders, fellow producers and the radio.

3.1.3 Domestic marketing, smallholder supply, many actors involved

The small domestic marketing channels are characterised by several actors including producers, assemblers/wholesalers, and retailers. The channels are not very labour demanding and the quality requirements of the produce cannot match with those of the export. In addition many smallholders usually produce horticultural crops for home consumption and the surplus is sold in the local markets. In other cases cash requirements drive the farmers to sell even the vegetables grown for domestic use. The horticultural commodities important in the domestic market include pineapples, passion fruits, and onions. Onion marketing is very dynamic and could be traded across the borders depending on demand and supply at any given time; however, most onions are used locally. The supply is affected by seasonality and reliability on rain fed production. For the exported commodities, quality is ensured to meet the conditions set by the international importers. However, the quality of commodities produced for the domestic markets is not that rigorous since no stringent regulations are necessary.

Smallholder producers grow horticultural commodities targeting domestic markets on small acreages, normally under intercropped systems. At least every family in the production areas has at least a small portion of their land reserved for these commodities. Unlike under production for export where producers are members of groups/associations this is not necessary under the production for domestic market although it could improve the benefits from the enterprises. The producers obtain market information from traders operating within the growing areas. The major challenges facing producers for domestic market include: inability to access agricultural extension services, insect pests and diseases, fluctuations in prices.

Assemblers are motivated to start trading in commodities marketed locally after identifying the trade as a viable option for income generation. Capital (cash) is needed to start the trade, mainly for procurement of the produce and hire of transport. The assemblers operate in different locations within each district to ensure enough is collected for movement to main urban areas. On a collection day, they hire motorcycles to help them move around and consolidate the produce at each location or "stage". After consolidating all the produce at different stages, wholesalers/assemblers hire trucks to transport the commodities to Kampala and other terminal towns. The traders obtain market information from fellow traders, and they always call colleagues in Kampala while they are still in the field to ascertain price trends that they use to determine their purchases.

Average gross margin (2 extreme outliers excluded) in our sample of 14 assemblers and wholesalers in the 2003-04 marketing year is Ush 114 mln (EUR 8,215). The distinction between these groups of traders is, in the end, arbitrary. In general,

wholesalers trade bigger volumes over longer distance. Most assemblers often make use of bicycles as a means of transport, whereas wholesalers rely on motorised transport between assembly stations and their outlets.

The retailers are the last link in the chain and have direct interface with most of the final consumers. Most retailers also perform the function of wholesalers who sell to big consumers such as institutions and hoteliers. Most retailers interviewed own or rent stalls in the main markets (Owino) in Kampala. To start a retail business, capital (cash) is required to hire or buy a stall and to procure a reasonable amount of produce. Most retailers revealed that they were motivated to start this business to generate income after failing to obtain employment elsewhere. The basic assets required for different actors to participate in the channels are indicated in Table ----

Table 1. Assets required participating in domestic marketing channels

Actors	Assets required
Producers	• Education - be able to read and write. • Access to extension services. • Family labour is very important and essential. • Land (owned or hired). • Infrastructure – accessible roads are essential for marketing. • Finance to undertake all the operations.
Assemblers	• One should be able to read and write. • Knowledge of the way the market operates is a must. • Means of transporting produce from the gardens to consolidation points. • Communication – cell or public phones. • Access to trucks for hire. • Access to capital for crop finance and for hiring of trucks.
Retailers	• One should be able to read and write. • Market information. • Knowledge of how the market operates. • Must own or be able to rent a stall in the market. • Capital to purchase the produce, to pay market dues and rent. • Post harvest storage facilities.

As a summary, horticultural supply chains provide various opportunities for workers and entrepreneurs with limited endowments in terms of education, capital, management level or transport. Most producers undertake the activities in their own farms and more would be interested to buy own land for better investment. Some of the commodities are take perennial and not suitable to be produced on hired land. However, for lack of investment capital, some farmers hire land to engage in production of horticultural commodities. The producers operate under varying management levels depending on individual ability to acquire the necessary inputs for production. The most limiting factor for production is management and market information that can determine the kind of profits that one can make.

Assemblers play a very important role including various services such as collection, sorting and transportation of harvested produce. Retailing produce to local consumers in small-scale market stalls, on roadsides and in city markets is done by retailers who package the produce depending on the clientele targeted. To effectively

engage in these activities one requires, however, a minimum level of training (being able to read and write) and some working capital. Those without access to capital and other necessary inputs have opportunities as worker on export farms, or as a (often casual) wageworker in trade and retail. Depending on the product, processing/value adding is done at the industry level, e.g. for passion fruit juice, or at the farm level, e.g. for solar dried pineapple or vanilla. In general the scope for processing at the small-scale farm is limited; it does create opportunities for value creation on the farm but the employment impact is small.

With better coordination and organisation, the horticultural activities can significantly contribute to incomes and employment creation in the rural areas in peri-urban centres in Uganda. More effort is needed to better address the linkages between the producers and the consumers by making the supply chain more efficient and cost effective.

3.2 Data

The study adopted a participatory process approach in executing the various activities planned. The study entailed eight major activities to enable the research team describe and interpret the contribution of selected horticultural commodity supply chains to poverty alleviation/reduction in Uganda. These steps are:

- Development of criteria for selection and actual selection of commodities and marketing chains;
- Determination of the boundaries of the study in terms of time and space;
- Identification of sources of information and data collection methods;
- Development of checklists and questionnaires for qualitative and quantitative data collection;
- Selection of samples of actors from the different market chains for data collection;
- Interviews with individual actors;
- Analysis of each horticultural commodity market chain;
- Development of quantitative indicators that can be used to compare the effectiveness of different horticulture commodity channels in poverty alleviation.

Four major horticultural product groups were identified: fruits, vegetables, flowers and spices. Out of each product group one or two commodities were selected. For each selected commodity the existing marketing chains were identified and described, and one to three of the most common marketing chains were selected for the study. In total six horticultural commodities, that is, hot pepper, onions, pineapples, passion fruit, vanilla and cut flowers were selected for the study. These commodities were selected on the basis of their importance (in terms of value and/or volume) to the horticultural sector; the number of persons involved in their production and marketing; and their actual or potential contribution to poverty alleviation.

Field data was collected in the central region of Kampala and surrounding districts and in the district of Kasese on the western border. Annex table AA provides detail on data collection. Several methodologies were applied. Representative enterprises were visited for a survey of management; none of the workers were interviewed. The survey covered three retailers including one supermarket, Uchumi; several plants of one large processing company, RECO; and six exporting companies. The subset of the survey data on growers, traders and farm workers that was analysed with

quantitative techniques comprised 25 growers, 14 assemblers and wholesalers, and 14 workers on flower farms.

3.3 Value creation in fruit, vegetable and flowers

3.3.1 The concept value chain

The supply chain of horticultural commodities enjoys a level of vertical and horizontal integration. The vertical integration here reflects the kind of relationship that the different actors have with one another. The level of coordination among the different players in the supply chain determines the efficiency attained in the flow of specific commodities. Apart from facilitating movement of the commodities from the primary producers to the local consumers and exporters, the participants are expected to add some value to the commodity. The value added is translated into price increase from one level of actor to the next. This value addition is the source of benefits that accrue to the actors at each level.

The value addition done at the producer level is in form of sorting by removing the diseased and undesirable fruits and vegetables. At the assembler level, value addition is in further sorting, grading, and packaging. The assemblers are also responsible for making the commodities accessible by transporting them from the point of production in the rural areas to the urban areas. Overall the value added to the commodity is expected to sustain the actors in the channel. Tangible changes in the outlook of the commodity would allow for greater value addition such as processing.

The analysis of value addition at each actor level was analysed in two stages. The first step involved gross value addition where only the price at each level was considered and price difference between the actors considered as the addition. The main assumption at this stage is that the actor incurs no costs. In the second step, the analysis was done in more details in that variable costs incurred by each actor are included in the analysis and are deducted to give net value addition.

3.3.2 Value chains in Uganda horticulture

Small-scale farming, work on commercial farms and small-scale trade are the activities where there is the biggest potential involvement of the poor. We are interested to assess what activities add most value to horticultural crops, and whether there is value creation in the activities in which poor farmers or workers could participate. Data collected from surveys, group discussions with farmers has been complemented with insight from a recent sector study (Sonko et al. 2005a), and expert opinion to arrive at table 2. The middle panel of the table provides detail on the distribution of value-added (VA) across 18 supply chains for a total of 6 commodities. The chains represent the variety of marketing arrangements that can be found for each commodity. In pineapple and passion fruit trade there is a wide variety of market arrangements. In contrast, hot pepper and rose trade flows all follow identical pathways.

We match the chains with the three-tiered classification of channels for livelihood development explained above: we provide data on export supply chains of roses where the commercial farm is also the exporting company (channel A, N=1); export supply chains that source fruit and vegetables from smallholder farmers and which

involve local traders (channel B, N=9); and domestic marketing arrangements with outlets on street retail or supermarkets, which involve smallholder supply and local traders (channel C). The table is a static snapshot of dynamic markets: in many markets there is seasonal variation in price due to variation in production, which is only visible in the assemblers' selling price, while the farm gate price and exporters selling price are rather constant.

The lower panel of the table provides data on the market share of each supply chain, i.e. what proportion of total commodity supply is handled in a channel, and on value creation per chain. Value adding per metric ton (Mt) multiplied by estimated annual yields (taken from the field report) transfer into a crude estimate of value added per annum per supply chain.

Two critical assumptions in the value chain analysis must be borne in mind. First, the use of a commodity-specific but otherwise uniform cost structure and farm-gate price for all channels. A more comprehensive analysis would entail detailed data collection on the revenues and costs per entrepreneur. Second, the costs accounted in the computations on value added exclude investment costs and depreciation. By consequence, where we refer to value added, the numbers should be interpreted as gross margins. The field report (Sonko et al. 2005b) provides full methodological detail. Reported in the table is the share of value added for each actor; shaded cells indicate no participation of the actor in this specific supply chain. For instance, in the single hot pepper chain reported, the value added created accrues for 30% to farm producers, for 24% to assemblers, and the remaining 46% is generated at the level of exporters. The scope of the value chain analysis is confined to domestic actors, yet excluding the barely nonexistent seed supply industry. By consequence, various foreign actors including suppliers of seed, trade houses, auctions, processors and retailers are also excluded.
Across the selected commodities, value creation occurs mainly at the levels of producers, assemblers/wholesalers, retail and exporters. As a rough indication, in fruit and vegetables VA is shared 50/50 between producers, small processors, assemblers and wholesalers on the one hand, and large processors, retail and exporters on the other. In the floriculture chains, typically the grower company is also exporting, taking care of all post-harvest services in-house. Looking at the distribution of value added, we find large variation between the supply chains (across columns) and between actors (across rows). In general, VA distribution varies as much, or more, within commodities than between commodities.[§§§]

What links generate most value in the supply chain? Growers contribute 20-30% to value creation on average, but shares range between 2 and 78%. Traders such as assemblers and wholesalers take between 10% and 30% of VA across the range. In domestic channels that involve small-scale retail there is major value creation (50-65% of VA) with the retailers in market stalls. These are comforting observations given that most of the poor are involved as growers, traders or hawkers. The evidence on value shares is inconclusive, however, on the most appropriate channel for livelihood development (exports versus home marketing). In export marketing, farmer VA share is typically above average, a reflection of improved quality

[§§§] There are no obvious commodity-specific distributions, apart from the observation that for vanilla VA is created mostly at the level of producers, and little at the level of trade and retail. In pineapple trade the opposite occurs: the VA share of producers remains below 15%, as retailers or exporters take big chunks of VA.

assurance at the farm.[****] The lucrative spice exports involve local assemblers yet in the voluminous fruit exports these local traders are often excluded. The opportunities for processing on the farm are equally poor in both channels.

For an analysis of income generating capacity of the supply chains for the poor, we must complement our relative value chain analysis with an assessment of the distribution of absolute value added. Typically, absolute value added ranges between Ush 500 and 1,500 per kg produce in the dominant supply chains for hot pepper, pineapple, passion fruit and onion; and around Ush 80,000 per kg for vanilla. Figure YY shows the scale of value creation in both export and domestic marketing. For the 6 commodities under study, total value added is roughly estimated at $193 million annually, of which the domestic market generates 59%, and exports 41%. Value creation from smallholder exports far exceeds that of rose production for overseas markets, but growth rates are much steeper for the latter. The observation that value creation in domestic marketing channels is substantial, and possibly outweighs export marketing, is important. The two bars on the left show that exporters generate 2/3rd or more of the value chain (which is then shared with downstream supply chain partners). Value creation with smallholders that supply domestic consumers amounts to $14 million, of a total of $23 million value adding by smallholders. Domestic trading activities rely almost completely on the home channel, which generates $24 million worth of value added. The domestic market also provides substantial opportunities for value adding in small-scale processing and street retail. Note that the supermarkets, even though they handle limited volumes of fruit and vegetable, already generate substantial share in value added.

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[****] The vanilla farmer forms the top end of the range in the sample, which reflects the fact that the peak in world prices was transmitted to the producers. With the plunge in world prices farm-gate prices have come down, and the distribution of VA has become more equal between the vanilla farmer and the exporter.

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Table 2. Value chains for selected fruit, vegetables and flowers

Commodity, supply chain	**1**	**2a**	**2b**	**2c**	**2d**	**2e**	**2f**	**3a**	**3b**	**3c**	**3d**	**3e**	**4a**	**4b**	**5a**	**5c**	**5b**	**6**
Category	B	C	C	B	B	B	B	C	C	C	B	B	B	B	C	B	C	A
% of value added, per actor																		
Producer	30	13	9	4	4	3	2	23	52	36	61	47	66	78	21	22	3	
Assembler	24	16						12	26			23	16		23			
Wholesaler		21	15		7	4												
Small Processor							53											
Big processor						34				48							97	
Small retailer		50						65							56			
Supermarket retailer			75						22	15								
Exporter	46			96	89	59	45				39	30	18	22		78		100
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Levels																		
Market share of chain *(% of supply)*	>90	85		15				80			20		2	98	97		3	100
Value added ($/Mt)	448	465	574	1219	1307	1970	2604	564	252	361	216	281	45643	38457	344	334	2743	780
Total annual value added (mln $)	0.1	32.2	39.8	7.4	8.0	12.0	15.9	1.2	0.6	0.8	0.2	0.2	0.1	2.8	24.5	23.8	12.1	5.6

1, hot pepper; 2, pineapple; 3, passion fruit; 4, vanilla; 5, onion; 6, sweetheart rose. 2a, 2b, alternative supply chains for pineapple. A, large scale exports; B, smallholder exports; C, smallholder supply to domestic market. Data source: Pro-Poor Horticulture field report (Sonko et al. 2005b)

For an analysis of income generating capacity of the supply chains for the poor, we must complement our relative value chain analysis with an assessment of the distribution of absolute value added. Typically, absolute value added ranges between Ush 500 and 1,500 per kg produce in the dominant supply chains for hot pepper, pineapple, passion fruit and onion; and around Ush 80,000 per kg for vanilla. Figure 4 shows the scale of value creation in both export and domestic marketing. For the 6 commodities under study, total value added is roughly estimated at $193 million annually, of which the domestic market generates 59%, and exports 41%. Value creation from smallholder exports far exceeds that of rose production for overseas markets, but growth rates are much steeper for the latter. The observation that value creation in domestic marketing channels is substantial, and possibly outweighs export marketing, is important. The two bars on the left show that exporters generate 2/3rd or more of the value chain (which is then shared with downstream supply chain partners). Value creation with smallholders that supply domestic consumers amounts to $14 million, of a total of $23 million value adding by smallholders. Domestic trading activities rely almost completely on the home channel, which generates $24 million worth of value added. The domestic market also provides substantial opportunities for value adding in small-scale processing and street retail. Note that the supermarkets, even though they handle limited volumes of fruit and vegetable, already generate substantial share in value added.

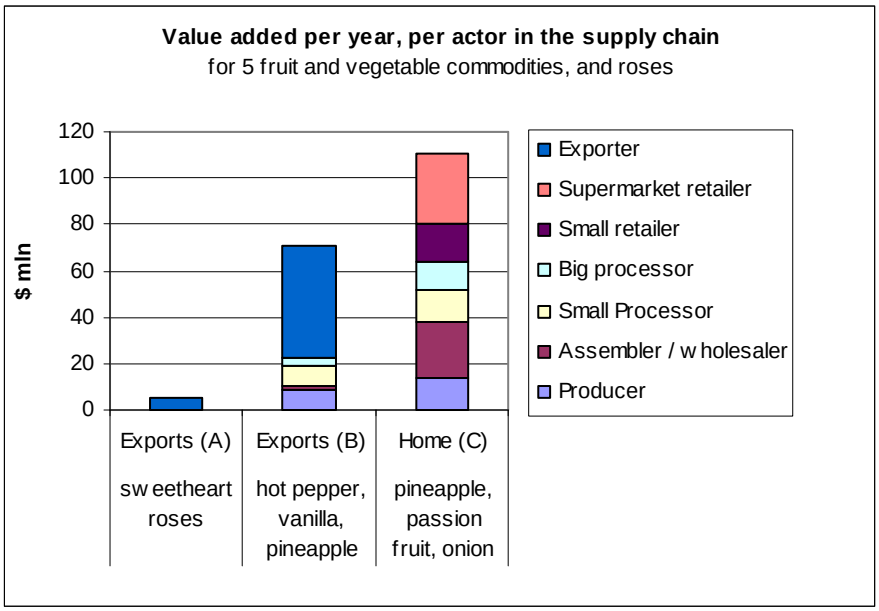

Figure 4. Annual value added in 6 high-value commodities

In summary, the value chain analysis for five fruit and vegetable commodities has revealed substantial value creation from activities that could be accessed by the poor, including (farm) production, trade services and small-scale retail. The value added shares and volumes traded in these activities tend to be bigger in the domestic marketing channels than in export supply. Domestic marketing generates an estimated $69 million of value added in activities accessible to the poor, compared to $19 million in export marketing. Thus, the value chain analysis provides no compelling argument to favour exports over domestic marketing as channels for pro-poor growth.

3.4 Employment in horticulture

We now turn to explore the extent to which value creation in the marketing channels under study relates to job opportunities accessible to the poor, and whether the earnings are sufficient to stay out of poverty. The analysis draws on surveys among workers among workers on flower export farms (this section), and on a survey of growers (next section).

3.4.1 Total labour demand

Total labour demand for the 6 commodities under study, from a crude estimate based on expert extrapolation of field data, amounts to about 37 thousand man-days (table 3). This excludes the demand for hired labour in primary production, because it was impossible to estimate the full number of growers involved in horticultural production. Table

Table 3. Rough estimates of labour demand for 6 commodities

No. of workers (man-days) engaged at the level of:	Total in the industry
Fruits and vegetables a)	**30,000**
Assemblers & wholesalers	15,900
Retailers	11,700
Processors	2,400
Exporters	300
Flowers (sweetheart roses)	**7000**
Total	**37000**

a. Hot pepper, pineapple, passion fruit, vanilla, onions. Numbers for fruits and vegetables (and spices) exclude hired labour at the farm. Source: authors' estimates.

Workers in the export trade and processing industry
The export companies hire workers that are involved in preparing the produce by sorting, packaging. Most companies deal with more than one commodity and hence the wage workers participate in handling all the commodities depending on the season and contracts with importers at any given time. The export companies employ a moderate number of workers and many of them are casual workers who come in depending of labour demand in a particular day or period. In total the four main exporting companies in fruit, vegetable and spices, i.e. Ice Mark, Sulma foods, Amfri Farm and Fruit of the Nile all combined employ about 65 works where some are on permanent terms.
Industrial processing is a source of employment for unskilled staff. However the level of processing in Uganda is minimal and hence low labour absorption. On farm processing is mainly undertaken by family labour under sun drying, where labour is needed mainly in the morning and evening mainly and probably intermittent turning of material for uniform drying.

Workers/entrepreneurs in assembling, wholesale and small-scale retail
A major contribution of horticulture to labour demand arises from domestic trading services. It is estimated that assembling and wholesale of fruit and vegetables in Uganda generates nearly 16 thousand jobs (Table 3). Retail, i.e. sales to end-consumers, generates another 11.7 thousand positions. At least 90% of jobs are in small-scale settings, of single-person entrepreneurs who employ 1 to 4 casual workers for harvest and post harvest services in season and on market days. Several trading entrepreneurs moved into such activities as a logical consequence to their farming activities, e.g. because they could gain better prices for a steady and voluminous supply. The remainder 10% of jobs are employment opportunities in registered trade houses and wholesalers, and supermarket outlets for fruit and vegetable.

We have insufficient data to estimate earnings of the assemblers and small-scale retailers. Field data does, however, indicate gross margins of these activities. The assemblers that are involved in the distribution of goods typically are specialised into fruit and vegetable trade. Self-acclaimed specialisation rates are that a minimum of 85% of cash income relates to fruit and vegetables. Assemblers rely very much on domestic markets. If assemblers are involved in export horticulture – which is less frequent the case than in domestic trade – if so, then their earnings are limited. Assembler gross margins (excluding hired labour) in exports just take the assemblers over the poverty line, by a factor 2 to 10. After subtracting wage costs, fixed transport costs and credit payments income will likely approach the poverty line. Domestic trade provides much better earnings, resulting in gross margins of $50-60 per day. The small-scale retailers, for instance those operating as street hawkers, indicate full dependency on horticultural crops for their income. Reported gross margins are in the range of $15-20 per day for passion fruit and onion, which should be sufficient to secure a net household income for the entrepreneur above the poverty line.

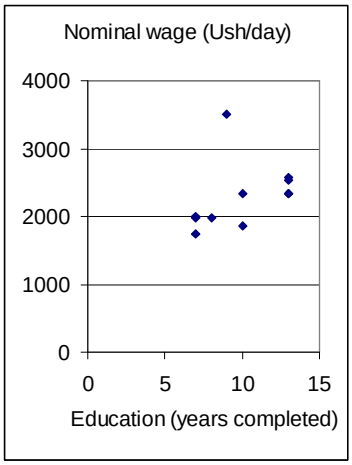

Figure 5. Wages rise with better education

Farm workers

Uganda covers a few dozen large-scale agricultural producers that provide employment opportunities to rural inhabitants in a wide variety of skills. Most of these companies comprise a plantation and in-house packing and processing services for export marketing. There are 19 of these companies in the rose business, all of them specialised in export marketing, which classifies them under channel A. On 10 rose companies, a total number of 12 workers were selected for an interview on their remuneration and motives for current employment. The sample comprises 7 regular workers, i.e. those working on a permanent or temporary contract, and 5 casual labourers. The level of education appears to be an important determinant of worker position in the sample (see figure 5): completed primary education is the entry level because of the requirement to be able to read and write; while 4 out of 6 regular workers did complete secondary schooling, none of the casual workers has. All respondents, except one, reported 2 to 3 years of experience in flower production. In terms of opportunities provided, many workers seek to acquire more skills in flower farming through their position within the rose company. Their motivation is to arrive, in time, at better terms of employment.

3.4.2 Income estimates for flower farm workers (channel A)

Table 4 reports on several characteristics of the sample of flower farm workers. Most respondents, all of whom are involved in farming activities, spend full work weeks on the farm. The average amount of labour supplied is 8% above the full-time equivalent. Casual workers invest 11% more time resources into farm work than regular workers. Rose farming requires labour services throughout the year, which generates demand for casual labour for 52 weeks a year. The daily wage for permanent workers exceeds that of casual workers by 25%. The wage gap can to some extent be related to differences in responsibilities and skills. For the activities that require more skills, companies often hire workers on a permanent basis. A regular position earns a monthly income of over Ush 64,000 in the sample, 18% more than a casual position. Just one worker reports small side-earnings, the others fully depend on their horticultural income. Most respondents consider that the pay is low, and some feel insecure.

Table 4. Wage worker sample from 10 rose companies

	Worker position		
	Regular b) (N=7)	Casual (N=5)	All (N=12)
Labour supply annual (%FTE) a)	104	115	108
Daily wage ($/work day)	1.12	0.96	1.26
Annual wage income ($)	386	316	357

a. Full-time equivalent, or FTE, is calculated on the basis of 8 hours work per day, for 6 days a week, for 48 weeks a year. b. Regular workers have a permanent or temporary labour contract. Source: rose farm worker survey

3.5 How does value creation translate into income earnings? Survey results of smallholder fruit and vegetable producers

3.5.1 Farming activities (channels B and C)

A substantial amount of the survey resources focused on small-scale horticultural producers that cultivate their own farm. The survey covered 24 farmers, 15 of which have a central location in districts near to the capital Kampala (Mpigi, Kayunga or Luwero), and 9 are in the south-western district of Kasese, bordering the DR Congo. The farmers were classified into channels B or C described above, depending on whether their cash crop output is marketed on export markets (B) or domestic markets (C). All 5 vanilla farmers and all 8 hot pepper farmers indicate that their produce is shipped abroad. There is some domestic use for hot pepper in Uganda for chilli sauce, but quantities are rather small and the structure of the marketing chain is anyway rather similar to the export chain. Both onion farmers and both passion fruit farmers in the sample are in the C channel, supplying their cash crop to domestic markets. One would expect so given their (inland) location in Kasese, and the small share of export marketing for these crops. In fact, onions are imported in order to satisfy domestic demand. Pineapple was the single commodity for which producers indicated that products are marketed on export markets as well as domestic retail. In part this relates to the uneven quality of the pineapple harvest: traders select the choice grade fruits for exports; the remainder is delivered to retailers on nearby markets. In addition, some growers sell dried pineapple, all of which is exported. The criterion for classification in B is whether at least half of income from pineapple is earned from sales to exporters. Of the total sample of 7 pineapple growers, all from the central Luwero district, just 2 are grouped under the B channel.

The sample of small-scale producers is summarised in Table 5. In total, 15 farmers rely heavily on export marketing for their horticultural produce, 9 are more involved in domestic marketing. The distribution over centrally located versus remote areas is balanced for the C sample, and favours the central area for the B sample. Average cultivated area is quite similar across both groups of growers, around 1.4 hectare. The smallest producer is a hot pepper grower who cultivates 0.4 hectare. Of the two biggest producers, both cultivating 2.6 ha, one is growing onions, the other pineapples. There is more variation in the domestic channel. None of the sampled producers operates on the scale of commercial farms like those in rose production with on average 7 hectare under cultivation. On the other hand, the sample does not cover the many part-time growers in Uganda who grow fruit or vegetables on small patches of land. This will have implications for our poverty analysis. As a further characteristic, we state the membership of farmer association. Many of the growers in the sample (17 in total) belong to some kind of farmer association. Among hot pepper producers,

there is the biggest number of non-associated growers. We will discuss the role of the farmer groups in the marketing of produce below.

Table 5. Small-scale producers in the sample

Channel	No. of producers	Cultivated area (ha/producer)	Member of farmer association (%)	Location
B				
Pineapple	2	1.6	100	Central
Hot pepper	8	1.5	50	Central
Vanilla	5	1.3	80	South-West
Subtotal	15	1.5	67	
C				
Pineapple	5	1.2	80	Central
Passion fruit	2	0.7	50	South-West
Onion	2	2.1	100	South-West
Subtotal	9	1.3	78	
Total	24	1.4	71	

Sample bias is best reflected in the figure below, which indicates the level of specialisation of the growers on cash crop production, both in terms of land use and cash generation. We find, for the full sample except one producer, deeper specialisation than the reference group of smallholder farmers. In fact, for 18 out of 24 producers the depth of specialisation in terms of both land use and income is at least 50%. Our sample consists of non-average farmers, and indeed was composed to cover the major horticultural producers within the districts serving as horticultural production centres. In terms of the poverty analysis that follows, we hypothesise that these growers fare relatively well, and seek to explore whether horticulture was instrumental for this group of farmers in escaping from poverty.

3.5.2 Income estimates

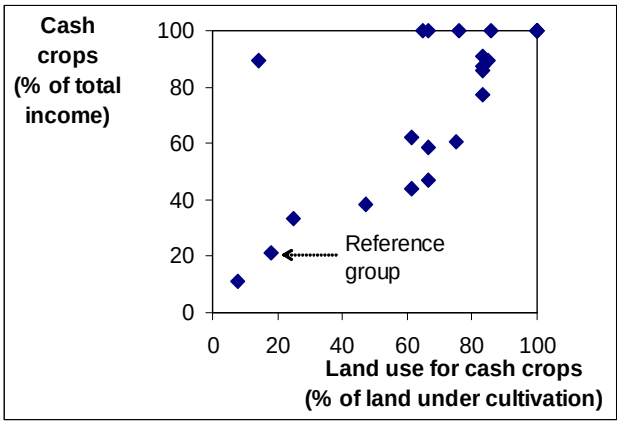

Figure 6. The sample consist of producers that have relatively deep levels of specialisation

We arrive at an estimate of the annual household income of the growers in the sample in three steps. First, we compute gross margin from horticultural income from the volume of marketed commodities in the last season of production as indicated in the survey, multiplied by a fixed added value per kg of marketed output. As intercropping is the common farming system, these growers often market 2 to 3 horticultural crops. For instance, almost every producer combines their crop with matoke, a variety of bananas. The estimate for added value is based on a total of 7 group discussions growers in the sample areas that involved 81 growers (of whom 24 growers were selected for the survey), and on expert opinion. The rate covers all variable costs, and excludes compensations for fixed costs. At 107 Uganda Shillings ($0.06) per kg, the value-added rate was lowest for pineapple. Vanilla earned a

stunning rate of over $35 per kg under the temporary price spike on the world vanilla market due to failed harvests in Madagascar and elsewhere.[†††††] For all producers, where necessary, the computed gross margins were extrapolated to an annual basis. Second, respondents were asked to indicate their other sources of income for the season, which for most respondents stemmed from animal husbandry, from wage activity or from shop-keeping. Some included the income of marketing coffee beans (or other traditional cash crops) under 'other income.' Third, we accounted for the allocation of household resources into the farming of food crops for home consumption by computing the 'non-cash income' for each household. Cassava, maize and sweet potatoes are common food crops. Specifically, the gross margin of food crops at market prices based on the area of food crops under cultivation was estimated. We assume that the costs of producing food crops are negligible; a strong assumption especially with regard to labour use as it implies zero opportunity costs of family labour.

The mean income (based on the gross margins of crop production) for the sample of growers is estimated at $2,987 (Ush 5.1 million) per annum (table 6). The median annual income is much lower at $1412, which points to a small number of large earners in the sample. We observe large income differentials across both marketing channels in favour of those involved in export production. Mean income of the grower household in the small-scale export channel (B) is over 4 times bigger than the average in the domestic channels. The income differences, as well as the absolute levels, are inflated due to the vanilla price hike. If we feed the present farm gate price for vanilla (Ush 5,000 per kg) into our income estimates, mean income of channel B growers plunges by 45%.[‡‡‡‡‡] A more recent set of data should, therefore, reveal less income inequality than the present analysis.

How do the income estimates from our sample compare? First, we compare our findings to a reference group of smallholder farmers (cultivated area 1.4 ha) in the central Lukwanga/Wakiso district. This is a set of 28 randomly selected participants for a farmer field school project, which lacked the focus on horticultural producers. In fact, only 21% of the farmers were involved in horticulture, growing leafy vegetables. Average annual income in this subset amounted to $387. In the subset of 79% not growing vegetables, average annual income was estimated at $536. Hence, earnings in the unbiased reference group are much lower, despite similar farm size. Second, it is relevant to compare the income of these horticultural producers to earning opportunities outside agriculture. The income exceeds by far the average income of a low-level position in civil service, which earns $352 per annum, even when taking into account the time resources left for part-time farming outside the civil service.

By way of summary, despite the income gap to export growers, producers in the domestic channels earn a respectable income. This is an important observation, because of the sheer number of growers involved in production of fruit, vegetables and spices for the domestic market. However, sample bias prevents us from drawing general conclusions on the earning power of horticultural crops.

[†††††] During the season under survey (July 2003 to June 2004), farmgate prices for vanilla dropped from Ush 120,000 to Ush 5,000. The average season price of Ush 62,500 was used to compute net value-added rates.

[‡‡‡‡‡] Under channel C, some producers grow a small number of vanilla plants, but the fall of mean income due to reduced cash revenues is just 8%, to Ush 1.5 mln.

Table 6. Volume and composition of annual producer income per marketing channel

	Primary producer gross income	Composition of income (%)		
Marketing channel type a)	($ per annum)	Horticultural crops	Other cash crops, livestock, casual labour	Non-cash crops (at market prices)
Total sample	2987	85.2	8.6	6.2
B	4749	89.7	7.1	3.2
C	903	53.2	19.2	27.6

a) Export-oriented marketing channels (type B) are hot pepper, vanilla, and to some extent pineapple. Roses are excluded here. Domestic marketing (type C) is dominant in pineapple, passion fruit, and onions. Source: grower survey, computations by the authors

3.5.3 Results: the impact of horticulture on poverty

3.5.3.1 Poverty reducing impact of horticultural growth

In the analysis we will take the income estimates presented above as the household income under a twofold argument: one, most respondents to the grower survey were heads of household, whom, in Uganda, are usually the sole cash earners in the household; two, the costs and returns to food crop production affect all household members. How does this estimate compare to average income in agriculture, average national income in Uganda? The overall incidence of poverty in Uganda in 2003 was that 39% of the population was poor, according to the latest estimate of the Uganda Bureau of Statistics. Keeping the substantial caveats in mind in treating the poverty rates in our sample as household poverty rates, we will compare them to the official poverty rates in Uganda. The poverty headcount against a $1 per day poverty line is just 8% in our sample (table 7). Most of the growers were sampled from horticultural production centres in central Uganda, i.e. Kampala and surrounding districts, where poverty rates are estimated at over 20% of the population. In the western region, which includes Kasese, the district in which we find large onion and passion fruit production, poverty incidence is much higher at 45%. It is likely that the poverty rates are underestimated because of the fact that income is overestimated: the computed income levels are gross margins that exclude capital costs; and we do not take into account other earnings and the size of the household. However, even if actual per capita income is half of that estimated here, poverty rates are still below average. This can be shown from the limited rise of poverty under $2 poverty line. We are confident that poverty rates in our sample are much below national incidence.

This gives us an indication of poverty in the sample, but that does not tell much about the extent to which involvement in horticulture determined the income position of the workers in the sample. This remainder of this section provides an examination along these lines, the one based on self-proclaimed views and the other quantitative based on income statements.

Table 7. Poverty indicators for the sampled producers

Marketing channel type	Poverty headcount (%)	Poverty gap (%)
The poor	*$1/day*	*$1/day*
All	14	14
A	25	5
B	7	49
C	11	4
The poor & the vulnerable	*$2/day*	*$2/day*
All	53	39
A	100	43
B	27	36
C	33	29

Source: authors' computations on data from the field report.

To get insight in the chances the horticulture commodity chain is providing for the poor we will calculate the Horticulture Out of Poverty Livelihood Indicator (HOPLI). The HOPLI is defined as: “Number of people whose livelihoods depends on a certain horticulture commodity chain to stay above the poverty line (in FTE)”. To be able to count these people we need to know:

- their total income;
- the income generated from participating in the horticulture commodity chain;
- the amount of time they invest in participating in the horticulture commodity chain to obtain this income;
- the best alternative activity for which they could have use the labour which they now used for horticulture;
- the income which they would have generated through this activity.

If a person would fall below the poverty line without the income from horticulture and the best alternative other activity (so without horticulture and with the best alternative activity), then this person will be counted by the HOPLI. By dividing the HOPLI by the total number of FTEs needed in a certain horticulture commodity chain, we will get in indication of how pro poor a certain channel is. If for example marketing chain A has a HOPPI of 20%, while marketing chain B has a HOPPI of 80%, we know that chain B includes more people who have no other alternative than this horticulture chain to remain above the poverty line (van Wijk, et al., 2004).

The biggest challenge in computing HOPLI is to assess the opportunity costs of time resources spent on farming and handling horticultural crops. A formal examination of alternative wage or farm opportunities was not undertaken. On the latter, a possible alternative avenue is to apply model simulations within an agronomical and economic framework to assess the possible returns to alternative crops, as applied in a similar research on the rose sector in Vietnam (van Wijk and Allbritton, 2005). This report takes a more basic approach. First, we analyse the extent to which earnings from horticulture reduce the poverty headcount in the sample. Second, we examine survey answers of respondents to questions relating to their motivation to become involved in their present activity in order to get a feel for perceptions with the respondents on alternative job or earnings opportunities.

Because the sampled workers and producers are identified as specialised producers, we expect that a simulation of income position excluding earnings from horticulture will

dramatically increase poverty rates. Table 8 does confirm the hypothesis; horticultural income reduces poverty in the sample by almost 60%. The results are interesting because of differences across the three channels for livelihood development. Poverty reduction is most dramatic for the rose workers, all of whom are under poverty line income without their horticultural earnings. The assumption is that there are no alternative opportunities for these workers (their reservation wage is zero). There is support for this preposition in the statements of the flower workers (see below).

Table 8. Poverty reducing impact with growers and flower workers

Channel	Poverty headcount against $1/day (%)		HOPLI (%)
	Income without horticulture	Total income	
A	100	25	75
B	60	7	53
C	56	11	45
All	72	14	58

HOPLI = Horticulture out of Poverty Livelihood indicator

3.5.3.2 Alternative livelihood means

Our sample excluded workers not involved in horticultural activities. Still, we seek to get an idea why the sampled workers did not resolve to other agricultural sectors or employment opportunities, if any. Workers and growers alike were asked to indicate what attracted them into horticultural activity. Growers were asked 'Why did you decide to grow this commodity?' (Grower survey, no. 11c). Flower workers were asked 'If given a chance, would you work somewhere else for the same salary?' (Worker survey, no. 20). Wholesalers, assemblers and retailers were asked to 'Rank horticultural business in relation to other agricultural commodities in the area as a dependable source of livelihood' (Trader survey, no. 20).

Under the flower sub-sector, the main contribution made in poverty alleviation among the rural and peri-urban poor is in creation of employment. The labourers are engaged in the flower farms because of the benefits of guaranteed employment as opposed to other employment opportunities that are quite shaky. This factor seems to be important to the workers since the actual pay is not that attractive. The export channel is a more attractive source of income for the rural producers. Many got engaged in production for export after observing the performance of early adopters and innovators. Noticeable changes and developments achieved for those involved in the enterprise led to others being interested. The most important response of those involved was profits attained by the smallholder farmers. Some responses given by the farmers include

- Crop is profitable
- Decline in performance of traditional cash crops like coffee
- To have a dependable source of income

Other external factors such as availability of exporters that can be relied upon also motivate the small holder farmers to engage in the production, especially after one has made the initial contacts. Involvement of local NGOs in facilitating production through training and extension services to those smallholder farmers producing for export has boosted their incomes to a large extent. Other training and crop management are also organised by some of the exporting companies to ensure quality. However, more organisation is still required for better

marketing. Farmers have benefited from such organisations as given in case study of Mr. Sebbula below.

Small scale export production

Hot pepper producer Sebbalu David, in the central district of Mpigi, used to grow ginger until the crop failed. In search of an alternative cash crop he participated in a training on hot pepper production that was organised by one of the exporting companies. He planted one hectare of hot pepper in a mixed cropping with vanilla, matooke (bananas) and cassava. He now gets over 60% of his cash income from hot pepper.

The farmers involved in the production for the domestic market operate under less intensive labour requirements and low inputs. They are motivated to produce for the local market because of the perceived profits. In addition, horticultural commodities effectively replace the role previously played by traditional cash crops such as coffee. For commodities that are also exported (pineapple and passion fruit) the domestic market provides an outlet for the goods that do not meet the export quality. Generally the change in lifestyle of people living in the towns has helped in creating demand for the produce and products such as juices. This also implies that there are areas that can be exploited to provide higher incomes to the producers. An added advantage unique to Uganda is that farmers can harvest some yields even when no external inputs are used, given the good soils in most parts of the country.

Generally returns from the domestic markets are poor compared to prices offered in the export market. Improving the quality of the produce targeting the domestic market could alter this situation. There are fewer regulations and controls for those producing for domestic markets hence less use of inputs. One can therefore argue that poor farmers could initially target the domestic market but with more resources gradually shift to target the export market once their resource base improve.

The assemblers and retailers are motivated to participate because of the perceived benefits in the trade. The trading is open to competition and therefore anyone willing to take the risk and has the minimal assets required is free to ender the market. In addition, they are keen to pick on the right signals on demand and supply situation. Acceptance and possession of entrepreneurial skills are added advantages to the traders (assembler and retailers). Some assemblers are motivated by the own production, which needs marketing. Fellow farmers also know local assemblers and therefore can trust them to handle their produce on credit since buyers demand larger volumes than own produce.

3.5.4 Discussion

The previous chapters have examined value creation, job opportunities and earnings in horticultural activities that are accessible by the poor, because of the limited endowments that are required for these activities. Table 9 summarises the results. Four activities were identified for potential involvement of the poor: farm work on export farms, growing in smallholder setting, local trade services, and retail in stalls and on street markets. Throughout the analysis we maintained the framework of three marketing channels for livelihood development that was developed in section 2. The combination of activities and market channels also defines potential focal points for government or donor involvement that aims to support pro-poor growth. This section examines the opportunities and threats for involvement of the poor, and suggests program areas for government or donor involvement.

Table 9. Areas for involvement of the poor, and potential impact

	High-value (exports) large scale, few actors (A)	High-value (exports) smallholder supply, many actors (B)	Low-value (home), smallholder supply, many actors (C)
Farm work/ contract farming	25% Poor HOPLI = 75%	n.a.	n.a.
Small scale growers	n.a.	7% Poor HOPLI = 53%	11% Poor HOPLI = 45%
Trade services, i.e. assembling, wholesale	n.a.	GM = 9-13 x poverty line income	GM = 2-60 x poverty line income
Retail: stalls, street markets	n.a.	n.a.	GM = 14-200 x poverty line income

HOPLI = Horticulture out of Poverty Livelihood indicator: the share of respondents that are non-poor due to involvement in horticulture.
GM = Gross Margin. Source: authors' computations.
N.a. combination is irrelevant or has not been examined.

3.5.4.1 Challenges & perceived risks

Challenges

The horticultural sector supply chain participants are faced with several challenges at almost every stage. The smallholder participants who are disadvantaged in many ways especially a limitation in the resources needed to efficiently play their role face most of the challenges. The main challenges identified in the smallholder sub-sector revolve around meeting the quantities and the quality requirements for the export market. The specific challenges are:

a) The primary producer is responsible for driving the chain since produce or products are required for downstream activities to take place. The production process at the smallholder level requires the farmers to have access to knowledge about market requirements and price trends since production decisions are based on existing opportunities. Some of the constraints affecting the efficiency of activities at the primary producer level include, lack of improved varieties, application of inappropriate management practices and skills, poor research and extension services provision, poor post harvest management and quality control mainly due to lack of knowledge and facilities, limited access to information on production and marketing, poor infrastructure, and inaccessible financial services.
b) Performance of the sector is affected by poor coordination and interaction of the various stakeholders involved in the provision of various services within the sector. The main challenge is the fragmentation of the stakeholders and lack of common approaches for capacity building and groups/associations strengthening.
c) Most of the production is carried out under rain fed conditions, which implies that supply during the dry period is very unstable. This has limitations in commitments to take importer orders that run over long periods. The limitation is affecting the long-term relationship between the exporters and smallholder producers that target export market and there is a potential danger of exporters delinking with smallholder producers in preference of large producers under irrigated conditions
d) Though there is potential in the domestic market for Ugandan produced fruits and vegetables, the organisation and retailing conditions leaves a lot to be desired. This has consistently hindered significant growth in quantities that end up in the local markets. Cultural

factors (each household maintains a vegetable garden) further continue to affect the performance of the domestic market. The inability for the retailers in the local markets to operate with economically viable volumes has led to some of them giving up after probably the first attempt. An expansion to super market retailing has created competition with horticultural products retailers in the major markets such as Kampala. However, their operations boost the incomes of producers making one segment of the poor benefit.

Risks as perceived by key actors

Several risks influence the activities of the actors in the horticultural supply chain. These risks are either external or internal the ability to manage them is dependent on the exposure and resource endowment. The smallholder producers generally face similar risks and these are related to the external factors for those producing for export, local environment for both export and domestic market and human relationships. The impact of the risks determine to a big extent if the actor remains active in the supply chain or quits. Producers face the risk of being excluded as a result of non-compliant to the EurepGap regulations and failure to have their farms certified. Risks within the farm are of less magnitude tan those related to the market such as low prices and conditions of exporters. Vagaries of weather due to dependence on rain fed production also affect the yields.

Fluctuation in supply and demand affects most actors along the supply chain although the producers and retailers may be affected most. Due to the nature of rain fed production this is a major concern since many commodities experience a glut period, when the farmers fetch very poor prices. The traders (assemblers and retailers) face the risk of high cost of transport that takes up much of their potential benefits. However, this is addressed by using the cheapest means of transportation such as bicycles and combining loads with one vehicle. Transportation also affected the exports that have to pay dearly for air lifting the commodities. This is exacerbated by limited or inadequate space and may lead to deterioration of the fresh produce.

3.5.4.2 Inclusion and exclusion of small farmers

Inclusion

The opportunities that the sector provides for smallholder producers to participate are many. As pointed earlier, the sector avails opportunity for income generation and employment for all actors along the supply chain.
The various actors are attracted to participate in the horticultural supply chain based on observations of progress made by those who entered earlier, experience gained by working in companies or firms active in the sector or after realising the potential in the horticultural sector. The main factors assessed as attractive by the key actors include assured markets, profitability of the enterprises and associated marketing activities, opportunity for diversifying income generating activities, a source of employment among others. The key factors can be considered as opportunities for growth as follows:

- Increase in per capita income, where the resource poor engage in production for the market. If production is more organised and is done under good management, per capita income could be increased significantly. The direct effect of this could be reduced rural to urban migration.
- Growing domestic, regional and export market since demand could be created through availing the produce in these markets in a form that is attractive to consumers. Since the population is growing, there is automatically an increasing demand of the horticultural produce and products. More awareness on the need to change eating habits will also create for some of the products especially fruits and vegetables in the domestic scene.

- Options for organic production, other market niches i.e. overseas ethnic markets. Currently, Uganda farmers can produce horticultural products organically. The main hiccup is the certification process due to accessibility of the growing areas.
- Cheap labour; surplus land (diversification); most smallholder farmers have adequate labour to undertake horticultural production as income generating activity. Even under labour intensive system, this is still possible in many developing countries including Uganda. They can also diversify to have more enterprises that may be related.
- Intercropping allows diversification and intensive use of land for those with small parcels. This also allows for cost effective use of resources at the farmers disposal. In many cases, the climate in Uganda allows for at least two harvests in per annum
- Local processing, adding value to horticultural produce is another avenue for earning more income from horticulture. Industrial and farm level value adding are practiced in Uganda. Farm level value addition has greater potential for improving the livelihood conditions of poor farmers.

Exclusion

Though there is great potential for involving the poor in horticultural production for income generation and employment, there are some limitations to entry at each actor level. All the actors are vulnerable to exclusion although the level of vulnerability decreases as one moves from the primary producers to the exporters. The level of vulnerability is influenced by the ability to cope with adverse conditions along the chain. However, for the domestic market vulnerability is variable depending on the ability and resilience of a particular actor such that any of the actors can loose suppliership at any given time.

The small holders engaged in export production carry the highest risk of exclusion. The only link they have to exporters in most cases are the assemblers or training organisations that could fail them at any time. The growers depend a lot on how organised they are into recognisable groups that are used as entry for training acquisition of knowledge. In regard to gender women have a higher risk of exclusion since they have limited access to capital and land. Certain activities such as spray are detrimental to women especially if they are pregnant. They can only engage in the enterprise if they have cash to hire labour. Distance to markets also increases the chance of exclusion, farmers far in the interior have less opportunity to participate in horticultural production for income generation, notwithstanding some opportunities due to limited pest pressures, e.g. in seed supply. Lack of planting materials and associated high cost of inputs poses a challenge to the small holder producers to remain active in the sub-sector. For specific commodities, the terrain and suitability of the soil on own land also affects the level of engagement.

Assemblers and retailers involved in export marketing could be excluded if the exporters reject their produce or if they lack good interpersonal relationships with the producers and other assemblers. Seasonality that calls for one with good entrepreneurial skills and cutthroat competition among the actors at one level could also cause one to fall out. Training on business tips and other factors that improves the entrepreneurial skills could help more of the resource poor people to participate in the supply chain in a more secure way.

Table 10. Exclusion factors for various actors

Actors	Exclusion factor
Producers	Women due to land access, capital, fear of spraying and overtake by man
	Production areas located far from urban centres
	High cost of inputs
	Certification requirement for export crops
	Unreliable buyers
	Labour intensity
	Length of growing period (passion/vanilla)
	Steep terrain/suitability of soil type
	Lack of planting material.
Assemblers	Acceptability by exporter
	Lack of goodwill of producers, capital, storage, cooling facilities and experience
	Seasonality of market
	Competition among assemblers.
Retailers	Fluctuation in supplies and price
	Lack of capital and working space
	Competition among retailers

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4 Employment and poverty alleviation in the flower market of North Vietnam§§§§§

4.1 Introduction

4.1.1 Goal

In this chapter, we will identify the current status of marketing chains in Northern Vietnam which supply roses to Hanoi and quantitatively analyze the effectiveness of these chains in sustaining livelihoods and their impact on the poor. The main issue addressed here is how important are different activities within the rose market chain to sustain the livelihoods of the actors in that chain.

The marketing chain supplying roses to Hanoi is pictured in Figure 7. This paper discusses and analyzes six of these marketing channels, three beginning with producers in Me Linh and three with producers in Sapa. All channels end with consumers in Hanoi city. Although we will not analyze all locations supplying Hanoi, we believe that our choice of marketing channels in this analysis is representative of all types of channels which supply Hanoi.

4.1.2 Data

Producers

Pro Poor researchers surveyed rose producers in Me Linh commune, Vinh Phuc province (specifically Hoi, Lieu Tri, and Duong hamlets) in August of 2004 and in Sapa commune, Lao Cai province in October 2004 through semi-structured interviews.

At each of the surveyed sites, researchers also interviewed key informants and held group interviews with both people involved in rose production and people who were not (Dang Viet Quang, et al., 2004 and van Wijk, et al., 2004). The key informants ranked all farms producing roses in 2004 by wealth (poor, moderate, and rich). From the each of the wealth ranking groups, farms were randomly chosen to be interviewed (i.e. stratified random sample).

Farms were interviewed about their rose production in 2003. Some of the farms were new entrants that had only begun producing in 2004; therefore the samples with no rose production or less than a full year of production in 2003 were excluded from the analysis. Table 11 shows the number of farms interviewed and included in this analysis.

Table 11 Rose producers interviewed, 2004

Commune	Research site	Number of Interviewed Farmers	Number of Interviewed Farmers that produced roses in 2003
Me Linh	Duong	33	30
Me Linh	Hoi	12	12
Me Linh	Lieu Tri	11	5
Sapa	Sapa	9	6

§§§§§ This chapter was authored by Amanda Allbritton, Maarten Siebe van Wijk and Dang Viet Quang.

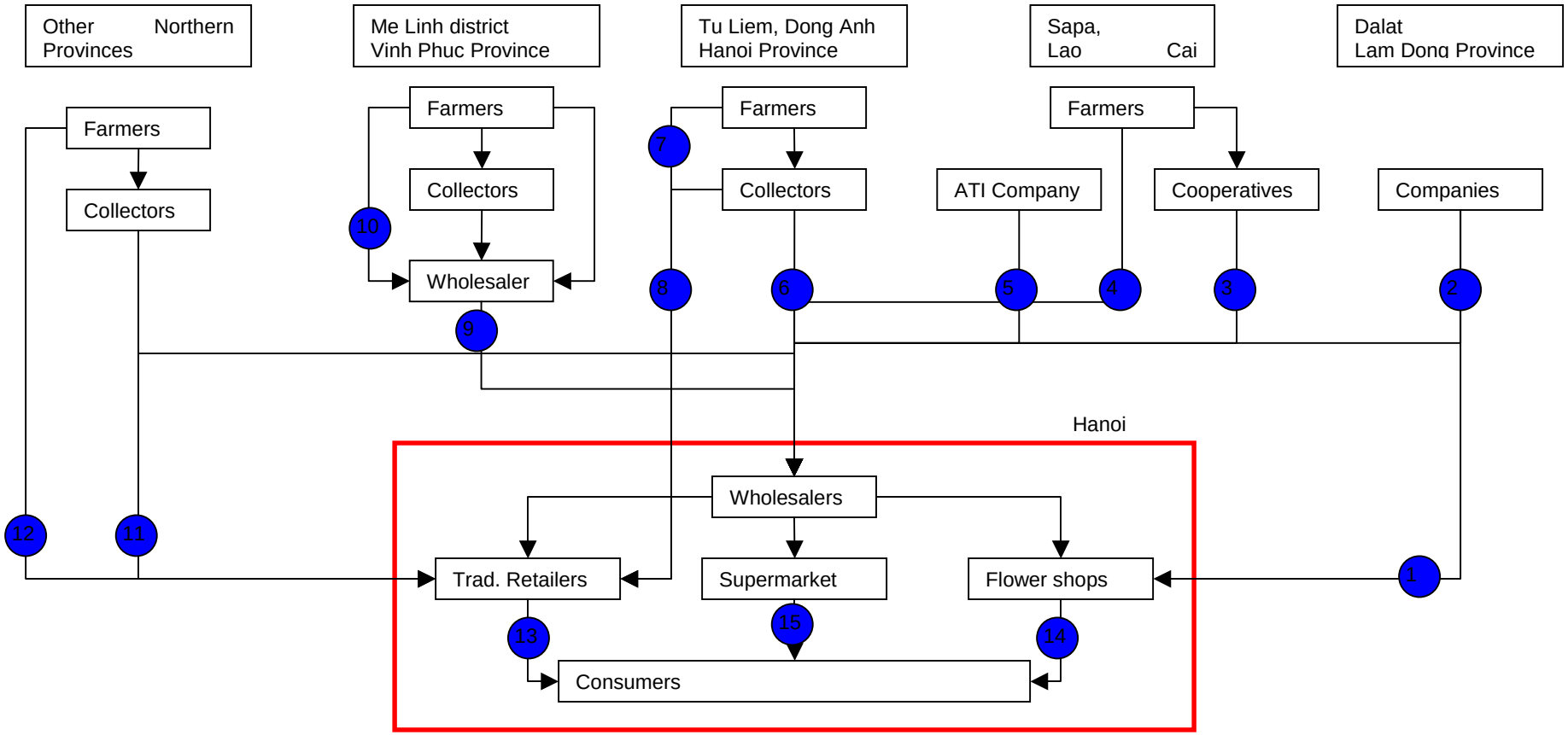

Figure 7 Marketing chain supplying roses to Hanoi

In Sapa, researchers interviewed the American Technology Incorporated Company (ATI) about its rose production. Quantitative information about this supply channel is taken from that interview which can be found in van Wijk et al (2004).

Estimates from key informants are used as guidelines to check and balance the estimations made in this paper.

Wholesalers and Traders

In June 2005, a team of researchers interviewed 15 wholesalers at Quang Ba wholesale market to gather information about their marketing in 2004. In May, they had also interviewed one big trader in Quang Ba wholesale market. Additional information about this group of actors comes from some group interviews of wholesalers ("The Wholesale Market Survey", 2004 and Dang and Pham 2005). The remainder comes from information gleaned from the semi-structured interviews of producers and retailers (i.e. channel flows) and from key informants in Me Linh and Sapa (i.e. percent of production destined for Hanoi).

Retailers

Flower shops, flower stalls and hawkers were sampled systematically. Streets and markets were randomly chosen and then every fourth retailer was approached for an interview in March 2005. Information was gathered for the year 2004. Table 12 shows the number of each type of retailer interviewed.

Table 12 Rose retailers interviewed, 2005

Retailer	Description	Number Interviewed
Flower shops	Flower shops with storefronts on the street	15
Flower stall	Fixed hawkers in official markets	14
Hawkers	Mobile hawkers in official markets	16
	Mobile hawkers in unofficial markets	5
	Mobile hawkers going door-to-door	16

In this paper roses are measured in units of 10,000. Labour is measured in units of full time employment units (FTE). One FTE is equal to 240 labour days, the approximate number of days that an office worker in Vietnam would work in one year.

The next section of this paper will define the rose marketing channels we analyze. Section three will identify estimates of the number of actors and the flow of roses through the channels. The fourth section will create indicators for comparisons across channels while the fifth section will look at the livelihoods of the players involved in rose marketing. The final section will offer some conclusions and recommendations.

4.2 The Rose Marketing Chain Supplying Hanoi, Vietnam

4.2.1 Channels

This analysis is primarily concerned with the roses sold to consumers in Hanoi. The supply channels in Table 13 will be analyzed quantitatively. These supply channels were selected from the larger supply chain diagram in Figure 7 as they are representative the *types* of channels supplying Hanoi.

Table 13 Rose supply channels investigated

Location of Farmers	Channel	Description				
Me Linh, Vinh Phuc	1A	Farmers	Wholesalers		Flower shops	Consumers
	1B				Flower stalls	
	1C				Mobile hawkers	
	1D				Supermarkets	
	2A	Farmers			Flower shops	Consumers
	2B				Flower stalls	
	2C				Mobile hawkers	
	3	Farmers				Consumers
Sapa, Lao Cai	4A	Farmers/ Workers (from Me Linh)	Wholesalers		Flower shops	Consumers
	4B				Flower stalls	
	4C				Mobile hawkers	
	4D				Supermarkets	
	5A	Farmers	Wholesalers		Flower shops	Consumers
	5B				Flower stalls	
	5C				Mobile hawkers	
	5D				Supermarkets	
	6	Workers	Large flower company	Wholesalers	Flower shops	Consumers

4.2.2 Actors

Some actors in the six supply channels have similar roles and differing functions. Table 14 discusses these in detail.

Table 14 Actors in investigated rose marketing channels

Actor	Role	Function
Farmer Me Linh	Producer	These are households which produce roses with family labour and some hired labour on small plots (700 – 6000 m^2). Some households specialize in rose production. Others diversify income with vegetable or rice production and/or off-farm income.
Farmer Sapa	Producer	These farmers are native to Sapa. The have medium sized farms (2500 – 20000 m^2) and produce roses with family and hired labour.
Farmer Sapa from Me Linh	Producer	These rose farms are created and managed by distant families. They rent land (2 – 4 ha) and hire labourers to grow roses in Sapa.
Company	Producer	Companies are large scale rose producers who operate entirely with

Actor	Role	Function
		hired labourers (75-100 seasonal labourers). Rose production may be one of many enterprises the company pursues.
Wholesaler	Intermediary	Wholesalers make arrangements with farmers, cooperatives, companies or collectors to receive roses for reselling to retailers. They can have permanent places in the wholesale markets or shifting places outside wholesale markets. This actor specializes in wholesaling and does not plant roses.
Flower shop	Retailer	Retailers who specialize in selling flowers. They usually pay rent and work with 2-5 labourers. The usually have a storefront on the street.
Flower stall	Retailer	These are fixed hawkers in official markets. They usually pay rent and are located inside the markets. They typically have 1-4 labourers.
Mobile Hawker	Retailer	Mobile retailers sell roses from motorcycles, bicycles, or baskets. This category includes mobile hawkers in official and unofficial markets and those who travel door-to-door.
Supermarket	Retailer	Large-scale generalist retailer

4.2.2.1 Producers

Farmers

Rose producing farm families have similar sizes across channels ranging from 4 (Channel 4) to 5.25 persons (Channel 5). Farmers native to Sapa use the most full-time family labour (3 persons). Both farmers in Me Linh and those native to Sapa have more full-time female family labour than farmers in Sapa originally from Me Linh. Part-time family labourers tend to be younger than the full-time family labourers. These are probably teenagers who attend school and also work with the roses. The two farms interviewed in Channel 4 do not have part-time family labourers.

Farmers in Channel 5 hire the most seasonal labourers (average of 370 days), while farmers in Channel 4 tend to hire year-round hired labourers more (7.5 persons/year). Farmers in Me Linh, on the other hand, use very little hired labour, averaging only 13 days per year and practically no year-round labourers. Daily labour rates for seasonal are similar in each location, between 20,000-25,000VND. The monthly wage for workers hired by farmers in Channel 5 is 730,000VND which is 130,000VND more than is paid to year-round hired labourers in the other channels.

Farmers in Me Linh have the smallest rose area (2211 m2), while those in Sapa have significantly larger areas (Channel 4 – 28750 m2; Channel 5 – 13735 m2). Farmers in Channel 4 dedicate all of their land to rose production, while farmers in Me Linh and those native to Sapa reserve some land for other production or other uses. Thirty-one farms in Me Linh rent in land the average size of 1174 m2. All of the land of farmers in Channel 5 is also rented in, as they are not native to the area. Half of the farmers in Channel 5 rent in land as do two-thirds of the farmers in Channels 1, 2, and 3. The average distance of the farm to the main road is 500 m or less. Farmers in Channel 5 will need the most financial capital for the following year's rose production, presumably because all of their land is rented.

Table 15 Producer descriptive statistics

	Channels 1, 2, & 3		Channel 4		Channel 5	
	Mean	SD	Mean	SD	Mean	SD
Males	2.53	1.23	2.00	0.00	2.50	1.00
Females	2.5	0.85	2.00	0.00	2.75	1.26
Household size	4.98	1.44	4.00	0.00	5.25	1.71
Average age	29.69	7.81	30.00	2.12	25.44	4.69
Full-time family labourers	2.72	1.37	2.50	2.12	3.00	2.00
Males	1.24	0.79	1.50	0.71	1.25	0.50
Females	1.48	0.75	1.00	1.41	1.75	1.50
Average age	34.73	6.98	29.25	1.06	36.50	5.15
Part-time family labourers	1.86	1.12	0.00	0.00	2.67	1.83
Males	1.03	0.72			2.00	1.00
Females	0.79	0.87			0.67	0.58
Average age	24.72	18.29			18.19	6.76
Seasonal hired labourers (days per year)	13.47	27.90	10	14.14	370.0	568.9
Wage per day (1000 VND)	21.47	29.39	25		25.0	0.0
Year-round hired labourers per year	0.02	0.15	7.5	10.61	2.8	3.0
Wage per month (1000 VND)	500.00		500		730.0	292.1
Roses (m2)	1,942	924	28,750	12,374	8,420	7,948
Cropped land (m2)	2,211	1,149	28,750	12,374	11,910	12,628
Garden (m2)	175	316	0	0	325	472
Other land (m2)	22	76	0	0	1,500	3,000
Total land (m2)	2,408	1,205	28,750	12,374	13,735	11,947
Owned with title (m2)	658	1,253	0	0	4,635	5,353
Owned without title (m2)	1,746	3,668	0	0	900	1,800
Rented out (m2)	5	32	0	0	450	900
Rented in (m2)	775	933	28,750	12,374	10,000	14,142
Total(m2)	3,183	3,528	28,750	12,374	15,985	9,517
Distance from rose fields to main road (m)	399	459	265	332	500	408
Financial capital needed for rose production next year (1000 VND)	11,875	9,820	275,000	247,487	57,500	33,040

SD = standard deviation

Cooperatives

Some rose farms are officially recognized as cooperatives by the Vietnamese government. In 2002, four cooperatives were established for organizational purposes in Sapa (Thien Thanh, Binh Minh, Thanh Xuan, and Hoa Hong). This allowed them to be more effective in both rose production and other businesses.

We interviewed two farmers in Sapa that were cooperatives (Binh Minh and Thien Thanh). One is in Channel 5 and one is in Channel 4.

These two farms were not grouped and analyzed as cooperatives. In interviews, we found that behaviour of the individual rose producers in the cooperatives was similar to that of other rose producers in the area. The difference between other farms and cooperatives is that in cooperatives three or four farms collaborated to arrange transport and share transport costs to markets in Hanoi or elsewhere (van Wijk, et al., 2004).

In an error on our part, little information was collected about this distinction. In the interviews of the six producers in Sapa, only two answered questions about how their roses were delivered. Theirs were picked up at the field or home. Transport costs were not collected in the questionnaires and we know little about the differences in transport arrangement between those in cooperatives and those who are not. There is no evidence in a premium price between the groups as the prices received by the cooperatives were not significantly different than those received by other producers.

Company

American Technology Incorporated (ATI), also known as Viet My Company, is a 100 percent foreign investment company set up by a Vietnamese who is living in America. The company consists of about 20 business units of which ATI Sapa is one. ATI Sapa was set up in 1997 with the focus on fruits and tourism with a staff of 100 persons in total. The company planted about 50 hectares (ha) with tropical fruit trees at first and in 2001 the company started with roses. In 2004, they had 14 ha of flowers of which, 13.5 were roses. ATI estimated that they made a profit of 40% per rose. ATI Sapa follows a strategy of aiming for the highest quality and destroys 50% of the roses on average.

4.2.2.2 Intermediaries

Collector/ Assembler/Big Trader

Farmers sometimes sell roses to collectors (sometimes also called "assemblers" or "big traders") who then resell the roses at wholesale markets or to wholesalers in other provinces. In Me Linh, there are 60-70 big traders who buy and sell 12,000-25,000 roses/day. From January to March the number increases to 100 (Dang Viet Quang, et al., 2004). Some collectors are located in Hanoi and some have direct links to farmers in Sapa and Me Linh, but the roses which they buy from farmers are sold to cities and provinces outside of Hanoi. Their role is important, but they are considered to be outside of the scope of this analysis because their roses are sold to consumers outside of Hanoi and will therefore not be included.

Box 1 A big trader in Quang Ba wholesale market

Ms. Thu is one of 10 big traders in Quang Ba wholesale market. She buys and packs flowers in this market and arranges transport to Hai Phong. Buyers (wholesalers and retailers) place their orders ahead of time and the driver delivers the flowers to them in Hai Phong.

The transportation cost is 150,000 VND/room (each truck normally has three rooms inside). She buys about 15,000 roses/day (equal to 300 bunches). Her buying prices are 7,000 VND/bunch of short-stem rose (type II and type III) and 12,000-13,000 VND/bunch of long-stem rose (type I). Her selling price at Hai Phong is 9,000-10,000 VND/bunch of short-stem rose and 14,000 – 15,000 VND/bunch of long-stem rose (Nguyen Viet Cuong, 2005).

Wholesaler

The information in Table 16 describes wholesalers at Quang Ba wholesale market. Wholesalers have an average of 2.64 persons per family and an average income of almost 45 million VND per year, 42% of which can be attributed to roses. Most live near the market, but four live in Me Linh – over 25 km from Quang Ba. Wholesalers have on average 11.6 years of experience in some form of flower trading. They work with themselves and only one hired labourer on all but two days per month.

Table 16 Wholesaler descriptive statistics

	Mean	Standard Deviation
Age of household head	41.29	5.72
Family size	2.64	0.93
2004 total household income (1000 VND)	44,930	28,392
Rose contribution to household income (%)	42.26	28.72
Distance from home to market (km)	10.00	11.45
Experience in flower trading (years)	11.43	4.45
Number of people working at wholesale booth	2.14	2.38
family labourers	1.14	0.36
hired labourers	1.00	2.15
full-time hired labourers	0.21	0.58
seasonal labour days	3.57	10.70
Hired labour monthly wage (1000 VND)	135.714	345.537
Seasonal labour daily wage (1000 VND)	8.571	17.478
Days per month selling flowers	28.79	2.89
Months per year selling flowers	11.64	0.74

SD=standard deviation

4.2.2.3 Retailers

Flower shops

Table 17 shows that flower shops have the largest average household income of retailers, 60,000,000 VND per year. About 23% of their household income can be attributed to the sale of roses. They live near their shops and have about 10 years of experience in trading flowers. They work with approximately three people of which at least one is hired.

Box 2 Hired labourers at flower shops in Hanoi

Researchers interviewed 16 hired labourers at different flower shops in Hanoi. The workers' specific duties included making bouquets (87.5%), arranging flowers in vases/making wreaths (37%), selling flowers (37%), delivering flowers (12%), and cleaning the shops (6%). They spend about 29% of their time working with roses. Family or friends helped 62% of the workers find employment at the flower shops, while 32% found the job on their own and 7% through an employment centre.

The average worker works 13 hours a day for 6.9 days a week and 11.7 months per year. Most workers get a break of about 7 days for the Tet holiday. All workers are paid monthly and the average salary is 1,043,750 VND/month. Eight workers get bonuses averaging 1,550,000 per year. For 75% of the workers, flower shop owners pay for their food and accommodation. Only two workers have formal contracts (one and three years). Those who were not contracted said that poor job performance or stealing would be cause for termination of employment.

Workers say that working in the flower shop does not require as hard labour as their previous jobs and is more comfortable and has a more stable income. Although, working in the flower shop requires longer hours and more precise skills such as those for designing bouquets.

If they were not working at the flower shop, over 60% would use the skills they have learned to open a flower shop or continue selling flowers elsewhere, while 30% would farm.

Flower stalls
Flower stall retailers make about 26% of their household income of 35,000,000 VND from roses. They live approximately 8 km from where they work. About half of the flower stalls work with a family member. Fifty percent of flower stalls are in official markets but do not rent stalls, while 43% rent stalls. Seven percent are in unofficial markets.

Hawkers
Most hawkers work alone and move door to door selling their roses which contributes to 24% of their income. They are less experienced than other retailers with an average of six years of experience in trading flowers and live further away from where they work (13.5 km).

Table 17 Retailer descriptive statistics

	Flower shops		Flower stalls		Hawkers	
	Mean	SD	Mean	SD	Mean	SD
Family size	2.5	0.7	2.4	0.5	2.3	0.9
Males	1.2	0.6	1.3	0.5	1.0	0.4
Females	1.3	0.6	1.1	0.5	1.4	0.7
Total income in 2004 (1000 VND)	60000	28763	35293	19170	32892	77055
Share of income from rose trading (%)	23.1	10.3	26.3	14.1	23.9	17.1
Distance from home to this market (km)	1.27	1.71	7.79	8.31	13.55	17.17
Experience in flower trading (years)	9.60	7.29	9.29	5.20	6.26	4.04
Number of people involved	3.07	1.62	1.50	1.29	1.00	0.00
Family members	1.93	1.67	1.50	1.29	1.00	0.00
Hired labourers	1.13	1.25				
Monthly salary of hired labourer (1000 VND)	267	272				

SD = standard deviation

Supermarkets
One Pro Poor researcher visited 11 large supermarkets in Hanoi in May 2005 (see Appendix C). Only one supermarket had ever sold flowers: Big-C supermarket. Of the 11 supermarkets, none had plans to begin or resume selling roses.

Box 3 A flower seller in Big C Supermarket

Ms. Huong manages a flower stall in the Big-C supermarket which currently sells artificial flowers. She also has a flower shop on Le Hong Phong Street. Initially, she sold fresh flowers such as roses, chrysanthemums and lilies in the supermarket. But she could not sell many flowers and the flowers quickly lost freshness because they sold slowly. She usually sold 1 to 2 bundles of flowers a day. Her customers were usually the staff in the office of Big-C supermarket. She said that there were few customers who wanted to buy flowers in the supermarket. They preferred to buy them from the flower shop. Now she has stopped selling fresh flowers in the supermarket and only sells artificial flowers. She does not have a plan to sell flowers at the moment because it is summer. She may sell fresh flowers in the winter again if she feels a need (Nguyen Dinh Tien, 2005a).

4.3 Estimations of Actors, Production, and Flows

4.3.1 Producers

In Dang Viet Quang, et al. (2004), Me Linh commune officials estimated that 300 households specialized in rose production, 300 in rose production and selling, 1500 in rose and cash crop production and 50 in rose production and some other trade. This totals to 2150 farms involved in various intensities of producing roses (Channels 1, 2, and 3).

In van Wijk, et al (2004), Sapa commune officials identified 28 rose producing farms in 2003. Ten were originally from Me Linh (Channel 4) and 18 were native to Sapa (Channel 5). Officials also identified 15.5 ha of roses being cultivated by companies. ATI Company had 87 seasonal and 13 full time workers producing roses on 13.5 ha. Assuming the remaining companies had similar employment ratios we can estimate that there are 100 seasonal and 15 full time employees working at rose producing companies in Sapa Commune.

Table 18 Estimated number of rose producers in Me Linh and Sapa

Channels	Population involved in rose production
1,2,3	2150 farms
4	10 farms
5	18 farms
6	100 seasonal employees 15 full time employees

We based estimations of rose production for the researched farmers on the mean productivity of the sampled actors within a particular channel. The example of Me Linh can be seen in Table 19. The sample productivity per ha (867,840 roses/ha) was calculated from the sample and then multiplied by the commune area under rose production in 2003 (200 ha, according to commune officials) to make an estimate of the number of roses produced in that year for the commune (173,567,405 roses). Note that the productivity of farmers in Me Linh is much greater of those in Sapa. This is because different types of roses are grown in each place. Rose plants grown in Me Linh produce more, but smaller roses than those grown in Sapa.

The Commune area in rose production in 2003 for Channels 4 and 5 in Sapa were not distinguished, but rather officials told us that roses were produced by farmers on 55 ha of land. We designated the areas of 33.136 ha and 21.864 ha to Channels 4 and 5, respectively, based on the proportions of farms identified in each channel (10 and 18) and the sample's average farm size for each category (2.875 ha and 0.776 ha).

Table 19 Estimated rose production from Me Linh and Sapa

Channels	Actor	Sample Roses Produced (10,000 roses)	Sample Area in Rose Production (ha)	Sample Productivity (10,000 roses/ha)	Commune Area in Rose Production in 2003 (ha)	Estimate of Commune Rose Production (10,000 roses)
1,2,3	Farmers in Me Linh	791.936	9.125	86.784	200.000	17356.7405
4	Farmers in Sapa from Me Linh	163.40	5.750	28.417	33.136	941.6509
5	Farmers in Sapa	67.10	3.368	19.923	21.864	435.5836
6	Workers in Sapa	267.75	13.500	19.833	15.500	307.4167

Interviewees identified the actors to whom they sold their roses according to the percentages in Table 20. Farmers in Channels 1, 2, and 3 are located near Hanoi. Therefore we assume that the wholesalers, consumers, and retailers to whom they sell are located in Hanoi. Since Me Linh is near Hanoi, we assume that the assemblers they sell roses to are also in Hanoi. Assemblers in Hanoi buy roses and resell them to locations outside of Hanoi. The 24.24% of roses sold to assemblers are therefore assumed to be destined for locations outside Hanoi.

Channel 4 producers grow roses in Sapa but are originally from Me Linh, where they previously grew roses. With their experience and networks in Me Linh, we assume that they have marketing arrangements similar to those producers in Me Linh and that their roses are destined for Hanoi. Interviewees reported that 100% of their roses were sold to wholesalers, which we presume are in Hanoi.

According to local government officials in Sapa, 80% of the roses produced by farmers in Channel 5 are sold in Hanoi (van Wijk, et al., 2004). We assume that the 15.50% sold to assemblers were resold in other provinces and 0.46% was sold to local consumers. As there are no wholesale markets in Sapa, we can assume that the 84.04% sold to wholesalers go to wholesalers in Hanoi. We find the response of the sample in Channel 5 reasonably reflects the knowledge of local officials.

The ATI Company interviewed for Channel 6 said that all of their roses were sold to six wholesalers in Hanoi. Then 60% of those roses were sold to flower shops in Hanoi, while the remainder went to cities outside Hanoi (van Wijk et al., 2004). We assume that other companies in Sapa have similar marketing strategies.

Table 20 Flow of roses from producers (%)

Channel	Actor	Wholesalers	Assemblers	Consumers	Retailers	% to Hanoi (according to local officials)	% remaining in Hanoi
		%					
1,2,3	Farmers in Me Linh	56.48	24.24	10.29	8.99	--	75.76
4	Farmers in Sapa from Me Linh	100	0	0	0	--	100
5	Farmers in Sapa	84.04	15.50	0.46	0	80	84.04
6	Workers in Sapa	100	0	0	0	100	60

Source: Producer interviews (2004) and van Wijk et al. (2004)

4.3.2 Wholesalers

There are several wholesale flower markets supplying Hanoi: Quang Ba, Mai Dich, Nga Tu So, Vinh Tuy, Cau Giay, Dong Xuan Street, and Ha Dong, among other smaller ones. According to the management at Quang Ba it is the largest, holding an 80% share of the market (Wholesale Market Survey, 2004). Quang Ba and Mai Dich are considered large wholesale markets while the others are considered small wholesale markets. The members of a group interview in 2004 estimated that there were 1000 wholesale traders in Hanoi (Pham and Tran, 2004). The definition of wholesaler in this group interview applied to anyone who sold roses to retailers, including farmer/sellers who brought their roses to wholesale markets. In this paper, we define wholesalers as those who buy and resell roses. They do not produce roses.

Information from the retailer interviews about their particular wholesaler source is listed in Table 21. Flower stalls and hawkers bought their roses from more diverse locations than flower shops. Of the retailers we interviewed 73% got their roses from Quang Ba wholesale market.

Table 21 Retailer sourcing from various wholesalers

Wholesaler Location	Flower shops (%)	Flower stalls (%)	Hawkers (%)	Total (%)	Roses in sample (10,000)
Quang Ba	97.10	45.44	80.02	73.03	311.761
Quang An	0	0	1.31	0.71	3.010
Mai Dich	0	6.76	4.87	4.56	19.485
Me Linh	0	18.59	0	5.36	22.890
Nhat Tan	2.90	8.94	9.51	8.19	34.963
Dam	0	11.33	0	3.27	13.950
Nga Tu So	0	8.94	4.29	4.88	20.835
Total	100.00	100.00	100.00	100.00	426.894

Source: Retailer Interviews, 2005

In Me Linh commune, there are 230-240 wholesalers who buy and sell 3000-5000 roses/day (Dang Viet Quang, et al., 2005). These wholesalers are farmer/sellers and are not considered as specialized rose wholesalers, but rather fit into Channels 2A, 2B, 2C, and 3 under our categorization.

Quang Ba Wholesale Market

Over half of the roses sold by wholesalers at Quang Ba wholesale market are bought from farmers in Tu Liem, according to information from wholesaler interviews in Table 22. About 23% come from farmers in Me Linh and 9% from farmers in Sapa. Roses that wholesalers buy from Tu Liem are the cheapest at an average cost of 415 VND/rose, followed by those from other wholesalers, 464 VND/rose; Me Linh, 639 VND/rose; Sapa, 927 VND/rose; and companies, 1161 VND/rose. Wholesalers sell almost half of their roses to flower shops (46.74%) and the majority of their roses to flower stalls and hawkers (51.6%). Wholesalers sell higher quality roses to flower shops for the average price of 693 VND/rose and to flower stalls or hawkers for the average price of 613VND/rose.

Table 22 Wholesaler's sourcing, costs, and revenue of roses (sample totals)

	Farmers in Tu Liem	Farmers in Me Linh	Farmers in Sapa	Other Wholesalers	Companies	Flower shops	Flower Stalls/ Hawkers	Consumers	Assemblers/ Collectors	Total
Roses bought	826.170	379.826	148.682	220.075	29.723					1604.475
Buying costs (1000 VND)	3425610.5	2425487.9	1378559.1	1020474.5	344977.5					8595109.5
Buying cost/rose (VND)	415	639	927	464	1161					536
Roses sold						749.870	827.900	15.455	11.250	1604.475
Revenue from selling (1000 VND)						5195883.25	5071883.2	150035	25650	10443451.5
Selling price/rose (VND)						693	613	971	228	651
% roses bought	51.49	23.67	9.27	13.72	1.85					100.00
% costs of buying roses	39.86	28.22	16.04	11.87	4.01					100.00
% roses sold						46.74	51.60	0.96	0.70	100.00
% revenue from selling						49.75	48.57	1.44	0.25	100.00

Source: Wholesaler interviews, 2005 (N=15).

The table below shows that of the roses that wholesalers bought from farmers in Me Linh, they sold 54% to flower shops, 44% to flower stalls and hawkers, and 2% to consumers. Of those roses bought from Sapa, wholesalers sold 48% to flower shops, 48% to stalls and hawkers and 4% to consumers.

Table 23 Percentage of roses flowing through wholesaler from origin to destination

(%)	Flower shops	Flower stalls and hawkers	Consumers
Me Linh	54.20	43.79	2.01
Sapa	47.99	47.94	4.07

Source: Wholesaler interviews, 2005 (N=15).

According to a group interview at Quang Ba wholesale market, there are between 1000-1300 households which are involved in selling roses there. Of these, 10% buy and resell roses to retailers and are considered specialized rose wholesalers. The remaining 90% both grow and sell roses and come to Quang Ba every two or three days (Dang and Pham, 2005). The average estimate of the number of wholesalers at Quang Ba market by individual wholesalers that we interviewed is 127. According to individual interviews, there is an average of 287 farmer/sellers at Quang Ba per day. Farmer/sellers may only come every two to three days leading to a much higher total number.

Error! Reference source not found. is based on information from a group interview of wholesalers and market management at Quang Ba Wholesale Market. The group reported that an average of 520,000 – 650,000 roses was sold daily at Quang Ba Wholesale Market by wholesalers, farmer/sellers, and big traders. Seventy percent of the roses that come to Quang Ba remain in Hanoi. Others are sold through big traders to places other than Hanoi (Dang and Pham, 2005). According to results from retailer interviews, they buy 73.03% of their roses from Quang Ba. Wholesalers at Quang Ba reported in interviews that they sold 51.6% of their roses to stalls and hawkers and 46.74% to flower shops.

Table 24 Quang Ba wholesale market and total wholesale market annual rose sales (10,000 roses)

Description	Quang Ba	All Hanoi wholesale markets
Average number of roses sold per year from wholesalers*	21352.500	29237.984
Amount sold from wholesalers to locations outside of Hanoi through big traders (30% of Quang Ba total)*	6405.750	8771.395
Estimated number of roses sold to consumers in Hanoi (Quang Ba has 73.03% of the wholesale market)***	14946.750	20466.589
Amount sold to Hanoi flower stalls & hawkers (51.6% of wholesale total)**	7712.523	10560.760
Amount sold by wholesalers to Hanoi flower shops (46.74% of wholesale total)**	6986.111	9566.084
Number of specialized rose wholesalers (persons)	127**	173
Number of farmer/sellers at Quang Ba per day	287**	-

*Calculations made from information Quang Ba Wholesaler Group Interview (2005)
**Wholesaler interviews (2005)
***Retailer interview (2005)

4.3.3 Retailers

The second through fourth columns of Table 25 are derived from the retailer interviews according to their sourcing. The last three columns of this table are calculated from information about wholesale markets. Using the estimates of the amount sold from wholesalers to retailers, we can estimate the amount of roses retailers get from all sources and their total sales. Hawkers and flower stalls are combined in Table 22 because wholesalers would not be able to distinguish between the two when they come to buy roses. Therefore we split the category evenly – 25.8% of roses sold at wholesale markets go to each flower stalls and hawkers.

Table 25 Sources of retailers' roses (% and 10,000 roses)

Source	Flower shops (%) n=15	Flower stalls (%) n=14	Hawkers (%) n=37	Flower shops (10,000 roses)	Flower stalls (10,000 roses)	Hawkers (10,000 roses)
Wholesalers	78.41	76.16	69.94	9566.0837	5280.3800	5280.3800
Other Farmers	17.35	4.22	18.18	2116.7141	292.5841	1372.5666
Own Farm	0	19.62	11.88	0.0000	1360.3080	896.9247

Source	Flower shops (%) n=15	Flower stalls (%) n=14	Hawkers (%) n=37	Flower shops (10,000 roses)	Flower stalls (10,000 roses)	Hawkers (10,000 roses)
Dalat – Hasfarm	4.25	0	0	518.5035	0.0000	0.0000
Total	100	100	100	12200.081	6933.2720	7549.8713

Source: Retailer Interviews, 2005

From this calculation, Hanoi consumers buy 266,832,246 roses per year from flower shops, flower stalls and hawkers. This does not include roses sold directly to consumers from farmers.

Number of Retailers

Interviewed retailers were asked to estimate the number of retailers on the street or in the market in which they were working. Some respondents were from the same market or street. Taking the average of those responses, we determined a lower-bound estimate of 40 flower shops, 112 flower stalls and 377 mobile hawkers.

On July 17, 2004, Pro Poor researchers counted 111 flower shops in Hanoi. Combining this count with the sampled retailers' estimations (one count overlapped with an estimation), we can estimate that there are approximately 150 flower shops in Hanoi.

Interviewees told us that 377 hawkers could be found on the 18 streets and in the 18 markets where the interviews took place. We assume mobile hawkers cover more than one street, while those at markets might remain there throughout the day. It is difficult to extrapolate this number to apply to all of Hanoi since we do not know how many streets each mobile hawker covers or if certain streets have higher hawker traffic than others. Therefore, 377 is an initial minimum in our estimation.

From his interviews with retailers, researcher Nguyen Dinh Tien estimated that there are about 500 hawkers on the streets of Hanoi most of whom buy flowers from Quang Ba market (2005b). Additionally, Dang and Pham estimate that there are a total of 500 hawkers who visit Quang Ba Wholesale Market (2005). These hawkers do not remain at Quang Ba but rather pick up their flowers and travel throughout the city. We assume that since Quang Ba holds 80% of the market, some 20% of hawkers who buy roses from wholesalers could also visit one of the other wholesale markets in Hanoi. This would lead to an estimation of 625 hawkers who source from wholesalers.

From the interviews we know that hawkers also get their roses from their own farms and other farms. Using the percentages in Table 25 and the estimation of 625 hawkers sourcing from wholesalers we can estimate that 106 hawkers source from their own farms and 163 source directly from other farmers. This leads us to a total of approximately 894 hawkers in Hanoi.

Another method of estimating the number of retailers is to dividing the total sales estimates by the average amount of roses sold by those retailers in our sample. By doing so, we estimate that there are 1923 flower shops, 600 flower stalls, and 875 hawkers in Hanoi. This estimation for flower stalls seems a little large and quite different from the count of 150 flower shops.

Table 26 Estimated number of retailers in Hanoi

Retailer	Sample size	Estimate by interviewed retailers	Estimate based on additional information	Estimate based on average and total estimated sales
Flower shops	15	40	150	1923
Flower stalls	14	112	>112	600
Hawkers	38	377	894	875

4.3.4 Flow of roses through channels

Combining information from interviews and estimations made, we have estimated the flow of roses through the investigated rose marketing channels. Columns 3, 4, and 5 of Table 27 are from farmer interviews. Column 6 is from wholesaler interviews. For example, of all roses sold to wholesalers from Me Linh farmers, 54% are sold to flower shops and 43.8% are sold to hawkers and flower stalls. All information for Channel 6 is derived from the qualitative interview with ATI.

Table 27 Estimated flows of roses through investigated marketing channels (10,000 roses)

Channel	Estimated amount of roses produced (10,000)*	% to Wholesalers	% to Retailers	% to Consumers	% from Wholesalers to Retailers in Hanoi	Amount to Consumers	%	% of Entire Retail Market*
1A	17356.7405	56.48			54.20	5313.2732	36.92	18.66
1B		56.48			21.90	2146.8761	14.92	7.54
1C		56.48			21.90	2146.8761	14.92	7.54
1D		56.48			0	0.0000	0.00	0.00
2A			8.99			1560.3710	10.84	5.48
2B								
2C								
3				10.29		1786.0086	12.41	6.27
4A	941.6508571	100			47.99	451.8913	3.14	1.59
4B		100			23.97	225.7278	1.57	0.79
4C		100			23.97	225.7278	1.57	0.79
4D		100			0	0.0000	0.00	0.00
5A	435.5836	84.04			47.99	175.6716	1.22	0.62
5B		84.04			23.97	87.7511	0.61	0.31
5C		84.04			23.97	87.7511	0.61	0.31
5D		84.04			0	0.0000	0.00	0.00
6	307.4167	100			60	184.4500	1.28	0.65
					Total	14392.376	100	50.55

Based on total estimated sales of* 284,692,332 *roses per year to consumers in Hanoi.

We have estimated that 266,832,246 roses per year from flower shops, flower stalls and hawkers (see Table 25). If we include the 17,860,086 that are sold directly from farmers in Me Linh to consumers (Channel 3), we get a total of at least 284,692,332 roses sold to consumers in Hanoi. Therefore, as Table 27 shows, the channels investigated in our analysis covers approximately 50% of the market of roses sold to consumers in Hanoi. The channel with the largest volume is Channel 1A (18.66% of the Hanoi market) which originates with Farmers in Me Linh, includes wholesalers and ends with flower shops. The

next largest channels are 1B and 1C, in which Me Linh farmers sell roses to wholesalers who sell to flower shops and hawkers (7.54% each of the Hanoi market). Running closely behind is Channel 3, from farmers directly to consumers, holding 6.27 % of the market. The largest channel for roses from Sapa was Channel 4A which was 1.59% of the Hanoi market.

4.4 Indicators

To determine the impact of a certain horticulture commodity market chain on poverty we should look at the aspect of generating income for involved actors. In Table *28*, a number of indicators are presented with regard to the role horticulture commodity chains play in providing livelihoods. For each of the selected commodity marketing chains we will calculate how much labour of one adult is needed to produce, process and market a certain amount (i.e. 10,000 roses) from the field to the consumer. This labour is expressed in full time employment units, which is equivalent to the labour of one adult working 240 days per year.

Table 28 Indicators for quantifying the poverty reduction effect of horticulture commodity chains

Abbreviation	Indicator	Definition
HortiFTE	Horticulture commodity chain full time employment generation indicator	Number of labour units needed to produce, process and market a horticulture commodity from the field to the consumer (in FTE/10,000 roses)
HortiGrossVal	Horticulture commodity chain gross value added generation indicator	Gross value generated by a certain horticulture commodity chain (in US$/10,000 roses)
HortiNetVal	Horticulture commodity chain net value added generation indicator	Net value generated by a certain horticulture commodity chain (in US$/10,000 roses)
HortiValFTE	Horticulture commodity chain net value per capita generation indicator	Net value generated by a certain horticulture commodity chain per FTE involved in this chain (in US$/FTE/10,000 roses)

For an amount of horticulture products we can also calculate what have been the gross value added and the net value added. By dividing the net value added by the FTE needed in the whole channel, we will get an idea of the productivity of the horticulture value chain.

4.4.1 Employment

Full time employment units (FTE) for producers, workers at the ATI Company, wholesalers and retailers were calculated from the in-depth interviews which investigated the amount of labour required to add value to 10,000 roses. We assume that producers and workers at ATI Company work eight-hour days. Farmers can be classified in one of the categories found in Table 29. Year-round hired labourers work nine months out of the year while family labourers work 12 months. Seasonal hired labourers are reported from the interview on a per day basis.

Table 29 FTE labour days per year for producers

Farm Labour Category	Number of days per year worked
Year-round hired labours	270
Full-time family labourers	360
Part-time family labourers	180

All workers at ATI Company, full time and seasonal, work in rose production for nine months per year. The full time workers are reassigned to another department of ATI Company for the remaining months of the year. Each worker spends about 30 days per month working in the rose fields. Therefore, each worker spends 1.125 FTE/year in flower production.

Wholesalers reported the number of days per month and months per year they worked. Retailers reported their work schedule with more detail giving the hours per day that they sold roses, as well as the number of days they worked. Each reported the number of hours that they worked selling flowers. We calculated FTEs for roses as a percentage of their total working hours based on the percentage of income they received from roses.

Roses were assigned to marketing channels (e.g. 1A, 2A, 3, etc.) according to the actors through which they flowed. A percentage of the total roses handled by an individual actor were determined for each of the observations. For example, 89% of roses produced by one farmer in Me Linh went to wholesalers and 11% to consumers. In some cases, less than 100% is considered in our calculation because some of an actor's roses were not sold to consumers in Hanoi, as is the case with those roses that farmers sold to assemblers. Total FTEs were calculated for each observation. The percentages were then used as multipliers to assign fractions of the total FTEs to channels. FTEs were summed and then divided by the total number of roses (in units of 10,000) that flowed through that actor-channel. For example, in channels 1A, 1B, and 1C, Me Linh farmers sold 4,368,480 roses to wholesalers. These roses required 117.873 FTEs of labour to be produced and marketed. The calculation for HortiFTE is based on that assumption that all flowers grown and marketed by a specific actor required equal marginal labour (i.e. no particular flower grown by one farmer or sold by one wholesaler requires more labour than any other flower that that actor may handle). As the FTE calculations are made on a per actor basis then summed, this assumption should be reasonable because with the possible exception of wholesalers, the types of roses a particular actor handles are quite similar.

From Table 30 we can see that for producers, those roses produced by workers of companies in Sapa (Channel 6) require the most labour, followed by native rose producers from Sapa (Channel 5). From site visits, we understand that the quality of the roses produced by companies in Sapa is greater than local producers and those in Me Linh. Producers originally from Me Linh who produce in Sapa (4A, 4B, and 4C) are more efficient than both native Sapans and their former counterparts in Me Linh, using less labour to produce 10,000 roses.

Flowers sold by wholesalers require much less labour than any other actor. This is rather intuitive as buying and reselling of roses requires much less labour than cultivating or peddling roses. Of the flowers handled by wholesalers, those from companies in Sapa do require more attention. Flower shops are the most labour intensive retailers. Flowers that retailers buy directly from farmers in Me Linh require less labour from the retailer than those sourced from wholesalers.

Channel 6 requires the most labour to produce 10,000 roses (1.38 FTEs), but covers only a fraction of the market of roses in Hanoi. Marketing channels originating in Me Linh (Channels 1, 2, and 3) require less labour per unit of roses but create the most employment opportunities as there is a larger flow of roses through those channels.

Table 30 HortiFTE (FTE/10,000 roses)

Channel	*1A*	*1B*	*1C*	*1D*	*2A*	*2B*	*2C*	*3*	*4A*	*4B*	*4C*	*4D*	*5A*	*5B*	*5C*	*5D*	6
Actors	*HortiFTE (FTE/10000 roses)*																
Worker																	0.840
Producer	0.270	0.270	0.270	0	0.371	0.371	0.371	0.307	0.150	0.150	0.150	0	0.579	0.579	0.579	0	0.000
Wholesaler	0.010	0.013	0.013	0					0.012	0.016	0.016	0	0.012	0.016	0.016	0	0.033
Flower shop	0.508				0.195				0.508				0.508				0.508
Flower stall		0.175				0.108				0.175				0.175			
Mobile hawker			0.117				0.112				0.117				0.117		
Supermarket				0								0				0	
Total	0.788	0.458	0.400	0	0.567	0.479	0.483	0.307	0.669	0.341	0.283	0	1.099	0.771	0.713	0	1.381
Market share (%)	21.43	8.66	8.66	0			6.29	7.20	1.82	0.91	0.91	0	0.71	0.35	0.35	0	0.74

Table 31 HortiGrossVal (USD/10,000 roses)

Channel	*1A*	*1B*	*1C*	*1D*	*2A*	*2B*	*2C*	*3*	*4A*	*4B*	*4C*	*4D*	*5A*	*5B*	*5C*	*5D*	6
Actors	*HortiGrossVal (USD/10000 roses)*																
Worker																	0
Producer	171	171	171	0	222	222	222	132	567	567	567	0	842	842	842	0	935
Wholesaler	328	234	234	0					252	249	249	0	252	249	249	0	916
Flower shop	1285				615				1285				1285				1285
Flower stall		416				395				416				416			
Mobile hawker			464				348				464				464		
Supermarket				0								0				0	
Total	1785	821	869	0	837	617	570	132	2105	1232	1281	0	2380	1507	1555	0	3136
Market share (%)	21.43	8.66	8.66	0		6.29		7.20	1.82	0.91	0.91	0	0.71	0.35	0.35	0.00	0.74

4.4.2 Gross Value[******]

The indicator of HortiGrossVal (USD/10,000 roses) is used to show how much gross revenue is generated by each channel-actor.

For producers, selling prices for roses were reported per month or anniversary day. For example, in February 2003, 90% of one farmer's roses were sold to wholesalers and 10% to consumers. One price was reported for all roses sold that month: 550 VND per rose. Portions of annual revenue were then assigned to channels according to which actor in the supply channel the roses went to next.

Wholesalers categorized roses sold into three groups: winter, summer, and anniversary days. For winter and summer, roses are labelled as red, colour, or Dalat. Within each of these groups, roses are categorized as type 1, 2 and 3[††††††]. For each combination of classifications (e.g. winter/colour/type 3), interviewees reported a selling and buying price. Only quantity, buying price and selling price were reported for each of the anniversary days. For each summer, winter and anniversary, percentages were reported for the sources (Me Linh farmers, Sapa farmers, and companies from both Sapa and Dalat) and buyers of wholesalers' roses (flower shops, flower stalls/hawkers, consumers, and assemblers). The percentages were used as multipliers to find how much money was generated by selling roses in each seasonal category for each buyer. We calculated total revenue for each buyer and summed them in that channel.

Retailers reported the actor and location from whom they bought their roses. Also, prices and quantities were reported monthly and for each of the anniversary days, by colour. For our purposes we were interested in the roses they bought from all wholesalers and from farmers in Me Linh (they did not report buying directly from Sapa). In this case we had specific month/location/seller/colour price and quantity information. We calculated revenue for roses bought from wholesalers and farmers in Me Linh.

Each of the summed revenues per channel were exchanged from VND to USD and then divided by the number of roses (10,000) in that channel.

Of all actors and channels, flower shops that bought roses from wholesalers generated the highest gross value per 10,000 roses (1285 USD). They are followed by companies in Sapa (935 USD/10,000 roses) and the wholesalers who buy from them (916 USD/10,000 roses). Notably, native rose producers in Sapa (Channel 5) generate more gross value (842 USD/10,000 roses) than those farmers from Me Linh who grow roses in Sapa (567 USD/10,000 roses). After supermarkets, which sell none, Me Linh farmers who sell directly to consumers generate the least gross value (132 USD/10,000 roses).

Marketing channel 6 generates the most gross value per 10,000 roses (3136 USD/10,000 roses). Channel 5A and 4A follow with 2380 and 2105 USD/10,000 roses, respectively. Hawkers who buy roses from wholesalers generate more revenue than flower stalls that buy

[******] The 2003 annual exchange rate of 15509.6 VND/USD was used for calculating the gross and net values into US Dollars (ADB, 2004a).

[††††††] Type 1 describes large roses with the branch length of about 1.2 m. Type 2 and 3 are smaller roses with the branch length of about 80 cm.

from wholesalers. In contrast, flower stalls that buy roses directly form farmers generate more gross value than hawkers who do so.

4.4.3 Net Value

HortiNetVal (USD/10,000) illustrates the net value created by a channel-actor by producing and/or marketing 10,000 roses. It is calculated using the gross revenue discussed above and the costs calculated in the next section.

4.4.3.1 Costs

For producers we calculated the depreciated cost of a "package" of first-year inputs, including seedlings. Seedlings have a productive life of seven years, so we used that number in a straight-line depreciation calculation. The costs of a water pump and drilling a well were also reported and we depreciated this over a lifetime use of 20 years with zero scrap value. The two depreciated values (which were reported per sao), are listed as Fixed costs in Table 32 and were added to the total per sao costs of 2003's production. This was multiplied by the number of sao in rose production and divided by the number of roses to give a per rose cost. This was then assigned and multiplied by the respective number of roses sold in a given channel.

The cost tables below show the mean cost per sao and per rose of producers. Costs for the ATI Company were not collected as uniformly as they were collected from individual farmers, causing the costs per sao of the company to appear quite low compared to other farmers. Labour costs were largest for the ATI Company, while chemical pesticides were the largest cost for other farmers, ranging from 23-54% of total costs. Other large costs were organic fertilizer 10-25% of total costs and fixed costs 11-17% of total costs. Overall, Me Linh farmers have the lowest costs per sao at 257.68 USD and farmers in Channel 4 have the highest at 436.96 USD.

Table 32 Producers' costs per sao

	Channels 1,2,3 (Me Linh)		Channel 4 (Sapa)		Channel 5 (Sapa)		Channel 6 (ATI Company)	
Input	Mean cost/sao (VND)	% of Total Costs	Mean cost/sao (VND)	% of Total Costs	Mean cost/sao (VND)	% of Total Costs	Mean cost/sao (VND)	% of Total Costs
Total organic fertilizer	984,681	25	705,000	10	1,369,000	21	32,000	1
Total chemical fertilizer	325,351	8	118,500	2	190,438	3	80,000	3
Total fees	70,690	2	405,000	6	125,875	2		0
Labour	102,428	3	434,400	6	1,065,560	16	2,400,000	87
Rolling paper	179,915	5	167,500	2	107,500	2		0
Chemical pesticides	1,205,213	30	3,650,000	54	1,502,500	23	16,000	1
Land rental	404,468	10	155,500	2	225,000	3		0
Other	121,340	3	0	0	1,200,000	19		0
Fixed costs	602,503	15	1,141,214	17	694,705	11	221,538	8
Total costs	3,996,589	100	6,777,114	100	6,480,578	100	2,749,538	100
Total costs (USD)	257.68		436.96		417.84		177.28	

On a per rose basis, the ATI Company's costs (770 VND) are quite similar to other producers in the Sapa area (711 and 791 VND for Channels 4 and 5). This is because ATI Company destroys about half of their roses to maintain high quality roses. Again cost of production is least expensive in Me Linh where it costs 141 VND per rose.

Table 33 Producers' costs per rose

	Channels 1,2,3 (Me Linh)		Channel 4 (Sapa)		Channel 5 (Sapa)		Channel 6 (ATI Company)	
Inputs	Mean cost/rose (VND)	% of Total Costs	Mean cost/rose (VND)	% of Total Costs	Mean cost/rose (VND)	% of Total Costs	Mean cost/rose (VND)	% of Total Costs
Total organic fertilizer	35	24	69	10	160	20	9	1
Total chemical fertilizer	12	8	11	2	23	3	22	3
Total fees	2	2	50	7	23	3		0
Labour	4	3	38	5	160	20	672	87
Rolling paper	6	4	18	3	18	2		0
Chemical pesticides	44	31	389	55	194	25	4	1
Land rental	15	10	19	3	32	4		0
Other	3	2	0	0	101	13		0
Fixed costs	21	15	116	16	82	10	62	8
Total costs	141	100	711	100	791	100	770	100
Total costs (US$)	0.009		0.046		0.051		0.050	

Table 34 shows the gross margin per sao of rose producers in the various channels. Gross margin is calculated as gross revenue minus variable costs. Farmers in Channel 5 have the largest and Channel 6 has the lowest average gross margin per sao. There are some rather successful farmers from Me Linh and Sapa producing the maximums of 1,382.08 USD and 971.83 USD in gross margin per sao.

Table 34 Producers' gross margin (USD/sao)

	Channels 1,2,3 (Me Linh)	Channel 4 (Sapa)	Channel 5 (Sapa)	Channel 6 (ATI Company)
N	47	2	4	1
Average gross margin/sao	508.00	530.83	605.95	147.82
Minimum	123.10	501.69	237.53	-
Maximum	1,381.08	559.96	971.83	-

The average wholesaler buys and sells 1.15 million roses each year, so it is no surprise that their costs average US$ 40,178.98 with 98.5% of that coming from the cost of buying roses. Costs of preservation, car rental, petrol, repairs, and electricity are the next largest costs.

Table 35 Wholesaler's costs

Input	Average cost per wholesaler (VND)	% of Total Cost
Cost of flowers	613,936,393	98.52
Other costs‡‡‡‡‡‡	3,760,714	0.60
Preservation costs	2,971,429	0.48
Motorbike depreciation	935,714	0.15
Fee for selling place	934,286	0.15
Cool storage depreciation	548,810	0.09
Nylon packaging	68,571	0.01
Bicycle depreciation	3,929	0.00
Total costs	623,159,845	100.00
Total costs (US$)	40,178.98	

Costs per rose were calculated for all actors and then subtracted from the gross value generated by an actor in the respective channel. Table 36 shows the calculations for HortiNetVal. Each of the 100 workers at ATI Company is paid one million VND per month and works for nine months. This total divided by the number of roses sold give the net value of workers in Sapa as 433 USD/10,000 roses. This does not include their provided housing which is part of their employment contract. This exceeds the net value of all other rose farmers in Sapa by at least 198USD per unit of roses.

Me Linh farmers selling directly to retailers make 24 USD more than those selling to wholesalers. But those who sell directly to consumers make half as much as those who sell to wholesalers. Flower stalls that buy directly from farmers make 62 USD more per 10,000 roses than flower stalls that buy from wholesalers. Hawkers do better to buy from wholesalers.

4.4.4 Net value per labourer

HortiValFTE is created by dividing HortiNetVal by HortiFTE to find the value created per FTE. Producers in Channel 4 add the most value per FTE than the other producers, followed by those in Channel 6. Farmers in Channel 3 only add 149 USD/FTE. Wholesalers have the highest HortiValFTE numbers because of the high turnover of flowers and the little labour required to sell 10,000 roses. Those wholesalers who buy from farmers in Me Linh and sale to flower shops add a value of 4860 USD/FTE. Wholesalers who buy from companies in Sapa and sell to flower shops (Channel 6) add 3780 USD/FTE. Hawkers who buy from wholesalers do better than flower stalls who buy from wholesalers. Labourers in Channel 1A add a total value of 5885 USD to roses every 240 work days. Those in Channel 6 add 5401 USD/FTE.

‡‡‡‡‡‡ includes: hiring a car, petrol, repair costs, paying for electricity

Table 36 HortiNetVal (USD/10,000 roses)

Channel	*1A*	*1B*	*1C*	*1D*	*2A*	*2B*	*2C*	*3*	*4A*	*4B*	*4C*	*4D*	*5A*	*5B*	*5C*	*5D*	6
Actors	*HortiNetVal (USD/10,000 roses)*																
Worker																	433
Producer	99	99	99	0	123	123	123	46	134	134	134	0	235	235	235	0	374
Wholesaler	49	35	35	0					40	43	43	0	40	43	43	0	125
Flower shop	335				260				335				335				335
Flower stall		134				196				134				134			
Mobile hawker			161				133				161				161		
Supermarket				0								0				0	
Total	482	268	295	0	383	319	256	46	509	312	339	0	610	413	440	0	1268
Market share (%)	21.43	8.66	8.66	0			6.29	7.20	1.82	0.91	0.91	0	0.71	0.35	0.35	0.00	0.74

Table 37 HortiValFTE (Net USD/FTE/10000 roses)

Channel	*1A*	*1B*	*1C*	*1D*	*2A*	*2B*	*2C*	*3*	*4A*	*4B*	*4C*	*4D*	*5A*	*5B*	*5C*	*5D*	6
Actors	*HortiValFTE (Net USD/FTE/10000 roses)*																
Worker																	516
Producer	366	366	366	0	331	331	331	149	898	898	898	0	406	406	406	0	445
Wholesaler	4860	2751	2751	0					3394	2688	2688	0	3394	2688	2688	0	3780
Flower shop	659				1329				659				659				659
Flower stall		764				1821				764				764			
Mobile hawker			1376				1186				1376				1376		
Supermarket				0								0				0	
Total	5885	3881	4493	0	1660	2152	1517	149	4951	4350	4962	0	4459	3858	4470	0	5401
Market share (%)	21.43	8.66	8.66	0			6.29	7.20	1.82	0.91	0.91	0	0.71	0.35	0.35	0	0.74

According to our estimates, the supply channels we investigated covered 50.55% or of all roses sold to consumers in Hanoi or 143,923,757 roses. Table 38 shows that the investigated channels employed 8,392 FTEs of people and created 17 million USD in gross value and 5 million USD in net value. Therefore the entire rose marketing chain supply roses to Hanoi consumers generates 16,602 FTEs of employment, 34 million USD in gross value, and 10 million in net value.

Table 38 Total employment, gross value and net value generated by investigated rose marketing channels supplying Hanoi

Channel	Amount of roses to consumers in Hanoi (10,000)	FTEs (240 days/year)	Gross Value (USD)	Net Value (USD)
1A	5,313.2732	4,185	9,483,190	2,562,328
1B	2,146.8761	983	1,762,632	575,200
1C	2,146.8761	858	1,866,363	633,807
1D	0	0	0	0
2A	1,560.3710	295	435,299	198,987
2B		249	320,744	165,856
2C		251	296,620	133,052
3	1,786.0086	548	235,333	81,688
4A	451.8913	302	951,383	230,199
4B	225.7278	77	278,201	70,380
4C	225.7278	64	289,108	76,542
4D	0.0000	0	0	0
5A	175.6716	193	418,098	107,185
5B	87.7511	68	132,252	36,200
5C	87.7511	63	136,492	38,595
5D	0.0000	0	0	0
6	184.4500	255	578,502	233,848
Subtotal (58.04%)	14,392.3757	8,392	17,184,218	5,143,868
Total (100%)	28,469.2332	16,602	33,994,496	10,175,802

4.4.5 Importance of Rose Production and Marketing in Livelihoods

4.4.5.1 Share of Income from Rose Production and Marketing

In Me Linh, 13 of the interviewed farmers relied solely upon roses for income. For another 13 farmers, 70% of their income came from roses. In Me Linh, all poor and all rich households received at least 50% of their income from roses. In Sapa, all farmers relied upon roses for at least 50% of their income (see Figure 8).

Retailers, on the other hand, depended less on rose selling as a share of their income. Only six retailers relied on roses for 50% or more of their income, five of whom were mobile hawkers. Retailers often sell multiple types of flowers and other family members often have jobs outside of flower retailing (see Figure 9).

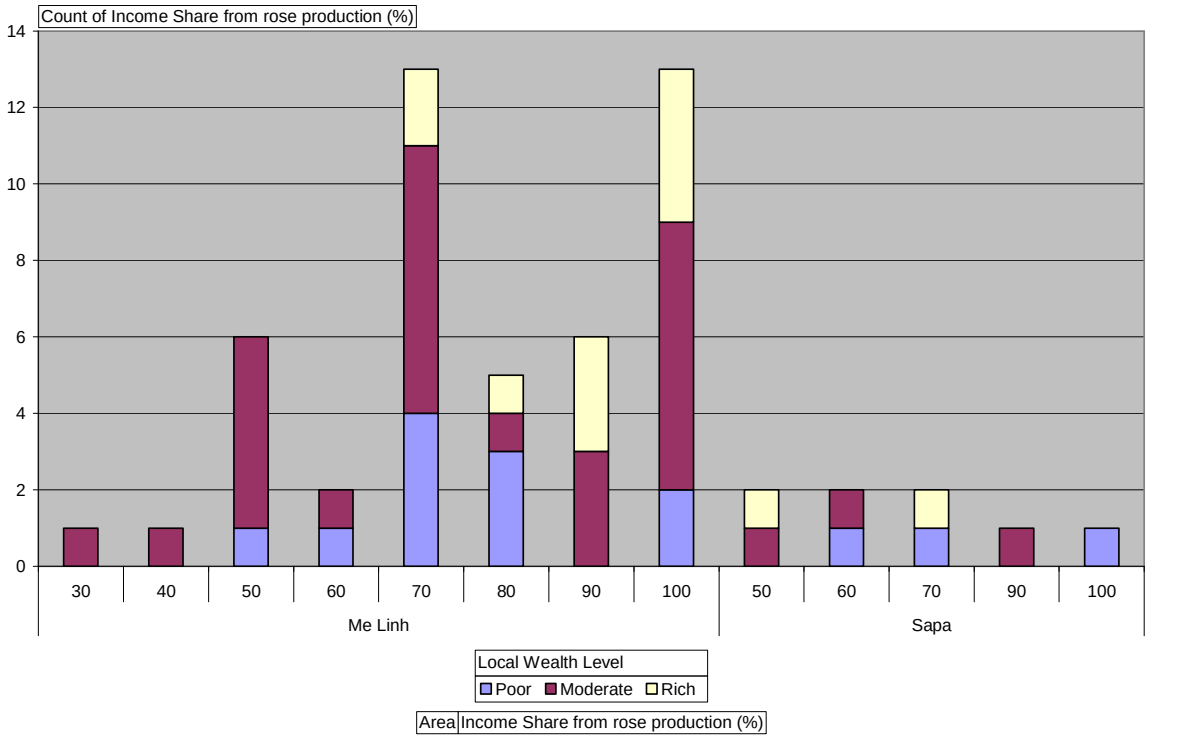

Figure 8 Income share of rose production for poor, moderate, and rich farmers in Me Linh and Sapa

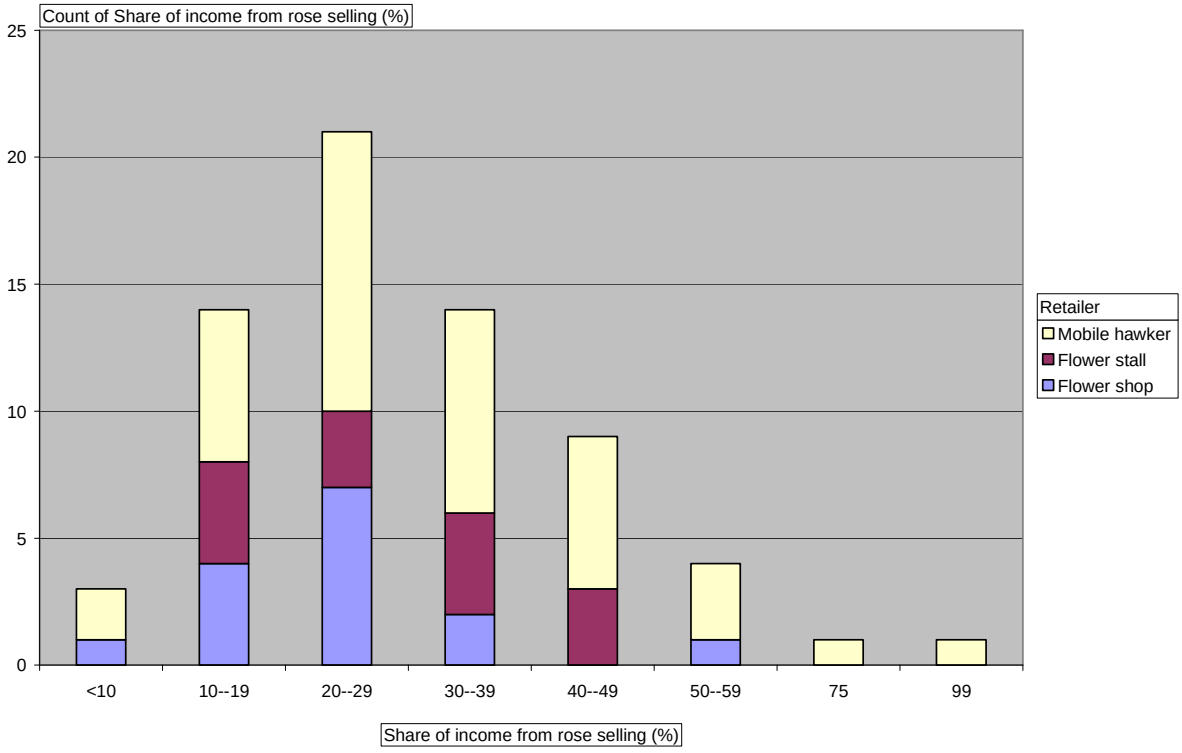

Figure 9 Income share of rose selling for retailers

4.4.5.2 Alternatives to Rose Marketing

Producers reported a variety of alternatives they would pursue if they did not produce roses. Over half would do some other type of farming work. The most popular response was to switch from growing roses to vegetables. Four people (7%) in the Me Linh area think that growing ornamental plants would be a viable alternative to roses while 18% of farmer in Me Linh would seek off-farm employment, mostly starting a small business, as an alternative to growing roses. Almost one third of the respondents could not report an alternative. They would continue to grow roses or sell their land.

Table 39 Alternative livelihoods for farmers (%)

		Producer Channel (%)			
Category	Alternatives Category	1,2,3 n=56	4 n=2	5 n=7	Grand Total n=65
Farming	Grow cash crops	2	0	0	2
	Grow ornamental plants	7	0	0	6
	Grow other flowers	0	50	0	2
	Grow safe vegetables	0	0	14	2
	Grow vegetables	32	0	14	29
	Grow vegetables and animal husbandry	0	0	14	2
	Grow vegetables and forest	0	0	14	2
	Grow vegetables and fruit trees	0	0	14	2
	Grow vegetables and paddy	5	0	0	5
	Grow vegetables, animal husbandry, and small business	2	0	0	2
	Grow vegetables, fruit trees and medicinal plants	0	0	14	2
	Paddy	2	0	0	2
Farming Total		50	50	86	54
Off Farm Work	Hired labourer	4	0	0	3
	Sell roses	2	0	0	2
	Services	2	0	0	2
	Small business/trade	11	0	0	9
Off Farm Work Total		18	0	0	15
Other	Continue to grow roses	4	0	0	3
	Does not Know	7	0	0	6
	No alternative	2	0	0	2
	No answer	18	50	14	18
	Sell his land	2	0	0	2
Other Total		32	50	14	31
Grand Total		100	100	100	100

A third of the hawkers interviewed would work on farms or with agriculture in some way if they were not selling roses (see Table 40). Currently many hawkers source their roses from their own farms or farms of family members, so returning to the farm seems like a reasonable alternative to them. Nineteen percent of hawkers said they would become hired labourers, cleaning houses, or working in a store. Over half of the flower shops would use their resources to open a shop or restaurant or begin selling food or goods. Eight percent of all retailers interviewed said they would be unemployed and 9% retailers said they did not know what they would do.

Table 40 Alternative livelihoods for flower retailers (%)

		Retailer (%)			
Category	Alternatives	Flower Shop n=15	Flower Stall n=14	Hawkers n=36	Grand Total n=65
Begin a new enterprise					
	Open a restaurant	7	0	3	3
	Open juice and drink shop	7	7	3	5
	Open shop to sell goods	7	0	0	2
	Rent out her shop	7	0	0	2
Begin a new enterprise Total		27	7	6	11
Farm	Farm	0	7	14	9
	Farm and animal husbandry	0	0	3	2
	Farm/hired labour/selling goods	0	0	3	2
	Grow flowers	0	7	8	6
	Grow vegetables	0	0	6	3
	Grow vegetables and flowers	0	7	0	2
Farm Total		0	21	33	23
Hired labourer	Do housework	0	0	6	3
	Hired labourer	0	0	6	3
	Hired labourer/sell goods	0	0	8	5
Hired labourer Total		0	0	19	11
Other	Care for her child	0	0	3	2
	Does not know	7	14	8	9
	Retire	0	7	0	2
	Return to hometown	7	0	0	2
	Stay at home	0	21	3	6
	Stay at home/care for grandchild	0	0	3	2
	Unemployed	13	7	6	8
Other Total		27	50	22	29
Selling	Continue to sell flowers	7	0	3	3
	Sell fruit	13	0	3	5
	Sell goods	7	7	0	3
	Sell pork	0	7	0	2
	Sell sticky rice cakes	0	0	3	2
	Sell vegetables	0	7	0	2
	Sell vegetables or fruit/hired labourer	0	0	3	2
Selling Total		27	21	11	17
Skilled labourer	Become a wedding photographer	7	0	0	2
	Embroider	7	0	0	2
	Tailor	7	0	6	5
	Tailor or barber	0	0	3	2
Skilled labourer Total		20	0	8	9
Grand Total		100	100	100	100

4.4.5.3 Livelihood Scenarios and Poverty Assessment

To assess the impact of rose production and marketing on poverty, we look at alternatives to rose production for farmers and their associated incomes. We compare producers' current levels of income and that of six alternatives. Scenario A switches the land in rose production to vegetable production and Scenario B, from rose to paddy. In each of these scenarios, all else is held constant, including current amount of off-farm income.

From the interviews, some farms which diversified production reported costs and revenues for production of vegetables and paddy. The averages are shown in Table 41. For example, one sao of vegetables in Sapa generates a net value of 3.78 million VND, so that income would replace forgone income from roses under Scenario A. No rose producers in Sapa were producing paddy in 2003, so Scenario B will not be applied to Sapa.

Table 41 Livelihood scenarios for producers

Scenario	Income per sao Sapa (VND)	Income per sao Me Linh (VND)	Annual income per capita Sapa (VND)	Annual income per capita Me Linh (VND)
A: rose to vegetables	3,784,067[MvW1]	1,473,420		
B: rose to paddy	---	513296		
C1: rose to skilled worker in agriculture, forestry and fishery			5,866,680	5,922,360
C2: rose to non-farm work - services			10,415,160	11,652,480
C3: rose to non-farm work - trade			7,746,600	12,277,200
C4: rose to non-farm work - unskilled workers			4,544,400	6,000,840

* Agricultural production information from interviews with producers. Salary information from GSO (2004).

Scenarios C1, C2, C3, and C4 hypothesize that farmers would no longer produce roses and that the full time labourers involved in producing roses would be employed as skilled workers in agriculture, services, trade or as unskilled workers. We assume that part time labourers once involved in rose production would be unemployed and that total household income consisted entirely of income of off-farm work (i.e. no continuing paddy or vegetables if currently doing so). Table 41 shows the annual income per capita for each region. This information was taken from Vietnam Household Living Standard Survey (GSO, 2004). Information for Sapa was taken from the reported numbers for the Northwest and for Me Linh from the Red River Delta.

The following per capita poverty rates were used in calculation of indicators: poverty line calculated by the expenditure approach 2002 (1,920,000 VND), 1 PPP$/day 2002 (1,115,404 VND), 2 PPP$/day 2002 (2,230,807 VND). The later two are calculated from the PPP deviation of 5 for Vietnam (i.e. 1 USD could buy fives times as much in Vietnam than it could in the US). All information about poverty rates and gaps for Vietnam comes from the "Vietnam Development Report 2004: Poverty" by the Asian Development Bank (2004b).

In Scenarios A and B, Me Linh producers are worse off than they are in their current situation (see Table 42). All Me Linh producers who might switch to rice production would be under the expenditure approach poverty line. However, Scenario A would bring four producers above the 1 PPP$/day poverty line, which would make them a little less poor than with rose production. Me Linh farmers who switched to services or trade would be lifted from poverty. If they were employed as skilled agricultural workers or unskilled labourers, fewer would be below the poverty line by the expenditure approach measurement, but more would be below the 2 PPP$/day line. The best alternative for producers in Me Linh is off-farm income.

Currently, all rose producers in Sapa are above the three measures of poverty used here. If they left rose production to become skilled agricultural labourers or unskilled labourers, some would be considered in poverty.

All rose producers have alternatives that could lift them from poverty if they were in poverty.

Table 42 Results of Poverty Assessment of Livelihood Scenarios (% below poverty line)

Scenario	Poverty Measurement	Me Linh 1, 2, 3 n=47	Sapa 4 n=2	Sapa 5 n=4	Vietnam
A	Expenditure Approach	55.32	0	0	28.9
	1 PPP$/day	2.13	0	0	12
	2 PPP$/day	63.83	0	0	55.8
B	Expenditure Approach	100.00	-	-	28.9
	1 PPP$/day	89.36	-	-	12
	2 PPP$/day	100.00	-	-	55.8
C1	Expenditure Approach	10.64	50	0	28.9
	1 PPP$/day	0	0	0	12
	2 PPP$/day	17.02	50	25	55.8
C2	Expenditure Approach	0	0	0	28.9
	1 PPP$/day	0	0	0	12
	2 PPP$/day	0	0	0	55.8
C3	Expenditure Approach	0	0	0	28.9
	1 PPP$/day	0	0	0	12
	2 PPP$/day	0	50	0	55.8
C4	Expenditure Approach	10.64	50	50	28.9
	1 PPP$/day	0	0	0	12
	2 PPP$/day	17.02	50	50	55.8
Current Status	Expenditure Approach	12.77	0	0	28.9
	1 PPP$/day	10.64	0	0	12
	2 PPP$/day	12.77	0	0	55.8

To assess the livelihoods of other actors, we can look at their average current income per capita. In Table 43, we see that producers have larger families than wholesalers or retailers. Producers in Channel 4 have the highest average income, while flower shops have the highest average income. Roses generate the greatest share of income for producers in Me Linh (79%) and the least for flower shops (23%). The average actor in the channels investigated received enough income per capita from roses alone to remain above the poverty lines (expenditure approach, 124 USD; 1PPP$/day, 72 USD; 2PPP$/day, 144USD). Averages do not show that there may be individuals below a measure of poverty. There are six farmers in Me Linh currently below the expenditure approach poverty line when all income is considered. Currently, none of the wholesalers or retailers is in poverty.

Table 43 Average incomes and incomes from roses for all channels

		Producers					
USD	Channels 1, 2, & 3	Channel 4	Channel 5	Wholesalers	Flower shops	Flower stalls	Hawkers
Average family size	5.00	4.00	5.30	2.64	2.47	2.36	2.34
Average total income	2,037	14,597	7,036	2,897	3,869	2,276	2,089
Average total Income/capita	412	3,649	1,431	1,273	1,646	979	861
Average share of income generated by rose production (%)	79	75	61	42	23	26	28
Average income from roses	1,543	8,562	4,056	1,007	936	554	495
Average income from roses per capita	311	2,141	837	422	386	243	207
Average roses sold (10,000)	16.4569	81.7000	13.1750	114.6054	6.3417	11.5451	8.6294

4.5 Conclusions and Recommendations

The rose marketing chain supplying Hanoi with over 285,000,000 roses creates 16,600 full time units of employment, 34,000,000 USD of gross value and 10,000,000 USD of net value per year. This horticulture supply chain is important in creating jobs and income for people in northern Vietnam. Rose producers rely heavily on rose production as a source of income. In Me Linh, all poor and all rich households received at least 50% of their income from roses. In Sapa, all farmers relied upon roses for 50% or more of their income. Retailers, on the other hand, were less reliant on rose selling's contribution to their income, although five hawkers, who have the lowest income per capita of retailers, relied on roses for 50% or more of their income.

Currently, of all the actors we analyzed, only 12% of the farmers in Me Linh were in poverty according to the expenditure approach measurement. All others were out of poverty and all farmers had some alternative that could lift them from poverty.

This analysis also looked at the efficiency of actors in producing net value with their available labour. Me Linh farmers who bypass wholesalers and sell directly to retailers make 24 USD more net value per 10,000 roses, but selling directly to retailers requires 24 more days of labour per unit of roses. Therefore, selling roses to wholesalers has higher returns to labour (35 USD more per FTE). Selling roses directly to consumers brings little revenue and requires the same amount of labour for production as selling to retailers.

Producers in Sapa who are originally from Me Linh are the most efficient with their labour of the producers and create 898 USD net value per FTE. Labourers at the ATI Company make 516 USD net per FTE, which is better than the 406 USD per FTE that native Sapa producers make.

Wholesalers make the most net value per FTE. When they buy roses from farmers in Me Linh and sell them to flower shops they generate 4860 USD/FTE and when they buy from companies in Sapa and sell to flower shops they generate 3780 USD/FTE. Flower shops and stalls are better off buying flowers directly from farmers, in our analysis. Flower shops make 670 USD net more per FTE when they buy from farmers, while flower stalls make 1057 USD net more. Hawkers earn 190 USD net more per FTE when they buy from wholesalers rather than directly from farmers.

This paper is the beginning of exploring the rose marketing channels in Hanoi as well as applying the methodology of van Wijk, et al. Future research could explore more opportunities in selling roses from supermarkets, rose export markets, and Dalat's impact on the Hanoi rose market. Applying the marketing chain analysis methodology to other horticultural marketing chains could improve the methodology, specifically the portion measuring vulnerability of livelihoods. Future research should be designed to incorporate more information about the transport of the products, including the location at which the next actor in the channel collects the product and the cost of transport. Care should also be taken in tracking the flow of products through intermediaries to get more precise channel-specific information about prices and volumes.

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5 Discussion

5.1 Observations

Horticultural development can be facilitated, not created. Three historical cases of business development in Thai fruit and vegetables stress the fact that there are several drivers of horticultural development that lie outside the scope of development policies. They include growth of per capita income and changing diets, changes to the structure and conduct of global agricultural and food industries, and increasing requirements for food safety and quality. Hence, rather than creating opportunities for horticultural growth, governments and donors should seek to address the conditions that allow tapping into this growth potential. A most conducive feature of the Thai rural economy has been its strong institutional infrastructure in relation to education, research and extension. The (partial) liberalization of capital markets comes out of the case studies as another important condition because it attracts foreign capital (both financial and human capital). All three case studies have learned that the active participation of international companies in the Thai horticultural sector was essential in making producers shift their supply orientation towards outlet markets.

Small-scale producers must undergo organisational innovation, and be supported to find complementary modes of livelihood. In Thailand, as well as elsewhere, the face of food production has changed considerably over the last decades. This process is ongoing. The sourcing of fruit and vegetables from wholesale markets and anonymous traders is rapidly being replaced by integrated supply chains, which involve "preferred suppliers" and contractual relations with buyers. The proliferation of economies of scale in fresh food production is a test for the economic efficiency of small-scale agriculture: large monitoring costs, organizational weaknesses, and the risk of inconsistent quality and irregular supply may render such schemes economically infeasible. There are, however, advantages to source raw produce from smallholders, including lower costs in the case of labour intensive products, motivated and skilled growers and access to land. It appears that well-organized groups with good leadership, in combination with public support are prerequisites for the development of viable smallholder supply chains. Some small-scale producers will be better off under alternative livelihood strategies, for instance as a worker on a commercial farm, or in off-farm employment. While the rise of plantation horticulture and services generates new livelihood opportunities in the rural economy, support is required to guide those households through transition.

Both value creation and the generation of opportunities for (self-) employment in domestic marketing channels are substantial, and possibly outweigh the economic impact of export marketing. In North Vietnam, the rose marketing chain, which annually supplies the hub of Hanoi with over 285 million roses, creates over 16.6 thousand full time units of employment, 34 million USD of gross value and 10 million USD of net value per year. In Uganda, for 6 garden crops under study, total net value added is roughly estimated at $193 million annually, of which the domestic market generates 59%, and exports 41%. Within the export sector, the overall economic impact of small-scale fruit and vegetable exports in Uganda is five times that of rose production for overseas markets, but growth rates are much steeper for the latter. Total employment creation for six garden commodities in Uganda is indicated at 37 thousand full time units of employment, excluding hired labour on the farm. Poverty alleviating impact of export horticulture is largely indirect, via economic growth, or via raised skills levels that are of use in self-employment. The employment impact is strongly related to the extent to which domestic trading services are involved in the marketing chain.

Farming, trade and small-scale retail, and farm labour are activities to which members of resource-poor and economically vulnerable households have the best access given their endowments. Horticultural supply chains provide various opportunities for workers and entrepreneurs with limited endowments in

terms of education, capital, management level or transport. However, a minimum required level of skills, and access to land and information will often deter the opportunities for the poorest of the poor to take part in growth of the horticultural sector. The livelihood options that are best accessible as avenues to escape out of poverty are the growing of cash crops in the (home) garden, in assembling or other trade services, in hawking or other forms of street retail. Employment as a farm worker on export farms of flowers in Uganda does not seem to provide sufficient income security from being poor, but it does provide skills that should reduce vulnerability in the longer run. The incidence of poverty in our sample of horticultural growers and workers is far below national averages. Based on a hypothetical comparison of the earnings of horticultural growers to the alternative earnings as a wage worker, it is concluded that some non-poor grower households would slide into poverty when moving into farm work. However, getting a job in a non-agricultural sector would probably result in higher earnings than horticulture provides.

A move from food production for own use towards cash crops is supported when there are sufficient options to reduce livelihood risk in the household after the transformation. Field research has revealed that both in Uganda and Vietnam households specialise to varying degrees in the production or trade of cash crops. In the production centres of Me Linh and Sapa, in northern Vietnam, the growers of roses depend for at least 50% of their household income on rose production. Retailers, on the other hand, are less reliant on rose for their income, but still depend heavily on a range of garden commodities. With the horticultural growers in Uganda, similar depths of specialization on cash crops have been observed. Not all farm households are in the position to make the leap for market orientation, as the move towards cash crops entails a reduction in the level of food production for home consumption, and increased risk in terms of food security. If the returns to cash crops are modest or insecure, farm households tend to rely more on their own land to produce their food, as a cushion for the perils of the market. Deeper specialization often raises the productivity of the land, and it is important to understand the constraints of making the transformation toward cash crop farming. A vast area of research has underscored the importance of institutional arrangements that provide opportunities for risk reduction in the household as necessary conditions for change.

5.2 Recommendations for intervention

Based on the discussions above, we come to a set of general guidelines for support to pro-poor growth in horticulture:

- Most poverty alleviation occurs outside the marketing channels with biggest economic impact.
- There is substantial untapped potential for horticultural development in Uganda and Vietnam, also in remote areas where few options for sustainable livelihoods exist.
- There is a risk of environmental depletion in remote areas under horticultural development.
- Altered trade policies in the EU regarding tropical imports can be improved to support horticultural growth in the South, especially regarding residue levels for plant protection chemicals.
- Reducing trade barriers will have a direct, but limited, poverty alleviating impact; the indirect effects (through economic growth) can be substantial, especially on local levels.
- More important from a poverty alleviation objective, is to support the development of local markets for horticultural produce.
- Several key challenges that lie ahead relate to institution building; these are best addressed in platforms that unite producers, government, developmental organisations, and donor countries.

Both value creation and the structure of the supply chain are important determinants of the impact of horticulture on poverty alleviation and livelihood development. Policy support should be tailored to specific conditions and specific actors for maximum poverty alleviation impact. This paper has explored value creation and organisation structure in several horticultural supply chains in Uganda and Vietnam, and proposes a three-tiered grouping of marketing channels for livelihood development (see table

below). First, high-value horticulture in a large commercial setting, often involving exports of produce sourced from large farms, and with few domestic actors involved ('channel A'). Second, high-value horticulture, marketing of smallholder supply involving domestic traders and post-harvest services mostly on export markets and also domestically through emerging supermarket retail ('channel B'). Third, domestic marketing of produce of limited value, yet involving a large smallholder supply base and many small-scale entrepreneurs in trade and retail ('Channel C').

The constraints identified mostly relate to capacities and institutions. Other analysts have identified the policy agenda for pro-poor agricultural growth in terms of institutional development (Dorward et al. 2004). Based on the discussions above, a program of intervention is suggested in Table 44.

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Table 44. Areas of intervention

	Export marketing, sourcing from commercial farms or outsourcing, few actors involved (A)	**Export marketing, smallholder supply, many actors involved (B)**	**Domestic marketing, smallholder supply, many actors involved (C)**
Farm work, contract farming	Support the inflow of foreign direct investment Develop adequate institutions to address food safety, agricultural health Build coalitions to monitor environmental protection, working conditions on export farms Deliver MRL dossiers for developing country chemicals		
Small scale growers		Support producer organisation, market orientation Bring market orientation into R&D, extension. Develop seed varieties adjusted to local conditions for best yield, consistent quality, and environmental protection. Otherwise import improved seeds. Apply yield improvement technologies: fertilizer, biotechnology Unlock remote areas; improve road and communication infrastructure Deliver MRL dossiers for developing country chemicals. Support on-farm processing of fresh produce.	Support producer organisation, market orientation Bring market orientation into R&D, extension. Develop seed varieties adjusted to local conditions for best yield, consistent quality, and environmental protection. Unlock remote areas; improve road and communication infrastructure Risk sharing between producers in order to allow further specialization. Create employment opportunities off the farm.
Trade services, i.e. assembling, wholesale		Proper storage facilities, and transport equipment. Functioning credit markets, to cover the risk of producer losses. Develop a code for assembling practices, e.g. hygiene, administration, traceability. Improve infrastructure, reduce the costs of moving goods locally.	Functioning credit markets, to cover the risk of producer losses. Address the seasonality of demand for trade services
Retail: stalls, street markets			Support for retailer, hawker organisations to counteract increasing power of large-scale trade and retail.

Project outline

This research project aims to present policy makers with insight how horticulture can be an important vehicle for pro-poor growth and development. Governments and development agencies' focus on assistance to agriculture in East Africa and South East Asia should include fruit, vegetables and flowers. This focus should include development of the domestic market, apart from the often dominant attention paid to export oriented markets.

Specific objectives are:

- To assess the conditions for fruit, flower and vegetable production, distribution and marketing to serve as a pro-poor activity.
- To assess current outlet opportunities for fruit and vegetable products from the study, both on the domestic and international market, and to formulate expectations for the next decade.
- To predict the impact of the emergence of supermarkets in the distribution of food, and the increased scope of quality and safety demands on the scale and organisation of horticulture supply in the study regions.
- To determine whether horticultural growth results in environmental degradation or high risk consumption due to pollution in the production environment.
- To suggest interventions for pro-poor growth of fruit and vegetable production, distribution and marketing
- To suggest how EU trade policy and development assistance with regard to horticulture in developing countries can be made to work for the poor.

Research partners

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