

Sri Lanka Pineapple Supply Chain: Information and knowledge gaps of smallholders

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1. Preamble

This study was done as a part of LIRNEasia's project component Knowledge-based economies. The project conducted supply chain studies in three countries, Bangladesh, India and Sri Lanka with a meta-study being conducted in Thailand. Two supply chains each were selected in Bangladesh, India and Thailand.

The study was undertaken with the following objectives:

- Achieve an in-depth understanding of how the *efficiency* and *inclusiveness* of the selected agricultural supply chains may be improved via information/ knowledge flows facilitated by ICTs as well as via innovations related to ICTs.
- Examine the possibilities of increasing the participation (inclusiveness) of small players (especially MSEs/SMEs) within the supply chain through various forms of value addition and the reduction of various forms of transaction costs.
- Develop recommendations for improving the efficiency and inclusiveness of agricultural supply chains including through the application of ICTs, but not limited to them; specifically, identify and differentiate between the roles that can be played by the private sector vs. the public sector in providing such services to MSEs and SMEs.

The crops for the studies were to be selected on the following criteria:

- a. Goods that have potential for value addition.
- b. Have a high participation (or potential for participation) by small actors including MSE/ SMEs.
- c. Have high export potential.
- d. Have potential for increased productivity

Based upon the above, the researchers looked at the agriculture exports from Sri Lanka. An examination of data for the period 1996-2007 showed that Fresh and Dried Fruits showed the second highest Compound Growth Average Rate (CAGR). The highest was papain. Among the dried fruits and vegetables, dried pineapples showed the highest CAGR.

Based on the above figures, further consultations were held with experts. Their inputs led to pineapple being selected as one of the supply chains to be studied.

Agriculture sector employs the largest percentage of labor in most developing countries but contributes the least to GDP. Agriculture, the most traditional and least productive of the three main sectors (agriculture, industry and services), is the most challenging in terms of knowledge application and integration into global supply chains. In agriculture, there are knowledge-related constraints, but rarely

are the constraints solely knowledge-related. For example, farmers in Sri Lanka are prohibited from growing other crops on land used for rice farming, however low the yield and the returns are. Labor shortages exist, but mechanization is difficult because farmers are unable to consolidate holdings since they lack transferable title. The argument that ICTs can contribute to desirable outcomes only when complementary factors are in place is not a new one. The relationships between ICT use and transportation, distance to market locations, etc. have been investigated in previous work done by LIRNEasia.¹ In previous work where we examined traceability in an agricultural supply chain, we found that the incentives were not fully aligned to take advantage of the improvements in information transmission.

At the second Harvard Forum on ICTs, human development, growth and poverty reduction last year, Michael Spence said that it was his conclusion from the work of the Growth Commission that the two major contributors to growth in developing countries in the past decades have been integration to global supply chains and increasing application of knowledge to economic activities.² The Inclusive KBE research module drills down into one supply chain to examine the on-the-ground ramifications of Spence's conclusions.

The research seeks to develop recommendations that will address what private actors can do help make supply chains more efficient and inclusive.

The focus of the research was to *seek to create a reliable source of pineapples for the growing market, by identifying constraints and opportunities for the pineapple sector from a small holder perspective.*

A supply chain analysis method was used as the primary method of investigation and the approach was two-fold;

1. Desk Research
2. Interviews/Discussions and semi structured interviews

The desk research involved examining the existing literature in supply chain analysis. A considerable amount of value chain analysis has been conducted by development agencies such as GTZ (Altenburg, 2006), DFID (M4P, 2008) and IDRC (Kaplinsky & Morris, 2001). Therefore the desk research looked at both academic as well as grey literature of reports and publications by development agencies.

The initial desk research resulted in the following methodology:

1. Mapping the core processes in the supply chain
2. Identification of the actors

¹ <http://lirneasia.net/projects/2008-2010/bop-teleuse-3/papers/>

² http://www.idrc.ca/panasia/ev-140355-201-1-DO_TOPIC.html; see also, Samarajiva, R. (2009, October 12). Great recession: Danger or opportunity for Sri Lanka? *Lanka Business Online* <http://www.lankabusinessonline.com/fullstory.php?nid=1896068867>

3. Identification of the services that feed into the supply chain
4. Mapping the relationships and linkages
5. Mapping the flow of products including the geographical flow
6. Mapping the changes in the value and form of the products
7. Mapping the information and knowledge flows
8. Mapping the volume of actors
9. Identification of the transaction costs and ways to reduce them

Ten in-depth interviews and 20 semi-structured interviews were conducted in the second phase of the project. The in-depth interviews involved agriculture experts, pineapple processors and exporters. Semi-structured interviews or discussions were conducted with smallholding farmers.

The report will begin by giving a brief overview of the world and Sri Lankan pineapple sector. This will be followed by an examination of the supply chain and identification of some of its problems. From its inception, the study intended to understand the gaps in the information and knowledge flows of the supply chain. The report will conclude by looking at possible solutions for bridging some of the knowledge and information gaps identified.

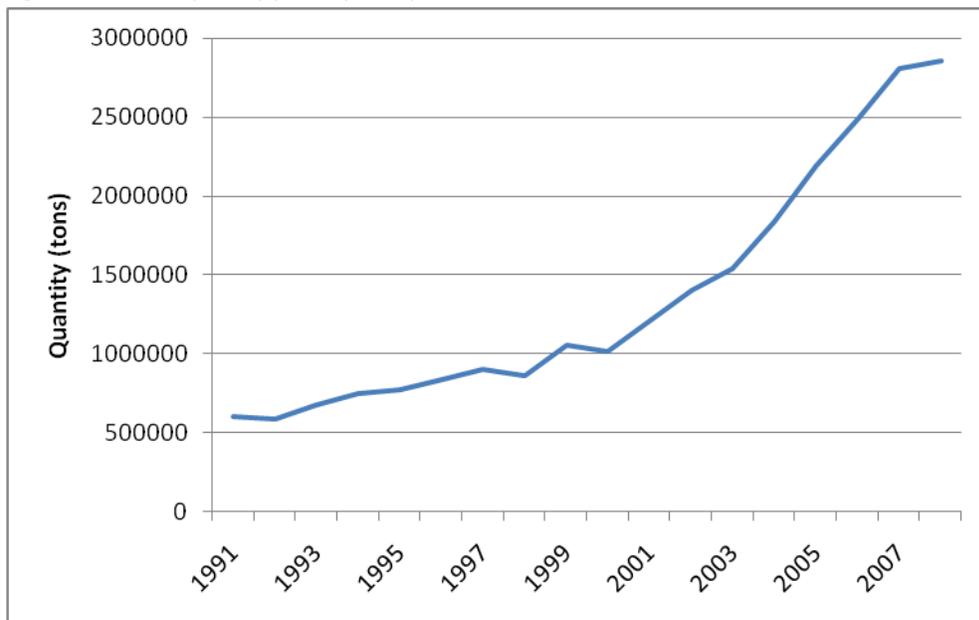
As mentioned above, the study objective was to *seek to create a reliable source of pineapples for the growing market*. While the study did examine the supply chain, it placed emphasis on the source of the supply, where in this case the smallholders are the majority. A significant number of the Sri Lankan pineapple growers are smallholders and they also supply to the export market. So therefore the findings of the study will benefit not just the smallholders but other players in the supply chain.

2. Market Trends and Competitiveness

2.1. Sri Lanka in the world pineapple market

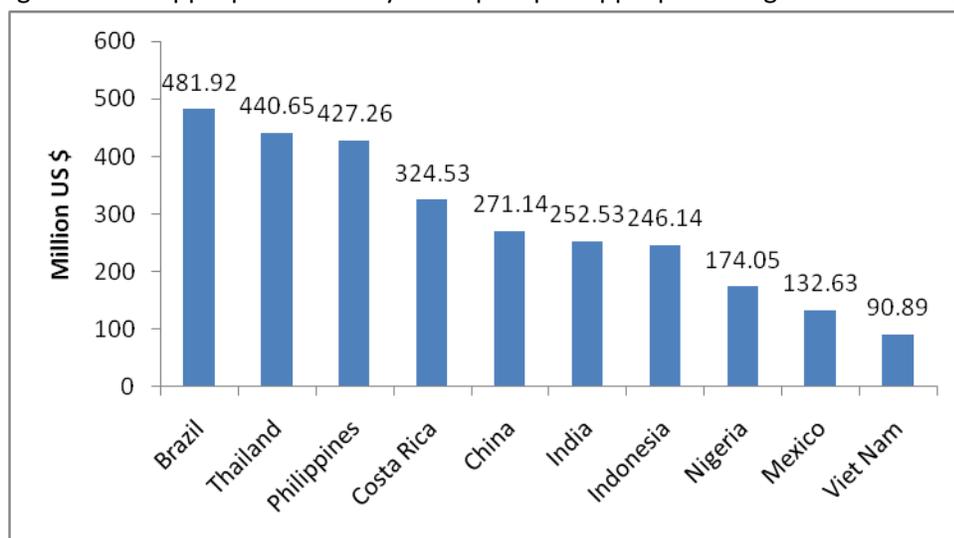
According to the Food and Agriculture Organization (FAO), in 2009 pineapple was a major tropical fruit with over 920,000 hectares cultivated and 18.2 million tons of pineapple produced in the world. The world market for fresh pineapple has been growing rapidly during the past years as shown in Figure 1, and is expected to further expand in the future. The major pineapple-growing countries in the world are Brazil, Thailand and Philippines.

Figure 1: World pineapple export quantities



Source: FAO, 2011

Figure 2: Pineapple production by the top 10 pineapple producing countries in 2008



Source: FAO, 2011

Sri Lanka is placed 34th in terms of world production with less than 1% of total world production. Despite being large producers of pineapple, neither Thailand nor Brazil are top exporters of fresh pineapples, as shown in Table 2. However Thailand is the top exporter of canned pineapples.

Table 1: World pineapple exports in USD Millions in 2008 ³

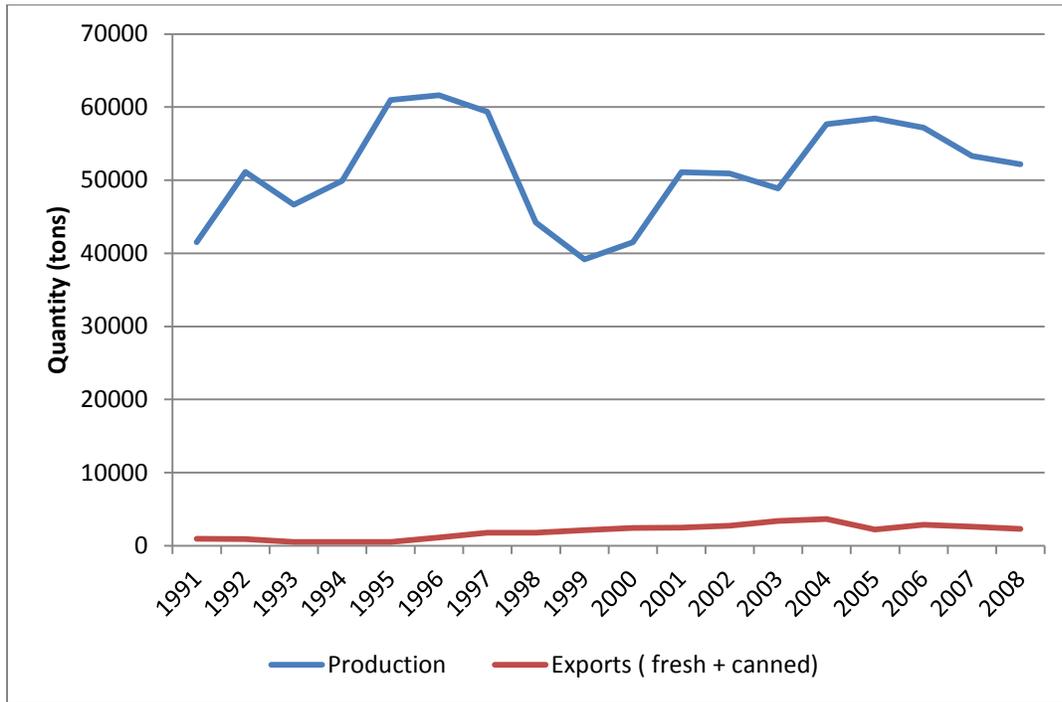
Fresh pineapples				Canned pineapples			
Rank	Area	Quantity (tons)	Value (Mn USD)	Rank	Area	Quantity (tons)	Value (Mn USD)
1	Costa Rica	1458980	574.92	1	Thailand	618508	563.32
2	Belgium	234123	239.43	2	Indonesia	220856	170.5
3	Netherlands	216131	224.06	3	Philippines	191608	135.98
4	Philippines	261338	162.4	4	Kenya	94682	75.76
5	U.S.A.	90512	93.41	5	China	76990	62.76
6	Germany	30648	37.59	6	Netherlands	36567	48.91
7	Ecuador	90022	36.6	7	Germany	26686	43.19
8	Panama	55737	36.5	8	Viet Nam	27620	15.18
9	Côte d'Ivoire	69201	29.11	9	Belgium	7576	12.39
10	Spain	23306	24.06	10	Malaysia	12803	9.65

Source: FAO, 2008

³ Table includes re-exports.

The FAO pineapple export figure shown in Figure 3 has been challenged by exporters who explained that pineapples are exported in crates mixed with other fruits and vegetables and therefore is recorded under a separate HS code provided by the Sri Lankan customs. This leads to an understating of the volume and value of pineapples being exported and thereby undervaluing the contribution of the pineapple sector to the Sri Lankan economy.

Figure 3: Sri Lanka pineapple production and exports (tons) recorded

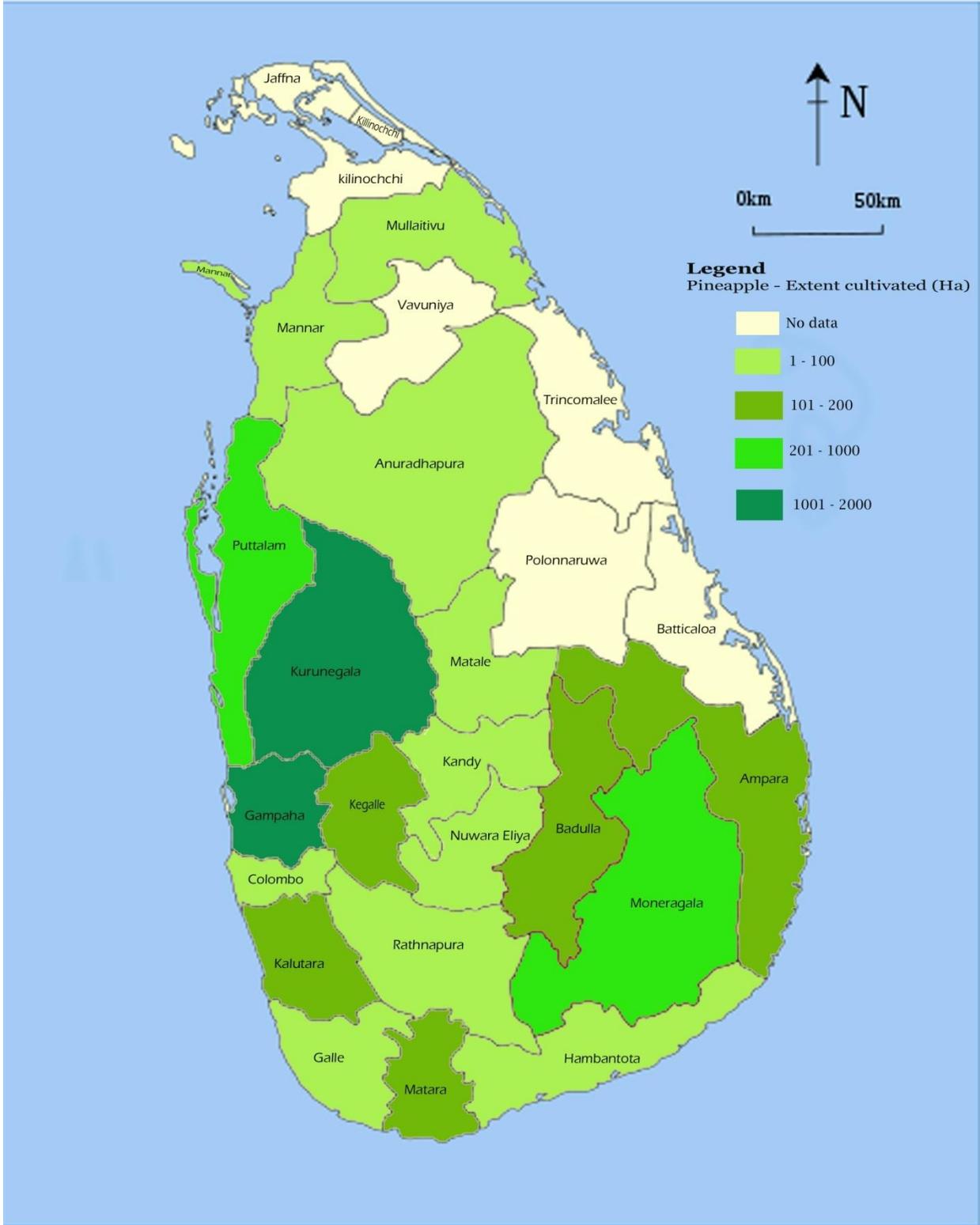


Source: FAO, 2011

2.2. Growing pineapples

In Sri Lanka, pineapple is predominantly grown in the Kurunegala and Gampaha districts as illustrated in Figure 3. Ten farmers from each district were selected for in depth interviews for the study.

Figure 4: Pineapple cultivation by districts in 2008



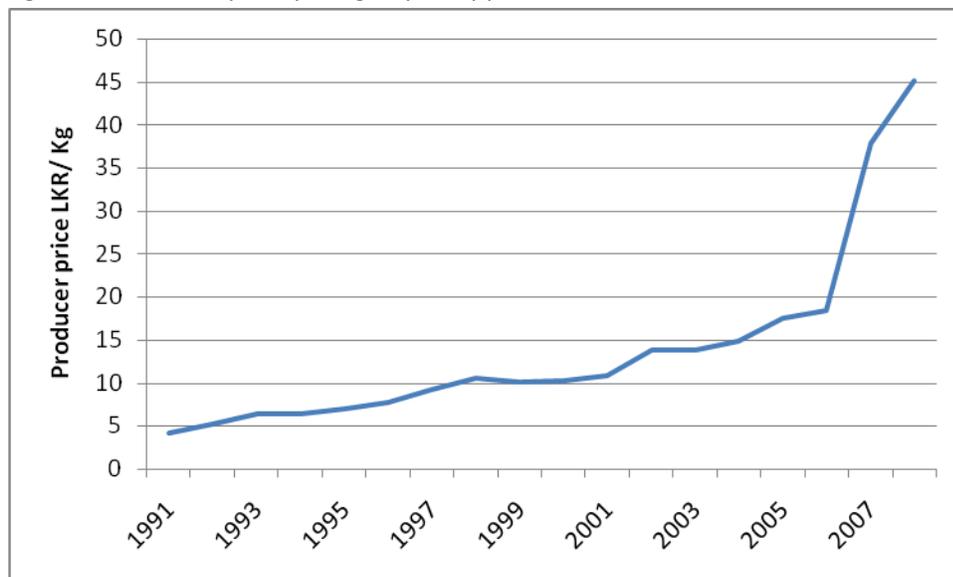
The two types of pineapples grown in Sri Lanka are Mauritius and Kew. There is either little or no irrigation for pineapple farming in these two districts and therefore farmers depend fully on rainfall. Pineapple production in Sri Lanka has been declining since 2005. The decline in extent cultivated maybe due to a number of reasons including access to suitable land. According to FAO data pineapple prices has been steadily rising as shown in Figure 5, however farmers cited the volatility of prices within the year as a reason for leaving pineapple farming along with the spread of diseases harming cultivation.

Table 2: The extent of pineapple cultivated in Sri Lanka

Area	Hectares cultivated				
	2004	2005	2006	2007	2008
Gampaha	2042	2029	2076	1841	1780
Kurunegala	2042	2059	1730	1664	1636
Moneragala	205	228	251	225	248
Total	5188	5257	4963	4778	4962

Primary source: Department of Census and Statistics; Secondary source: Data Bank of HARTI

Figure 5: Producer price per kg of pineapple



Source: FAO, 2011

According to those in the pineapple industry, especially exporters, Sri Lankan pineapples are known to have a distinct taste and are in high demand in both domestic and export markets.

Pineapples were initially grown in home gardens. Now it is mainly grown by smallholders (less than 10 acres) and a few large-scale farmers.

Pineapples are normally intercropped with mature coconut trees. The majority of pineapples are grown on leased coconut or bare land. However due to unavailability of larger plots of land for leasing, pineapple cultivation is often fragmented.

Below is a cost structure calculate up to the first harvest by the Department of Agriculture, Sri Lanka for cultivating pineapple in a land intercropped with coconut in a single row system.

Table 3: Cost of cultivating pineapple⁴

Item	(LKR /ha)
1. Land Preparation	14,000
2. Planting Material (10000 plants)	60,000
3. Pre-treatment	4,500
4. Planting (25 man days)	10,000
5. Fertilizer (50 kg x 24 bags)	48,000
6. Weeding	6,000
7. Hormone	4,000
8. Pest & disease control	10,000
9. Harvesting	6,000
10. Others	12,500
Total	175,000

Source: Department of Agriculture, Sri Lanka

Most pineapple farming is on leased land. There is no data available for average period of leased lands or the cost leasing land. From the interviews conducted it could be deduced that lease periods average 5 years and per annum leasing cost for bare land is around LKR 3000 per acre whilst land with mature coconut is around LKR 10,000-15,000 where the leasee gets to sell the coconuts grown on the land.

May-June is generally the main or the natural harvesting season for pineapples. According to some farmers sampled, prices tend to be lower during this time of the year. However, currently farmers are able to better control the harvesting periods through the application of hormones. Therefore pineapples can be grown throughout the year. The hormones stimulate flowering and pineapples can be harvested 3.5 to 4 months from the time of application. In the studied districts, pineapples are normally propagated from “slips” or “suckers”. Suckers arise from the underground parts of the plant. In addition, propagation can also be done through slips that arise from the fruiting stem and from the crown on top of the fruit⁵ however these method are rarely used in Sri Lanka.

Most of the farmers sampled planted an average of 4000- 6500 young pineapple plants or suckers in an acre in single or double rows. However, companies such as dole will plant between 27000 – 33000 pineapple plants per acre (mono cropping)⁶. The Department of Agriculture, Sri Lanka now recommends that 10,000 plants be planted per acre.

⁴ It should be noted that the values maybe outdated.

⁵ Pineapple India website <http://www.pineappleindia.com/Pineapple-Farming.html>

⁶ Dole plantations <http://www.doleplantation.com/QA>

Figure 6: Pineapple plants planted in double rows



Source: Authors

Before planting the plants are dipped in fungicide. Fertilizer and insecticides are applied during growing and flowering stages. At eight months when the pineapple bush has approximately 30-35 leaves, hormones are applied to induce flowering. When the plant is around 12-13 months the first fruit which is called “plant crop” is harvested. Plant crops are bigger and thereby get a higher price. By the time of harvesting each pineapple bush would have sprouted about two suckers.

Once the pineapple is harvested, the parent plant is removed. One of the suckers may also be removed and sold whilst the other is fertilized for the next harvest which is referred to as “ratoon crops”. The economic life of a pineapple plot is around 4-5 years after which the land is completely cleared. Growers refrain from re-planting pineapples in the same plot for several years since the crop is highly susceptible to disease. However there are instances of some pineapple plots which have lasted for 20 years by remaining disease free. The sizes of the pineapples that are harvested from these old plots are smaller.

3. Mapping the supply chain

Figure 3 summarizes the core processes and the actors of the pineapple supply chain. The study concentrated mainly on small-scale growers who have less than 50 acres under cultivation. The majority, however, have less than ten acres under cultivation.

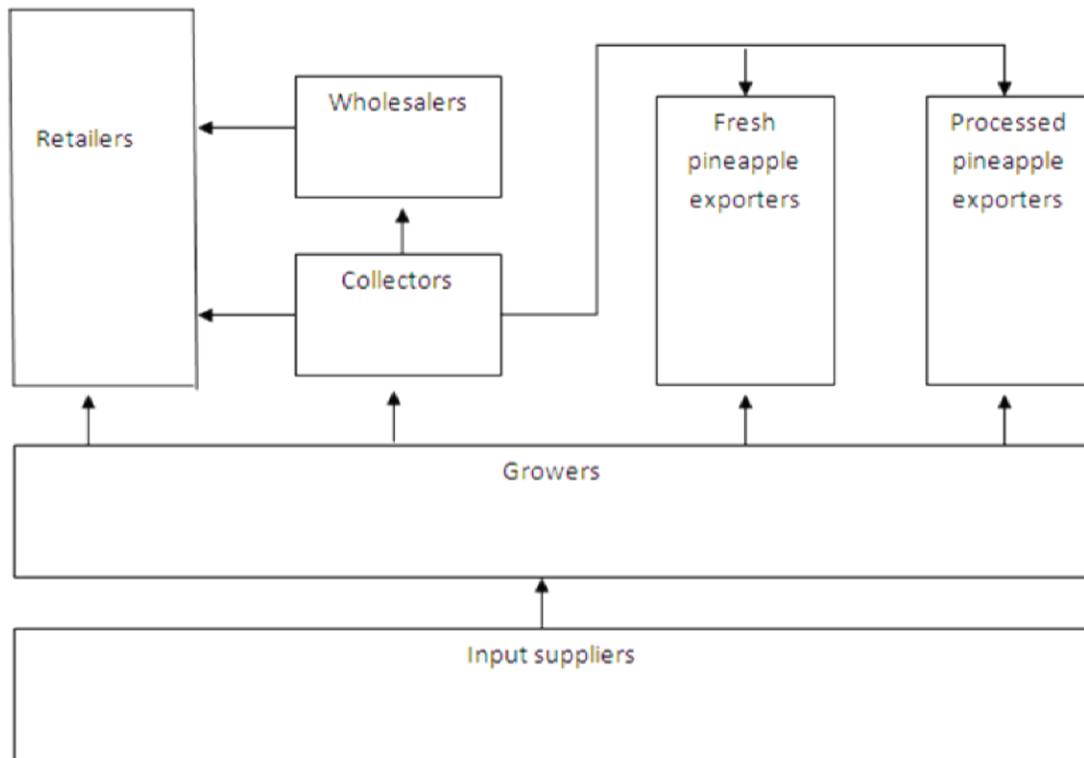
Most farmers fertilize their cultivation every three months and purchase their fertilizer and pesticides from an input shop in close proximity. Bigger growers tend to buy directly from chemical companies. In both cases it is often a continuous relationship.

Majority of growers sell to local collectors. Collectors provide transport and warehousing for pineapples and then re sell them to either exporters, processors or other collectors/wholesalers who distribute pineapples to other parts of the country. Collectors especially those who supply to exporters or

processors may have verbal or informal agreements with farmers. Majority of smallholders however do not have agreements with collectors.

A pineapple market exists in Belummahara in the Gampaha district. The shops in this area act both as retailers and wholesalers whilst providing storage facilities and are sources for exporters or processors who have unexpected shortages in supply.

Figure 7: Simplified Pineapple supply chain



Source: Authors

3.1. Pineapple markets

There are four markets that pineapples are sold to:

- Fresh domestic pineapple market
- Fresh export market
- Processed domestic market
- Processed export market

According to exporters, high demand along with high prices in the domestic fresh market has led to fewer growers supplying to the export market. The number of pineapples available for exports may further reduce with the rapidly expanding tourism sector which demands exotic fruits. According to the Sri Lanka Tourism Development Authority (SLTDA), a record 650,000 tourists arrived in 2010 and over 700,000 arrivals are expected in 2011.

The exports of fresh pineapples are mainly to the Maldives due to distance and less stringent quality demands. However the market is highly price competitive with a lot of undercutting from exporters. There are no country specific standards when exporting to Maldives. The majority of the demand is from resorts that have their own standards and specifics. However all buyers don't have the same requirements. E.g. different buyers have different preferences for fruit weight and how raw the pineapple should be when exported. Having HACCP and/or ISO 22000 is often advantageous and in certain instances is a buyer requirement therefore some local exporters are keen to obtain the required certifications.

The decision on which of the above markets to sell to is dependent upon the prevailing domestic market prices as well as the network of traders that the grower is connected to. Most farmers decide on which market to supply to prior to planting. Technically a farmer can change his decision as no special action is needed in the planting or growing stages to supply to the export market, however some farmers who supply for certain export markets plant more plants per acre as the fruits selected for freight is between 1-1.25 Kg and no bigger. The complication also arises at the time of harvesting. If supplying to the fresh export market the fruit needs to be harvested while it is still green and immature.

The processors who make juices, cordials, jams tend to cater mainly to the local market. Smaller quantities are exported to retailers as well as expatriate shops in Europe. There are also exports of dried pineapples, pineapple slices in to Europe.

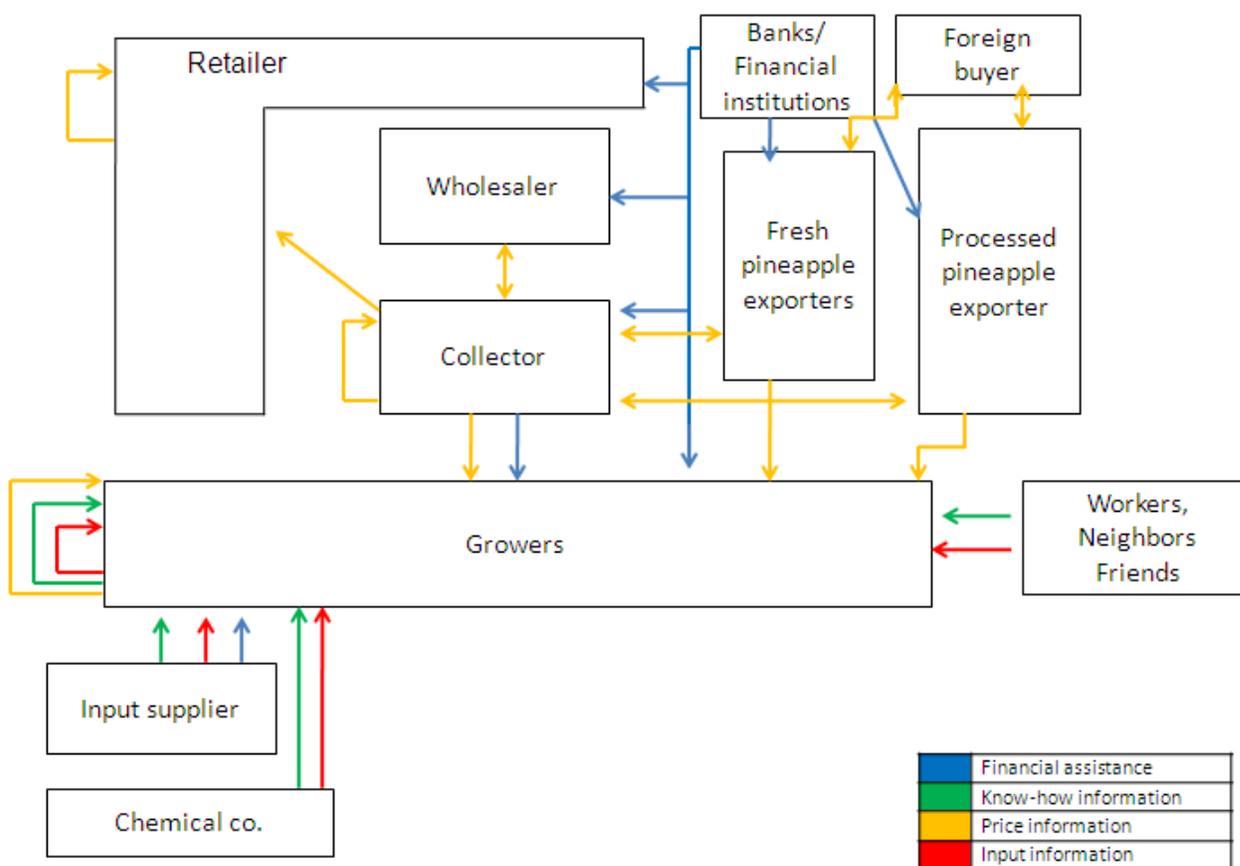
Mature or smaller pineapples are mostly utilized by the processors. The processed market buys the mature/ripe pineapples that can no longer be sold in the fresh form. The bigger pineapples go to the fresh pineapple market whilst the smaller pineapples that get lower prices tend to go the processed market.

4. Information flows

After gathering general information about pineapple farming in the region, farmers were asked a range of questions relating to planting material, land preparation, planting and disease management.

How and from whom farmers sourced their information was the core of the questionnaire. Information on how to get financial assistance, input, and price and know-how knowledge was mapped out and is shown in figure 6.

Figure 8: Information flows in the supply chain



Source: Authors

4.1. Price information flow

Farmers interviewed in the two districts received price information by calling several collectors in the locale. The bigger the farmer's cultivation, the more traders a farmer calls to get price information. Price negotiations seem to take place over the phone but the deal is not complete until the buyer has checked the pineapples physically for weight or size. There seem to be no strong loyalty towards any particular collector in his locale, with the farmers opting to sell to the highest price offered. However most farmers do not sell one-off to outsiders/ exporters even if prices offered are higher since most of them want the security provided by supplying to a collector based nearby with whom they have a personal relationship so that they will have a guaranteed buyer even during the peak pineapple season when there is excess supply.

Most farmers see the advantage of knowing pineapple market price in the Colombo Manning market, the main retail and wholesale market in the capital, to enhance their bargaining power. They were inquired about their willingness to use SMS based system like Govi Gnana Seva (GGS), a service that delivers spot and forward agricultural commodity price information in the three Economic Centers of

the country via mobile phones. Most smallholders thought it was beneficial but most were unwilling to subscribe to it since the extent of the benefit was debatable to them. Firstly, most small holders own only a few acres they believe that they are unable to bargain even if prices in Colombo markets were known.

Secondly, most smallholders only harvest once or twice a year and do not require day to day price of pineapple. They believe it is more beneficial to large scale farmers who tend to apply hormones accordingly and force fruiting every 2-3 weeks and therefore sells pineapples regularly.

4.2. Know-how information and input information

Know-how information about pineapple farming is required mainly by new farmers, before the planting stage. This may include the type of soil that is required for successful cultivation, how many plants to grow in an acre, whether to opt for single row or double row planting system, the distance between two plants. By input information what is meant is where to get healthy suckers, which fertilizers and pesticides to use and its frequency.

New farmers source know-how information and input information from other growers, experienced field workers, friends who might have some basic agriculture knowledge, the local input shop owner and through programs conducted by chemical supplying companies. There is a risk that new farmers get partial or inaccurate information and no method of verifying information received as they have limited contact with government agencies like Govi Jana seva.

For experienced farmers information about new fertilizers comes mainly from the local shop or through programs conducted by chemical supplying companies. Information about where to source new plants is mainly received from asking neighboring pineapple cultivations and collectors who know which growers have suckers.

4.3. Financial assistance

Financial flow is in 3 main forms.

- Input suppliers selling fertilizer on credit to selected smallholders. Farmers who have a good, persistent relationship with suppliers can sometimes pay for the fertilizer after their harvest is sold.
- Collectors giving loans to selected smallholders with whom they have a persistent relationship
- Bank loans through the Kapruka loan scheme. It is a scheme offered by commercial banks in the country with interest rebates and a grace period of 1 year offered for pineapples intercropped with coconuts. Most smallholders seem to be aware of this service but tend to reinvest profits.

Table 4: Details of Kapruka loan scheme available for farmers who intercrop coconut and pineapples.

Loan Category	Purpose	Maximum loan per acre LKR	Grace Period Years	Payback Period years	Interest Rebate
Coconut New Planting and Inter Cropping	Coconut New Planting, Intercrops, soil and Moisture Conservation, Fertilizing & Maintenance	75,000/-	1	5	1st Yr 100% 2nd -4th 50% 5th Yr 100%
Coconut Replanting and Inter cropping	Removal of Senile Coconut Plantation & Replanting with Inter crops, Soil & Moisture Conservation, Fertilizing & Maintenance	75,000/-	1	5	1st Yr 100% 2nd -4th 50% 5th Yr 100%
Rehabilitation of Coconut Lands & Intercropping	Intercropping Soil & Moisture Conservation, Fertilizing & Maintenance	75,000/-	1	5	1st Yr 100% 2nd -4th 50% 5th Yr 100%

Source: Sampath Bank, http://www.peoplesbank.lk/Kapruka_Loan.php

4.4. Export quality requirement information

There seems to be limited feedback from exporters or collectors to farmers pertaining to quality standards of pineapples supplied. Whilst farmers supplying to export market are aware of the correct time to harvest, other knowledge about quality requirements does not seem to have reached them.

5. Constraints and possible solutions

In depth interviews with growers, collectors, processors, exporters and industry experts have revealed some inherent problems within the industry. All of which will not be highlighted in this report. Instead, the report will analyze a few of the problems faced by the industry. Discussions with the collectors, traders, processors and exporters reveal that they believe that there is excess demand in the market and there is room for supply to expand.

As mentioned at the beginning the report, smallholders provide a majority of the pineapples to the supply chain, be it for the local market or the exporters.

A list of the interview and discussion participants has been attached in annex 1.

5.1. Gaps in farmer knowledge on financial assistance

Farmers we spoke to were unaware of government schemes like 'one village one crop' which is a project under Ministry of Agriculture and implemented by the Department of Agriculture. The program selects crops that is most fitting for the village and then tries to increase its production and productivity and thereby increase the living standards of the farmer community. Under this program suckers are provided at a 50% subsidy to smallholders of 1-2 acres who want to start pineapple cultivation in selected provinces. This greatly reduced the risk of buying unhealthy suckers by smallholders entering the industry.

Experienced farmers have no knowledge of new schemes and have limited involvement with extension officers. The main reason for this seems to be the lack of interest and trust farmers have in government institutions. New farmers seem to be ignorant of this mainly because information flows to them from experienced farmers and not government agriculture extension officers like the "Govi Jana Seva" though which this project is brought to the farmer level.

There is also a toll free agriculture advisory telephone service, 1920. Even though there is a need for advisory for disease management by smallholders they are not aware of this service.

Smallholders though aware, seem to have an inaccurate knowledge about the loan scheme Kapruka. There is a belief that the loan system does not apply for leased land. Most farmers seem to have preconceived ideas that the loan application process is too tiresome and difficult and does not apply even if they have a necessity.

One method of getting accurate information across to vast number of farmers is by using existing avenues like the local input suppliers. Pineapple farmers visit the local shops frequently, posters or leaflets with government service information placed at key places, regularly visited by farmers is a good way of reaching a large number of farmers. This is a continuous reminder for farmers and is likely to be compliment well with one-off awareness creating programs.

5.2. Shortage of healthy suckers

In the pineapple industry, it is understood that almost all plantations have been affected by disease. However to degree to which these plantations are affected will vary. As new suckers have to be sourced from the existing plantations, the growers need to be careful when selecting the new suckers.

There is a deficit in the supply of healthy suckers. Growers incur search costs spending up to two months looking for healthy suckers. They normally inquire from several pineapple farmers and collectors to obtain the information on where to buy suckers. Further time is spent thereafter to examine the cultivations and plants to check if the plants are healthy. Often new growers purchase virus-ridden plants since they do not have the knowledge to distinguish the healthy from the diseased suckers. This shortage of healthy suckers in the sector can result in the further spread of diseases and loss of pineapple crops.

The best solution to this problem may be the use tissue culture to propagate new plants. However, the authors were informed that while a program of using tissue culture to obtain new plants had been set up, it was suspended as at 12 Oct 2011. A few

A possible solution to fill this information gap may be for plant sellers and buyers to use an existing service like Dialog TradeNet. “TradeNet encompasses the collation, comparison, qualification and subsequent dissemination of trade enablement information to large numbers of stakeholders minimizing information arbitrage”⁷. If the farmer and seller are Dialog mobile users they can subscribe to receive an SMS when the demand and supply are matched. The service which is also available through the web can aid in reducing search time and search cost. It might not however solve the issue of unhealthy plants been sold.

The newly launched Agriculture Information Management System (AgMIS) by the Department of Agriculture aims to bridge the gap between farmers and entrepreneurs by having a data base on crops cultivated and providing a platform for suppliers and buyers to meet. Additional function listing sellers of pineapple suckers with their contact details can prove to be very valuable. However with the program in its launch stage it is vital to create proper awareness amongst farmers is created for the program to be successful.

Furthermore, currently, the information on the availability of healthy suckers is being sourced through social and business networks and is based on a recommendation of a known party. However, no such recommendation will be available on electronic platforms AgMIS or Tradenet. Therefore the incorporation of a reputational ranking to determine which suppliers are most likely to provide healthy suckers may act as a substitute for recommendation by a known party.

However, it should be noted that neither Tradenet or AgMIS may prevent unhealthy suckers been sold, it can reduce search costs significantly.

The current search time of six to eight weeks adds to the cost of the growers in the form of search costs. This in turn increases the transaction costs of the growers.

5.3. Lack of knowledge of new planting techniques

As mentioned above, commercial companies such as Dole, grow approximately 27,000 – 33,000 plants per acre. In Sri Lanka, most farmers still plant about 6,000 plants per acre, although the agriculture department now recommends 10,000 per acre shared cropping. Furthermore, a few farmers still prefer to engage in planting in single rows as opposed to double rows. The recommendation by the Department of Agriculture, Sri Lanka is to plant double rows. Research pertaining to pineapple in Sri

⁷ <http://www.dialog.lk/news/dialog-tradenet-ggs-partnership-set-to-revolutionise-agri-market-access/>

Lanka has more to do with finding new and improved fertilizer and concentrates less on new planting techniques.

However, given the above discrepancies in the number of plants per acre, it may be worth looking into new planting techniques as it has implications on productivity.

5.4. Export market/ Information Asymmetry

Whilst pineapples can be grown throughout the year, the overall market supply is not constant resulting in a recurring cycle of gluts and shortages. High information asymmetry with respect to market information leads to a lack of coordination between demand and supply. This is despite the fact that there are hormones which can induce flowering allowing farmers to shorten and thus determine the time it takes to harvest pineapple crops.

Exporters often do not directly approach small holders unless they have a deficit in supply and need to meet an export order urgently. Most exporters get their supply from a network of collectors who have farmers supplying to them. The collectors have arrangements with farmers, however there is seldom formal contracts. Collectors may be responsible for delivering pineapples at the required quality in timely manner to exporters. The collectors may also provide some assistance to farmers in the form of loans. However in the absence of formal contracts, farmers have no obligation to supply to collectors or exporters when the local price for pineapples is high or when there is fierce outbidding by exporters for pineapples. The result is that exporters do not have sufficient supply to export. This situation makes it difficult for exporters to enter into long-term contracts with their foreign buyers.

The farmer database AgMIS on the Department of Agriculture website and Tradenet again maybe a possible solution by providing an online market for farmers and buyers to meet.

5.5. Grading and Pricing of pineapples

Pineapples are priced both on size as well as weight. In the former, pineapples are visually graded into four or five categories based on size and a price is offered on a per fruit basis for each grade. When pricing is done by weight, two different methods identified are:

- Per-kilo prices are determined for two different categories of pineapples – one for those below 1Kg in weight and another higher per-kilo rate for those weighing more than 1Kg each
- A single per kilo rate is given for an entire stock of pineapples without considerations for individual weights.

The smaller farmers find it difficult to negotiate with traders when visually grading pineapples into categories as there is no standard. The grade 1 pineapples which get the highest price may be placed in

the grade 2 pile causing disputes and a lack of trust in the trader. The lack of trust can persist into price negotiations. Even if the price offered by traders is fair, the farmer feels cheated and is unhappy. Negotiations are almost impossible and the farmer is most likely asked to switch to another collector who may also not offer a better price.

Due to the small size of farmers bargaining is impaired. A possible solution may be farmer groups or cooperative systems which have been formed for joint marketing, to reduce transportation cost. Stanton (2000) has recognized that the size of the farm as the fundamental factor in the challenges rural producers face, and suggested that the creation of cooperatives as one way of the answers to solving this issue.

A case study done in Ghana by Yeboah (2005) looks at Farmapine Ghana Limited (FGL), an example of cooperatives and exporters working together to process and export their produce. Forming cooperatives maybe one of the methods to increase farmer bargaining power and reduce distrust between farmer and buyer. This solution might also help solve the trust issue farmers have with collectors. In the Farmapine arrangement, risks are considerably lower for the farmer and profits are rather high. It is owned by members of five farmers' cooperatives and two former producers/exporters. The five cooperatives have 80% ownership; the former exporters hold the remaining 20%. Output price is negotiated at the beginning of the growing season and reviewed periodically to reflect prevailing prices in the industry. Production managers coordinate the planting and harvesting activities of the farmers to ensure that they fit into the overall export program of FGL.

Technical know-how for farmers could be channeled through these groups. Cooperatives can act as a bridge between government advisory services and farmers. At present in Sri Lanka, there seem very little interaction and detrimental trust issues between farmers and extension officers in this field.

In Ghana, the farmers in the cooperatives also receive technical advice from the production managers who act as extension officers on chemical usage to ensure they conform to export standards along with assistance to any other problems associated with production.

However as mentioned earlier in the report, most farmers in Sri Lanka supply to the local market and are generally satisfied with the prices offered and maybe reluctant to change to an unknown export market.

The fact that buyers have to source from a large number of smallholders adds to their transaction costs as the same transaction has to occur many times over. However, the establishment of cooperatives will result in the reduction of some of these transaction costs.

5.6. Unavailability of land for pineapple cultivation.

Pineapple growers are often interested in expanding their cultivations however, they state that land shortage as a serious concern to the expansion of pineapples in both districts. Whilst bare coconut land

is available for leasing, most land owners are unwilling to lease it out due to problems occurring after the lease is over.

There is no data on lease periods however the in-depth interviews reveal that leases are for 5 years. Mostly leasees do not fertilize the pineapple cultivation after the 3rd / 4th year (depending on whether they can have another harvest before the lease expires). This leads to a drastic depletion in the soil nutrient content and fertility which results in the tapering of coconut trees. There is a belief amongst the public that pineapple cultivation depletes the soil of its nutrients.⁸ This results in misinformed land owners refusing to lease land to pineapple farming.

6. Conclusion

Demand for pineapples has been expanding both locally and globally. As mentioned at the start of the report, Sri Lankan pineapples are considered as the best in the world in terms of its taste by the industry experts interviewed by the authors. Therefore the potential for the expansion of the Sri Lankan pineapple sector is significant. Furthermore, in spite of the Sri Lankan pineapple sector receiving little state patronage, it has done well so far. However, problems do exist.

Most pineapples are grown by smallholders. The size of the smallholders is detrimental to their negotiating power and has led to an inert distrust in collectors. The establishment of cooperatives may assist them in increasing bargaining power of the growers. The establishment of cooperatives will also assist the buyers in reducing their transaction costs.

The existence of disease ridden suckers for sale is an issue particularly to new growers. This often results in high search costs and search times. The problem can be lessened by the use services like Tradenet or AgMis. These platforms, along with a reputational ranking, can provide a listing of sources and aid farmers to find information on sellers of suckers. However for these services to be successful awareness must be created amongst smallholders. Furthermore, the countries such as Philippines use new planting techniques to increase productivity. While all of these techniques may not be applicable to Sri Lanka, there is value in looking into these new techniques to ascertain which ones are. Particularly as it often have implications for productivity.

There is a considerable disconnection between farmers and government extension services. Lack of awareness, interest and trust in government services seems to be some of the reason for it. Whilst there is a need for information and knowledge, farmers source it from other farmers and other non-government stakeholders in the supply chain which may lead to impartial or inaccurate information been passed on to new entrants. Schemes like 'one village one crop' and services like 1920, the extension advisory service are almost unknown. Again as mentioned earlier it is critical that awareness

⁸ Integrated plant nutrition systems (IPNS) Training Manual
<http://www.agridept.gov.lk/images/stories/site/PDF/Publication/English/BOOK/ipns.pdf>

must be created amongst farmers. Using existing sources like the local input shop as a location to put up a poster with relevant information and to distribute leaflets to interested parties is a solution put forward. The main concern is not the lack of services but the lack of knowledge about the existence of services that are aimed to aid smallholders.

Exporters often claim that Sri Lankan pineapples are extremely marketable, however, they state that the supply is insufficient and often erratic. This is particularly a problem for exporters who are required to fulfill agreements. The establishment of cooperatives may also assist the exporters and local buyers in ensuring a more stable and higher quality pineapple supply.

As mentioned earlier, the Sri Lankan pineapple sector caters four main markets. Each of these segments has the capacity to expand. Industry experts believe that with the current expansion in the Sri Lankan tourism sector, there will be further supply shortages for the export markets.

The Sri Lankan pineapple sector has the potential to expand. However, in order to make the industry more efficient and expand further, some of the constraints identified in this report have to be addressed. As an agriculture produce, pineapple received little or no state patronage and can be called an orphan crop. However, the sector has performed well. With the above constraints addressed, the expansion of the industry is a definitely possibility.

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CIC Agri, http://www.cicagri.com/index.php?page_cat=farmspalwehera

Annex 1

Interviewees

Organisation	Name of person
CIC Agri Business	Mr. Keerthi Kotagama
Department of Agriculture	Dr. Eresha Mendis
HJS Condiments	Mr. Ananda Pathirage
MD- Lanka Canneries	Mr. Nilhan Ekanayake
Nidro Supply	Mrs. Dawn Austin
	Mr. Channa Madawela
Quality International Certification Services	Dr. Srilal de Silva
Serene International	Mr. Firoze Ismail
Sri Lanka Standard Institution	Mr. Kanchana Ratwatte
	Mr. Dharmawardene

List of smallholders

Mr. Sirisena Ekanayake
Mr. Mahinda
Mr. M.A. Ariyasighe
Mr. Abeyinghe
Mr. Dhanuska Ubayarathna
Mr. Nimal Wickramasinghe
Mr. Dilbarathna
Mr. Pathirana
Mr. Amaratunga
Mr. Ruwan
Mr. Asanka Prabath
Mr. Senanayake
Mr. Adrian
Mr. Navaratna
Mr. Tisera
Mr. Kulatunga Ranasinghe
Mr. Gunawardena
Mr. Priyantha (Grower and trader)
Mr. Pediric Appuhami
Mr. Dharmadasa