Steps towards Agri-Supply Chain Management

Public Report Phase 1

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World Fresh Agri-Supply Chain project, Bangkok, Thailand

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1 Introduction

The goal of the World Fresh Agri-Supply Chain project is as follows:

To ensure that fresh products (fruits, vegetables, meat, poultry and fish) bought daily by millions of Thai citizens are of good quality, safe, clean and fresh against competing prices.

The scope of the project is illustrated in figure 1.1.

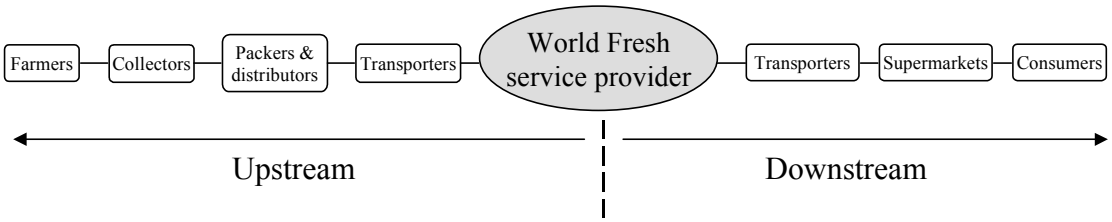


Figure 1.1: Scope of the World Fresh Agri-Supply Chain project

The entire project consists of three phases and has a throughput time of two years. Phase 1 was carried out from June 1998 until December 1998. Partners who participated in phase 1 were CRC Ahold Company Ltd., World Fresh Company Ltd., ATO-DLO and Rabobank International. Phase 1 was focussed on fruits and vegetables. In later phases the goal is to enroll the developed concepts to other product groups.

The starting point of the project was an analysis of the current supply chain (phase 1.1). In the rest of phase 1 three main activities were done:
1. Value Chain Analysis;
2. Quality Management & Specifications;
3. Main Suppliers.

An important condition of the project was that analysis that were done and tools and knowledge that were developed should also have a generic character. Furthermore attention was paid to knowledge transfer of experiences gained in agro-chain projects in the Netherlands.

In this report first the results of the analysis of the current supply chain are discussed. Then the results of the three activities in the rest of phase 1 will be described. Finally the recommendations for further research in phase 2 and 3 of the project will be presented.

2 Results: Analysis of the current situation

The goal of the analysis of the current situation was to analyze the Supply Chain for fruits and vegetables in order to identify the main improvement areas. The research was carried out through interviews with representative people from different companies in the Thai supply chain, observations and quantitative analysis of orders. In total 40 interviews were held during a period of 7 weeks. The analyzed companies varied from seed companies, farmers, wholesalers, World Fresh, CRC Ahold, TOPS stores and transporters. The results of the analysis of the current situation are discussed below.

CRC Ahold, a joint venture between Central Retail Corporation and Royal Ahold, operates TOPS supermarkets. There are 40 TOPS supermarkets in Thailand, of which 29 in Bangkok and 11 upcountry (e.g. Chiang Mai). An important part of the mission of TOPS supermarkets is to be 'the best in fresh'. The categories within fresh products at TOPS are fruits, vegetables, meat, seafood, bakery and deli.

Important factors for the Thai consumers with regard to fresh products are high quality (freshness), safety, assortment, availability and price. To fulfill those consumer demands, attention points are lead-time reduction, high standards, reduction of handling and elimination of activities and intermediaries that don't add any value. The Supply Chain must focus on these aspects.

There are two main distribution concepts for delivery to stores, namely distribution through World Fresh and Direct Store Deliveries. These concepts are illustrated in figure 2.1:

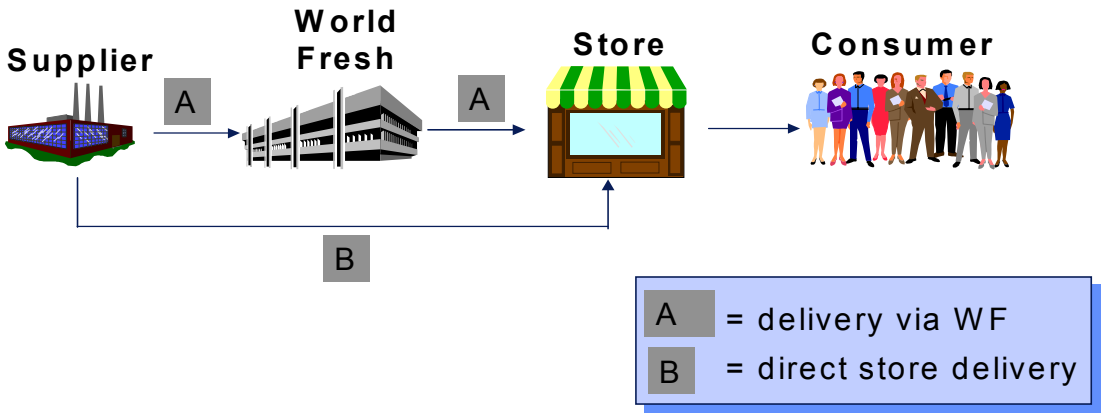


Figure 2.1: Delivery via World Fresh (WF) vs. Direct Store Deliveries

The policy for Bangkok stores is to order through World Fresh. This is a food processing and distribution center, located near Bangkok. World Fresh is a Thai Joint Venture between CRC-Ahold Company Ltd. (60%) and Northern Agricultural Company Ltd (40%). In case of a delivery through World Fresh, buyers gather the store orders. Subsequently buyers place orders at the

suppliers. Suppliers deliver the products to World Fresh, where goods from different suppliers are combined and send in one delivery to the store. The main functions of World Fresh are goods receiving, production (e.g. cutting and packaging), storage, order picking and loading of perishables. World Fresh has chilled storage facilities and state-of-the-art management information systems. Transport from World Fresh to the Bangkok stores takes place by TNT logistics in specially designed refrigerated trucks.

The policy for upcountry stores is to order fruits and vegetables as much as possible at suppliers in their area. Those suppliers deliver directly to the store (Direct Store Delivery) and not through World Fresh. Reasons for this are the high transport costs from World Fresh to upcountry and the freshness of the products. A disadvantage of Direct Store Delivery is that it is more difficult to reach quality standards than with an order through World Fresh. This is because World Fresh has centralized Quality Control. All suppliers that deliver to TOPS (incl. Direct Store Delivery) must be approved by buyers.

A lot of different purchasing channels are used to obtain the fruits and vegetables (see Figure 2.2). Many suppliers of fresh products are wholesalers (channel 1), what makes it difficult to control the chain backwards. Products are also bought from farmers directly (channel 2). For smaller quantities, products are sometimes bought at wholesaler markets (channel 3) or at local suppliers (channel 4). Imported products are retrieved from importers (channel 5). In general suppliers use their own transport to deliver the products.

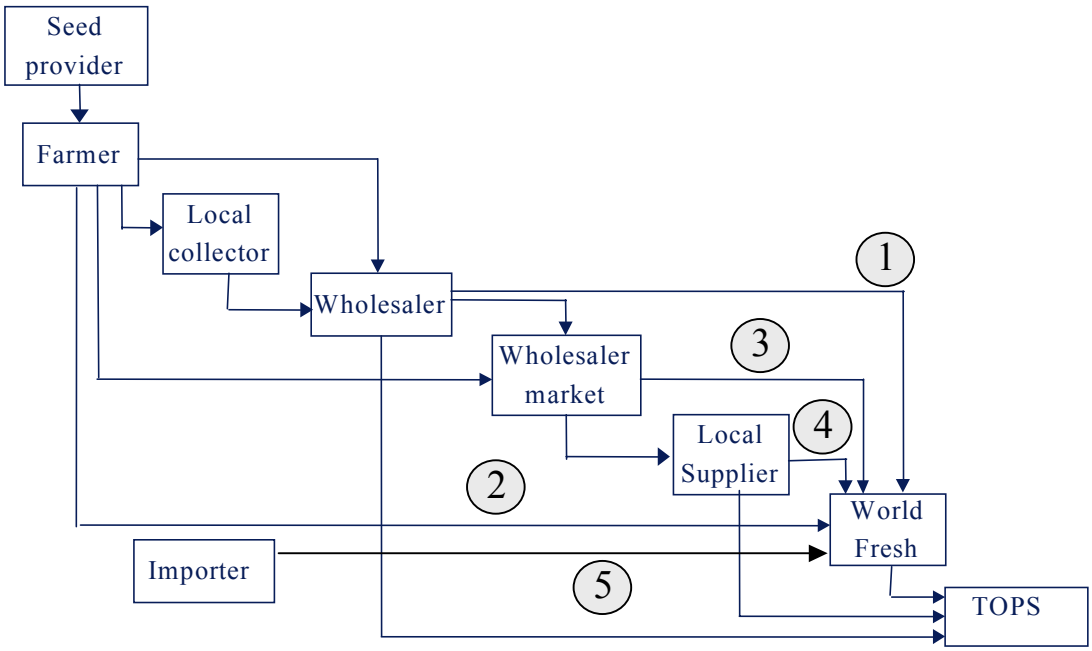


Figure 2.2: Variations and changes in purchasing channels

In the current purchasing process many small suppliers of perishables are active (250 for perishables of which 100 for fruit and vegetables). At the same time there are many different purchasing channels that may vary per ordering cycle. This way of purchasing has some important disadvantages, which also lead to high costs:

- Because of the large number of suppliers, there is a lot of variation in the quality and the quantity of products that the suppliers deliver to World Fresh. This also has a large influence on the outgoing service level;
- Tracking and tracing is difficult;
- Goods receiving and quality control at World Fresh is time consuming;
- Many small suppliers use non-refrigerated transport to World Fresh, which causes quality losses for certain products;
- The whole purchasing process with so many suppliers involved takes a lot of effort (esp. the administration, communication and information flow);

In general a lot of large improvements have been made in the Supply Chain last year, especially in World Fresh and in the downstream processes. Based on the results of phase 1.1, the project team worked on the following main topics in the rest of phase 1:

1. Value Chain Analysis;
2. Quality and specifications;
3. Main suppliers;

The results of these main topics will be discussed in the next paragraphs.

3 Results: Main topics

3.1 Value Chain Analysis

Goal of the Value Chain Analysis was to increase the insight in the chain by researching where the main costs are made in the Supply chain and how much value is added during different stages in the Supply Chain. This is important because it is advisable to define projects on cost reduction on fields where main costs are made. A Value Chain Analysis has taken place for four products of high potential suppliers. For these products the main costs from farmer until the shelf were analyzed with principles of Activity Based Costing. An example of the value chain model that was developed for cabbage is presented in figure 3.1. This figure limits to the modeled activities in the supply chain for cabbage.

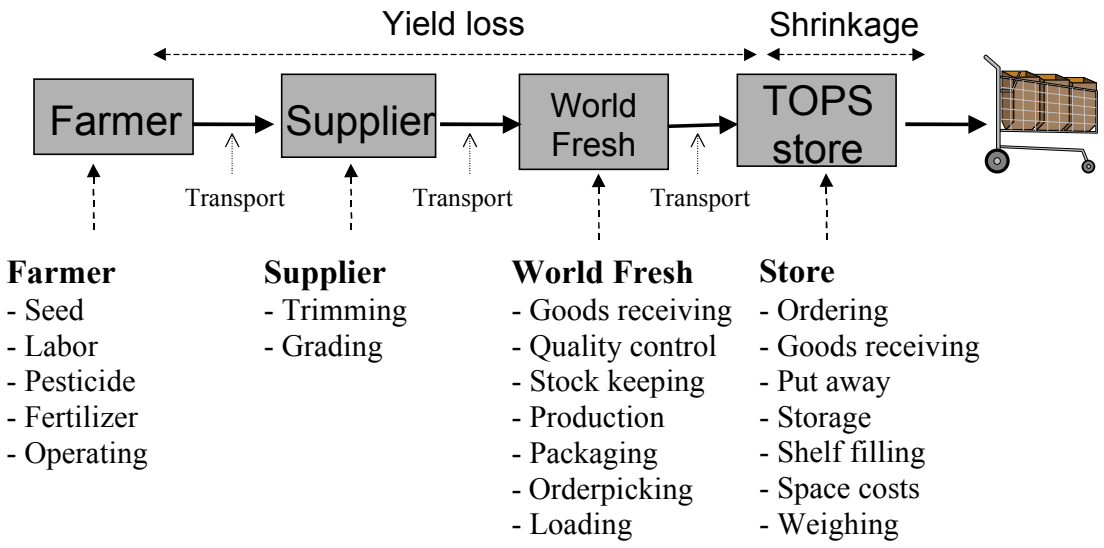


Figure 3.1: Example of modeled activities in value chain for cabbage

In general the Value Chain Analysis turned out to be a very useful tool to give insights into the added value in the chain and to create discussion between various members in the chain. However the insights in costs varied a lot among the different parties in the chain. At World Fresh an Activity Based Costing system is operational and stores also have a lot of data available. It appeared that many farmers and suppliers don't have good notions about their costs. Some farmers for example don't add labor costs and/or costs for their land in their cost price. The price the farmer gets depends very much on the market price, based on supply and demand. Therefore it is difficult for the farmer to use a 'cost price plus approach'. In general it can be concluded that there is need for good cost models for various parties in the chain, especially farmers and suppliers. Some other conclusions about the most important cost aspects for the four mentioned products are:

- The main costs of the farmer are fertilizer, insecticides and pesticides (Considered that some farmers don’t add labor cost and/or cost for their land);
- The costs because of yield loss and shrinkage in the chain can be reduced;
- Processing (cutting and trimming) at World Fresh is relatively expensive. This is caused for a large part because of investments at World Fresh. If possible these activities should take place as much as possible at suppliers;
- The two factors that influence the cost per product in the store most are the volume and the turnover rate of the products (fast mover or slow mover). Especially for slow-movers the space and labor costs are an attention point.
- For the analyzed products the transport costs vary from 20% to 40% of the total chain costs, dependent on the location of the production areas and the value density of the products. Conclusion is that transport costs are an interesting field to aim for cost reductions. Possibilities might be using backhauling and/or combined delivery of perishables and dry groceries to upcountry stores. Calculations in the project showed that combined delivery is an interesting concept for some upcountry stores (esp. Udon Thani and Ubon Ratchathani).

Performing Value Chain Analysis turned out to be so useful that it will become a continuous activity. Some aspects still require more detail or more checking. It would be good to develop standard cost models for the various parties in the chain and to integrate them in the future. Furthermore it is interesting to broaden the Value Chain Analysis to other products and/or product groups (meat, seafood).

3.2 Quality management and specifications

With respect to Quality Management improvements are defined and introduced with high speed, especially in World Fresh and at downstream parties. Most of the quality losses of fruits and vegetables are caused by uncooled conditions at upstream parties, sometimes in combination with long distances. However at the moment World Fresh has many small suppliers that probably won't be willing to invest in cooling facilities. A condition is that suppliers cooperate together or that some suppliers develop themselves to main suppliers. Improving the knowledge and understanding about fruits and vegetables in the complete Supply Chain through special training programs would be a step forward to long term quality improvement.

In this activity many short and long term recommendations were given about further quality improvement, of which some were already implemented during the project. Attention was paid on HACCP, an important system to guarantee safety throughout the supply chain. In 1999 a HACCP implementation will start in World Fresh. To support this implementation knowledge transfer about official Dutch HACCP procedures for stores and for processing of fruits and vegetables took place. In the future TOPS can also demand HACCP from their main suppliers. As an example of this a HACCP guideline for growing fruits and vegetables was also summarized and distributed in the organization. In the future regulations like this can be used to develop Good Manufacturing Practices for suppliers of TOPS in order to develop Integral Quality Control throughout the chain. However a critical success factor in reaching hygiene is the attitude and discipline of the personnel.

Recommendations were done about further improving handbooks with product specifications. An important recommendation was to introduce more quality classes (class 1, class 2) and grades (different sizes within a class) for fruit and vegetables.

3.3 Main suppliers

Goal of the activity main suppliers was first to analyze the qualitative and quantitative advantages of using main suppliers. Second to set up an approach of how to come to main suppliers and finally to develop a blueprint of how to deal with main suppliers.

3.3.1 Advantages of main suppliers

The main advantage of the use of main suppliers is an increased controllability because the use of main suppliers leads to a structuring of the overall distribution network. As a consequence the total distribution costs will decrease, the lead-time will reduce (which leads to improved freshness and lower stock) and the risk for involved parties decreases. With main suppliers it will be easier to reach higher quality standards and to start tracking and tracing. A spreadsheet model was developed to get insights in the cost effects of supplier reduction (restricted to the purchasing process). Conclusion was that the use of a limited number of main suppliers instead of many small suppliers could lead to a significant cost saving of the total chain cost. This concerns especially transport costs and costs for goods receiving/quality control. Furthermore it appeared that the fixed ordering costs are quite high, what makes ordering small quantities unprofitable.

3.3.2 Approach to reduce the number of suppliers

An approach was developed taking a product portfolio as starting-point. In this portfolio products are categorized using financial and supply risk as criterions. Examples of financial risk are impact on turnover and impact on profit. Examples of elements of supply risk are the location of suppliers, the number of potential suppliers, the availability (can there be scarce situations?). The assortment is split up into four product categories with the help of these portfolios: strategic products, leverage products, bottleneck products and routine products (see figure 3.2). In this figure also examples of each category are given.

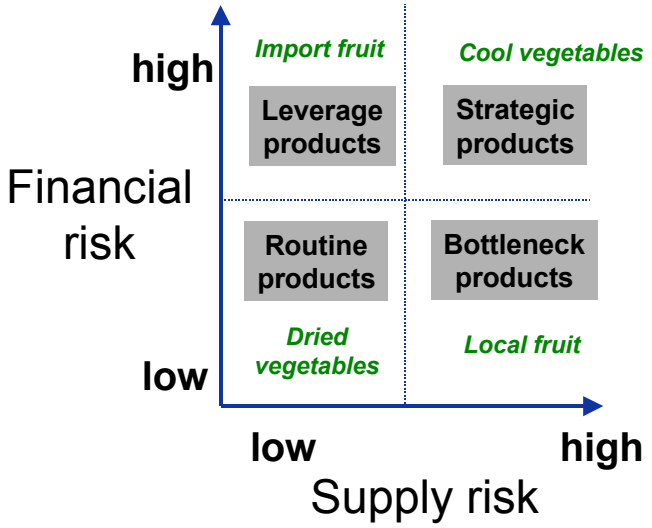


Figure 3.2: Purchasing portfolio (Kraljic, 1983)

Each product category has its own supplier requirements and purchasing strategies. For strategic products, that have a high supply risk and a high financial risk, it is advisable to aim for partnerships with suppliers. For leverage products 'competitive bidding' is a good

purchasing strategy, because these products have a high value, but are relatively easy to obtain. For bottleneck products it is important to ensure the deliveries.

The reduction of the number of suppliers should begin with the selection of suppliers of strategic products. With these suppliers partnership relations should be initiated. A method is described to select the most suitable suppliers for the rest of the product assortment. As supporting tool during this selection a checklist was developed for making a selection among the current offer of suppliers.

3.3.3 Blueprint of the relation between CRC Ahold and main suppliers

The relationship between CRC Ahold and its main suppliers is described in terms of marketing, logistics, quality and information. Desk research was the main research method in this part of the project. The developed ‘blueprint’ is a starting point. In later phases elements can be worked out further, broadened to other product groups and implemented. The developed concepts can be used in communication with suppliers about Supply Chain Management. Much material was already used during phase 1.

Marketing

Category Management is a keyword in describing the relationship between a retailer and its main suppliers from a marketing perspective. Category Management (one of the three areas of Efficient Consumer Response) can be defined as

'a retailer-supplier process of managing categories as strategic business units, producing enhanced business results by focusing on customer value' (source: ECR Europe).

A category is defined as:

'a distinct manageable group of products that consumers perceive to be interrelated and/or substitutable in meeting a consumer need' (ECR Europe).

Category Management consists of four improvement areas of which two are worked out in this study. First strategies are described for optimizing the current assortment in stores with the help of Direct Product Profitability (DPP) or Direct Category Profitability (DCP) tools. The profitability of a specific product or category can be evaluated with this tool and decisions about shelf space per product or (product)category can be supported.

In the study an 'Optimized Promotions Protocol' that TOPS and its suppliers can use is presented. The use of such a protocol will lead to a reduction of costly and unprofitable promotions, to promotions that lead to more turnover and profit for all parties in the supply chain and to a strong reduction of waste of costs throughout this supply chain.

Logistics

In the logistic section, a reference control model is presented that companies can use to structure the goods and information flow throughout the chain. Four basic logistic basic structures for the overall supply chain are presented and the advantages and disadvantages of the structures are discussed.

Quality

In the quality section it is described how Integral Quality Control may lead to improved product quality and safety. An example of Integral Quality Control is given in figure 3.3.

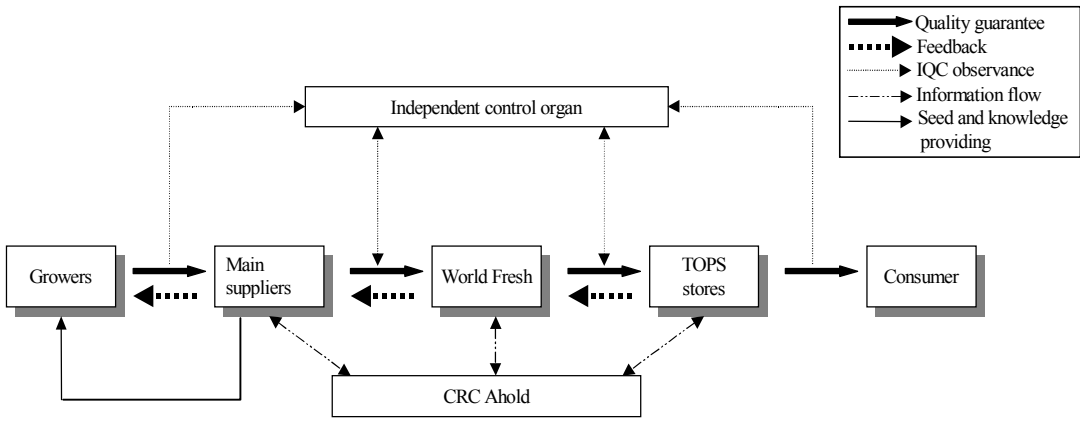


Figure 3.3: Integral Quality Control

Important characteristics of integral quality control in the Supply Chain are:

- Quality Guarantee: Partners in the Supply Chain must be able to guarantee a products quality and safety to next stages in the chain;
- Feedback: Results of quality checks should be sent back to the preceding link in the chain, so that the companies can learn and improve;
- Eventually an independent control organ should be established in order to monitor the regulations of integrated quality control;
- Quality information can be collected on a central place. The quality affairs department of CRC Ahold can for example gather quality information from main suppliers, World Fresh and TOPS stores;
- A task of the main supplier should be providing of knowledge, seed, pesticides etc. to their farmers;

Information

A reliable and timely information flow is necessary to come to an integrated logistic chain. In this section recommendations are done about the information flow throughout the supply chain. Information about demand should flow upstream (to achieve more accurate forecasting), information about origin and quality should flow upstream (to achieve improved traceability).

4 Recommendations for further research

In this paragraph recommendations resulting from phase 1 about the continuation of the project are given. The recommendations are divided into upstream, downstream and standards. After discussion about the recommendations a selection can take place and a proposal can be written for continuation of the project in phase 2 and 3.

4.1 Recommendations: upstream

For further research upstream the supply chain (i.e. main suppliers, growers) the following recommendations could be made:

1. *Scaling up from fruit and vegetables to other categories (meat, seafood, deli, bakery)*

In phase 1 the focus in the Supply Chain project was mainly on the fruit and vegetables segment. In phase 2 it is recommendable to do these analyses for the other categories within the perishables segment (meat, seafood, deli, bakery) as well.

2. *Develop value chain models for upstream parties*

A conclusion of the Value Chain Analysis was that upstream parties don't have good insights in their cost structures. It is advisable to develop value chain models for farmers and suppliers so that they can get more insight in their costs. In the long term these models can be integrated with models on World Fresh and store level. When there is notion about the costs, it will be easier to find opportunities for cost reductions and simplification of the chain.

3. *Main suppliers*

In phase 1 an approach was developed to reduce the number of suppliers. Also a global blueprint is developed for cooperating with the main suppliers. Attention is paid on marketing, logistics, quality and information. In phase 2 some elements of the blueprint may be developed further. It is recommended that TOPS really tries to use the developed approach to reduce the number of suppliers and that TOPS start to develop relations with some main suppliers. Some of the visited suppliers in the project definitely have the potential to become a main supplier of TOPS. The developed concepts in the blueprint can help in the process of coming to main suppliers.

An attention point with regard to main suppliers is how to organize the upstream chain especially on farmers' level. The farmers in Thailand are relatively small and that forces retailers to do business with wholesalers. However, if the farmers are able to start cooperating and professionalize, they can become 'main suppliers' themselves. In this way they will get more advantages from Supply Chain Management. A subject for research can be to develop and implement structures for farmers to work together and to look for examples of how to develop this. For this activity cultural aspects are of utmost importance.

4. Training program Quality and Supply Chain Management

It is advisable to develop and execute a training program with respect to applied post harvest knowledge of fruits and vegetables. A starting point in this training can be to develop Good Manufacturing Practices for suppliers of TOPS (see also 4.3). The target group could be very wide, like buyers, quality control, suppliers and even dedicated transport drivers. The training could be combined with Supply Chain Management. The training could be executed through a 'train the trainer' approach.

4.2 Recommendations: downstream

In this part recommendations are made about the Supply Chain from World Fresh to the store and about the processes in the TOPS stores.

1. Develop DCP (Direct Category Profitability) or DPP (Direct Product Profitability) models to support decisions about assortment and shelf space

During the Value Chain Analysis a basic cost model for the store was developed. It is advisable to develop DCP (Direct Category Profitability) or DPP (Direct Product Profitability) models on store level in order to support decisions about the assortment (e.g. remove products with negative DPP) and decisions about shelf space (e.g. give products with a high DPP per m^3 more space). Because of the complexity it is advisable to start with models on (sub)category level. Later the models can be extended to product level.

2. Optimized promotions

Experience in ECR projects in the Netherlands indicated that most promotions are carried out without clearly defined goals, insight in the results and without knowledge and understanding of the costs (e.g. Verstappen, 1997). In most cases the net profit of a promotion activity is even negative as a result of promotions on slow movers, high expenses for promotions, bad sales forecasting, forward buying, cannibalization effects etc. It is interesting for the Supply Chain project to focus on 'Optimized promotions' in order to see if improvements in the promotion policy are possible. 'Optimized promotions' projects in the Netherlands led to a reduction of costly and unprofitable promotions, to promotions with more turnover and profit for all parties in the chain and to a strong reduction of waste of costs throughout the supply chain. It turned out that saving of at least 0.7% of the turnover are possible.

3. Analysis of in-store-logistics

The feeling exists that store orders and stock levels in the TOPS supermarkets can be better tuned with actual consumer demand. Simulation studies of ATO-DLO in other research projects have indicated that an accurate store order is the most critical factor in relation to out-of-stock and/or shrinkage in the store. A good quantitative analysis of store orders in relation to sales, stock levels, out-of-stock and shrinkage is recommended.

4.3 Recommendations: standards

1. Develop and implement Good Manufacturing Processes for suppliers of TOPS

In the blueprint quality an example was given of Good Manufacturing Practices for growers of fruit and vegetables. It is advisable that TOPS starts developing a kind of TOPS - Goods Manufacturing Practices which they demand from their suppliers. Main suppliers of TOPS must implement those principles in order to create Integral Quality Control.

2. Start research programs in cooperation with growing specialists and research institutes aimed at sensitive local fruits

Some local fruits like rambuthan, longan, guava, mangosteen and local bananas are very sensitive. Improvements throughout the supply chain are very interesting. The supply chain must be mapped out in detail and different treatments should be studied. Cooperation with growing specialists will be needed as some or many of the problems might be caused during growth. Special research facilities might be necessary to be able to carry out the research.

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