

CHAPTER 11

FRUITFUL

*Integrated supply-chain information system for fruit produce between
South Africa and The Netherlands*

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Abstract. South-African and Dutch research institutes and business partners collaborated in several pilot projects for improving logistical performance and quality performance to strengthen the market position of South-African fruit after deregulation of the domestic market. Based on participatory problem assessment, it was concluded that major bottlenecks for realizing fully integrated exchange of information were far less of a technical nature (hardware and software), but had to do with the cost side and the 'human' nature, e.g., education, procedures, data accuracy, mistrust, competition, institutional capacities and organization. Pilots were conducted to improve inter-company planning, coordination and information exchange, and to enhance the role of the government in moving towards standardization.

Keywords: deregulation; logistics; electronic data exchange; black empowerment; traceability

INTRODUCTION

The FRUITFUL project focused on improvement of information exchange within the refrigerated fresh-fruit supply chain between South Africa and The Netherlands. The hypothesis was that improvement of information exchange would result in improved logistical performance and improved quality performance, which would strengthen the market position of South-African fruit and that of related fruit supply

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chains on the world market. As a result of this, stakeholders in the fruit export supply chain from South Africa to the Netherlands would profit. In addition, through global developments and requirements such as traceability and certification, a more integrated exchange of information within international agro-food chains was required. Failing of compliance with these new requirements would make it increasingly difficult for South-African fruit and the related supply chains to compete on the world market.

It was decided to follow a flexible approach regarding the system design in order to allow a choice between an overarching system that would replace existing systems and a decentralized system focusing on interfaces between existing facilities.

SOUTH-AFRICAN FRUIT EXPORT INDUSTRY

South Africa's climate and soil condition provide ideal conditions for many varieties of fruit to be grown; deciduous, citrus and subtropical fruit are all grown throughout most of the country. Deciduous fruit includes table grapes (grapes grown for eating, not wine production), pome fruit (apples and pears) and stone fruit (apricots, peaches, nectarines and plums). Citrus is split into oranges, grapefruit, lemons, limes and soft citrus (also known as easy peelers, such as naartjies, mandarins, etc.). Subtropicals are mangoes, litchis, melons, avocados and pineapples (while bananas also fall into this category, South Africa does not export any bananas).

A large amount of South-African fruit is exported. The destination markets are Continental Europe (43%), United Kingdom (25%), Middle East (11%), Far East and Asia (8%), Russian Federation (7%), Americas (3%), Africa (2%) and Indian-Ocean Islands (1%) (Fruit South Africa 2004).

South-African fruit is currently exported through the South-African ports of Cape Town, Port Elizabeth, Durban and the port of Maputo in Mozambique. Fruit is exported in cartons on pallets, either in refrigerated containers or in 'bulk' shipments, i.e., the pallets are loaded into the hold of a specialized refrigerated vessel. Almost no fruit is exported via air freight as this is too expensive. In addition to the container terminals, there are six dedicated fruit terminals (conventional terminals) in total at the four ports for loading specialized refrigerated vessels. Fruit to the European market is for the most part exported through the Cape Town harbour.

CONTEXT OF THE FRUITFUL PROJECT

Deregulation

Before the deregulation of the marketing of agricultural produce in 1997, only a few parties controlled the South-African fruit export industry, e.g., all citrus fruit was exported through *Outspan* and all deciduous fruit was exported through *Unifruco*. After the deregulation *Outspan* and *Unifruco* became *Capespan*. During regulation South Africa had developed a central information system that was very innovative

for that period. After deregulation, however, the situation changed dramatically and became rather chaotic (McKenna 2000). Hundreds of new exporters entered the market and many failed within a short time. Producers were generally not familiar with the free-market system and lacked the experience to face the challenges of the new rules and/or possibilities. Consequently, the (uniformity of the) quality of the fruit at the overseas markets decreased. Prices decreased and many producers and exporters alike faced enormous debts and filed bankruptcy. Global developments were most to blame for the state of the fresh-produce industry; however, deregulation was most certainly a contributing factor. The benefits of the original central information system lost part of their value as many companies and organizations began to develop their own system. As a result of the negative aspects of deregulation South-African fruit lost its (high-quality) reputation on the international market.

After a few turbulent years the fruit industry began to improve its organization in order to rebuild trust between the chain partners and to regain its position on the global fresh-produce markets. A pre-feasibility study of the FRUITFUL project (2000) showed that exchange of information strongly needed review, as there was no uniformity.

Black empowerment and the previously disadvantaged

After the legal abolishment of racial discrimination (Apartheid) in South Africa in 1994 programmes were set up for the benefit of the previously disadvantaged. Before the FRUITFUL project commenced, the South-African fruit industry had already become involved in a transformation programme in order to include previously disadvantaged communities in all spheres of the industry (BuaNews 2003). This included a development programme for emerging farmers as well as assistance for black economic empowered groups. It is estimated (2004) that there are presently 6000-7000 emerging farmers in South Africa.

Labour skills and HIV/AIDS

Due to the seasonal nature of the fruit industry much occasional/seasonal labour is employed. Many new workers are employed every year, as many workers do not return to the same farms year after year. These workers need training in the procedures and equipment used. In addition, many workers have a very low level of schooling or none at all.

HIV/AIDS has made and is continuing to claim many victims in South Africa, and this has an impact on production and on both social and economic circumstances. In the fruit industry, the impact of HIV/AIDS has been more noticeable on skilled labour, e.g., scanning and entering of information in the packhouse, forklift drivers, workers in conventional fruit and container terminals.

Global developments

Worldwide the fruit supply chain is moving towards a small number of powerful retailers and towards category management. Individual role-players are searching for ways to strengthen their position in the chain, e.g., by developing value-adding services.

Traceability was gaining more attention. In order to comply with EUREP-GAP and the imminent General Food Law (2005), stakeholders in the fruit chains from South Africa to The Netherlands needed to move towards huge changes in certification and traceability.

If the fruit export chains between South Africa and The Netherlands could comply with the requirements, all role-players could benefit from the global developments.

OUTLINE OF THE FRUITFUL PROJECT

The project commenced in August 2001 and continued until April 2003. Table 1 shows the formal participating parties.

Table 1. FRUITFUL formal participants

Name of participant	Type of organization / role in FRUITFUL
Capespan Ltd	South-African fruit exporter
Intertrading Ltd	South-African fruit exporter
South-African marine Ltd	International shipping liner reefer containers
Seatrade Ltd	International shipping liner
Anlin Ltd	South-African shipping agent
Seabrex BV	Dutch fruit terminal
Hagé International BV	Dutch importer of fruits and vegetables
FTK Holland BV	Dutch importer of (sub)tropical fruits
Paltrack Ltd	South-African IT service provider
PPECB	South-African perishable-products export control board
Rotterdam Municipality Port Management	Dutch Port authority
Dutch Ministry of Agriculture, Nature Management and Fisheries	Dutch sponsor
South Africa – Netherlands Transport Forum	Dutch sponsor
KLICT	Dutch main sponsor
Agrotechnology and Food Innovations BV (used to be ATO until October 2003)	Dutch post-harvest agro-research institute
CSIR Transportek	South-African research institute
TNO Inro	Dutch research institute, FRUITFUL project management

Several other companies contributed to FRUITFUL besides the formal project partners. Table 2 gives an overview.

Table 2. Non-formal parties that collaborated with the FRUITFUL team

Name of collaborating party	Type of organization / role in FRUITFUL
Cape Citrus Ltd	South-African exporter of citrus
Cape Reefers Ltd	South-African conventional reefer shipping liner
SOUTH AFRICAN FT Ltd / CFT Container Fruit Terminal	South-African Fruit Terminals
FPT Ltd	South-African Fresh-Produce Terminals
Coolcontrol BV	Dutch container fruit terminal
Kloosterboer BV	Dutch Fruit terminal
Capespan PLC	European importer of fruits
Caswell BV	Dutch IT service provider
VirtEx BV	Dutch IT service provider
Several growers and packhouses / cold stores	South African

In order to realize a practical workable structure within FRUITFUL project partners and other collaborating parties were grouped into three existing fruit supply chains. Each of these chains functioned as a FRUITFUL pilot supply chain with the three research institutes as the leading parties (one institute per pilot chain).

The basic structure of supply chains for refrigerated fruit from South Africa to The Netherlands as well as the 3 pilot chains is shown in Figure 1.

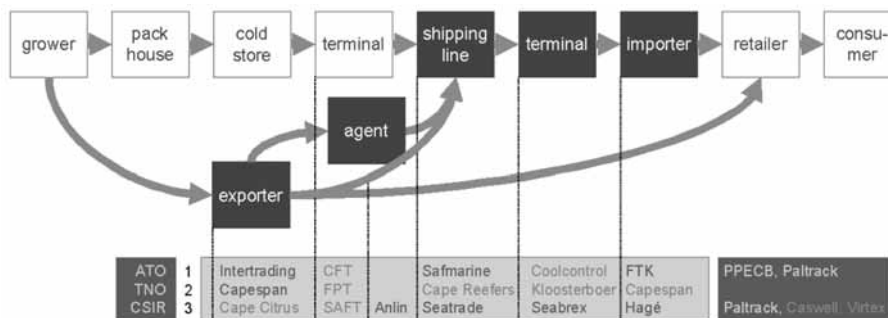


Figure 1. Supply chain of refrigerated fruit from South Africa to The Netherlands and structure of three pilot chains

Pilot chain 1 had a focus on transportation of mangoes and avocados in refrigerated containers (reefer containers) and was guided by A&F (ATO). Pilot

chain 2 had a focus on shipping citrus and grapes with conventional reefer (refrigerated) vessels and was guided by TNO Inro. Pilot chain 3 had a focus on shipping citrus with conventional reefer vessels and was guided by CSIR Transportek.

The three pilot chains all belonged to the same logistical network. Most stakeholders in one of the individual pilot chains were role-players in other individual supply chains as well.

Through interviews and meetings with role-players in the pilot chains analysis of the pilot chains took place for processes, exchange of information (what, how, when, to whom) and for user requirements regarding improvement of the current situation. Subsequently the project team identified and specified the problem areas and prioritized them per pilot chain together with the industry. After that, solution alternatives were chosen for selected pilot items (as time and funding were limited only feasible items were selected). Solutions were further developed and finally tested in pilots.

Although the three pilot chains had different characteristics and each pilot focused on separate issues, together they covered the big part of the 'basic supply chain' or logistical network. The combined items of the three pilots are shown in Figure 2.

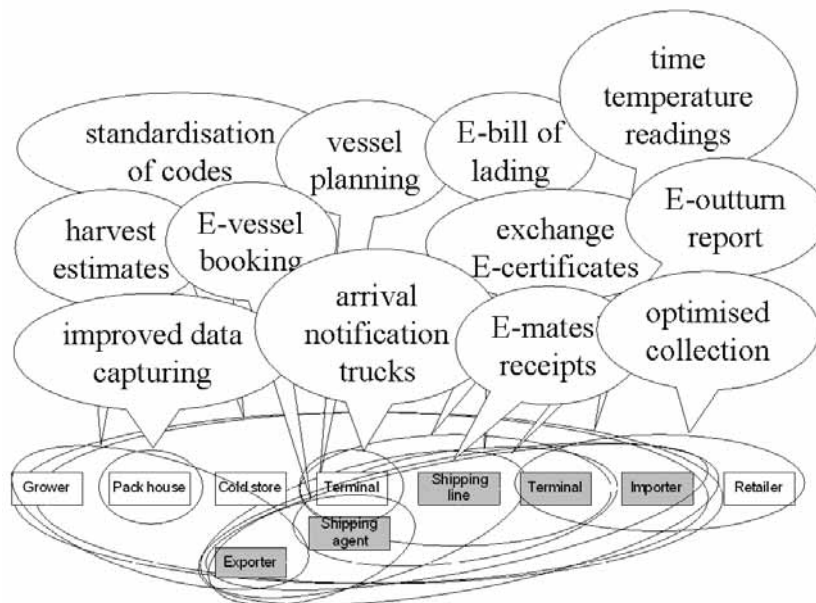


Figure 2. Combined pilot issues for the pilot supply chain

IMPORTANT RESULTS OF FRUITFUL

Combined pilot issues

- In order to implement electronic data exchange (EDI) in the whole supply chain all sending and receiving parties should use standard codes (e.g. port and country codes, commodity codes) and standardized message formats. During the project it became clear that very few standards existed although several initiatives were already running to correct this. In cooperation with the Fresh Produce Traceability Project (FPTP) and PPECB several standard formats and codes were introduced, including a standard format for exchange of quality information between the exporter and the importer.
- In one pilot chain all documents and exchange of information were collected during a physical pilot with 4 pallets of containerized fruit. This collection proved to be more than 40 items of documentation mostly consisting of faxes or hard copies. The collection showed the inefficiency and complexity regarding document exchange.
- In the pre-season planning, research showed that the harvest estimates and intakes at the depots that are used by exporters for all logistical planning are very inaccurate and may be logistically very inefficient and thus costly. A new strategy for planning vessels was developed for exporters, although the strategy was not tested during the FRUITFUL project. During the project an electronic web-based booking of containers was further developed and tested. Also a prototype web-based booking module was developed for booking pallets on conventional reefer vessels. The module was not tested.
- From the grower to the depot a couple of key issues were dealt with. Data capturing starts at the packhouse. For a solid and standardized 'backbone' that is required for EDI/integrated information systems, accurate and standardized data capturing at the packhouse is essential. This proved to be one of the bottlenecks and therefore standardization of codes, training of personnel and single pallet labels were considered to be requisites. Another bottleneck proved to be the Phytosanitary Certificate (PC) as a paper document. It is expected that European developments will make electronic exchange of PC possible within 5-10 years.
- Recommendations were made for improved notification of truck arrival at the port of loading in order to improve the logistical procedures in the port. These recommendations were not tested.
- Regarding preparing a load on a vessel and the voyage of the vessel possibilities were investigated for electronic Bills of Lading and an IT tool that facilitates putting a Bill of Lading on a closed website was tested. In addition the Mate's Receipt was made available electronically to various importers as well as to a receiving terminal in different ways.
- A website was further developed for the port of discharge under the FRUITFUL flag. The website was already under development by the discharge terminal. The data on the website related to information on availability and planning that is communicated between the terminal of loading, exporters, terminal of discharge,

importers and transportation companies in order to optimize the processes of the terminal of discharge. In addition, possibilities for electronic outturn reports were tested, including adding standardized information on quality at arrival.

Integrated electronic information system

During the FRUITFUL project it became clear that the climate was not suitable for an overarching centralized system and that the focus should be on interfacing existing facilities. In addition the information and communication (ICT) developments had developed rapidly during the past few years and were moving towards a preference for an ICT network structure. This outdated an overarching centralized information system.

It was concluded that bottlenecks for realizing fully integrated exchange of information did not lie on the technical side (hardware and software), but on the cost side and the 'human' side, e.g., education, procedures, data accuracy, mistrust, competition, institutional capacities, organization etc.

Development of level of collaboration within fruit supply chains

The South-African fruit export industry developed from a typical hierarchical structure before the deregulation in 1997 into a liberal market approach in 2002. It is a fundamental choice for each company to be either competitive in an open market or to collaborate in a network environment. In the case of the latter, a company would strive for connectivity, transparency and collaborative planning.

During the FRUITFUL project it became clear that the 'Capespan' pilot chain was much further developed towards collaborative planning than the other two pilot chains. This was not surprising as most partners in the 'Capespan' pilot chain were linked with one another in daily practice and worked together in a 'closed' supply chain as before the deregulation when *Capespan* was still *Unifruco* and *Outspan*.

One of the higher aims of the FRUITFUL project became working towards a network-oriented structure with transparent chains, connected information systems and collaborative planning. The project added to a much better understanding amongst the FRUITFUL role-players of each others' businesses and the identification of common aims.

More attention to producers and packhouses and smaller stakeholders

Data capturing starts at the packhouses (e.g. fruit specifications, pallet labels, etc.). Growers and packhouses were only involved in the FRUITFUL project through the exporters. This had not been a specific choice but was more due to how the project developed during the pre-phase.

As data capturing in the packhouse is the basis for exchange of information in the rest of the chain it was concluded that more attention should be paid to the start of the chain, not only in case of a FRUITFUL follow up, but in the whole fruit industry. In addition, in accordance with political and social developments more

attention should be paid to the previously disadvantaged and/or emerging stakeholders.

A number of initiatives have been taken with the aim of empowering people from previously disadvantaged communities. The South-African Agri-Academy was formed (a non-profit organization) to facilitate and train members of these communities. Currently the Organised Fruit Industry is running workshops with the aim of developing a Fruit Industry Plan (FIP). This FIP is focused at determining the needs of these disadvantaged communities and drafting an action plan to address the necessary transformation. At the same time the Department of Agriculture has just (July 2004) published its document on 'Broad Based Black Economic Empowerment Framework for Agriculture'. This document aims to establish guiding principles for broad-based black economic empowerment in agriculture. It recognizes the challenges of globalization and the job threats facing farm and industry workers. Importantly it also addresses the forward and backward linkages within the total value chain within and between various commodities. The guidelines focus on various fields; these fields are: Agricultural Land, Human Resource Development, Employment Equity, Enterprise Ownership and Equity and Procurement and Contracts.

There is no preferential or easy entry into the fruit supply chain. Managing an efficient supply chain has certain requirements and these cannot be downscaled to suit new entrants from previously disadvantaged communities. The challenge is therefore to raise the level of skills and knowledge of these people to allow them to participate as equals. The question will be where to draw a line for producers / emerging stakeholders when it comes to having a chance to operate in the export fruit chain considering the level of education and technology that is needed for being able to be an equivalent business partner.

Contribution public-private partnership within FRUITFUL

The public-private partnership was crucial for the success of the FRUITFUL project. The presence of the three research institutes as independent parties removed distrust between competitive project partners and restraints could be bridged. During the project the partners started understanding more about each other's positions and problems and constraints and requirements as well as they started seeing more common goals.

The role of running and managing a complex project like FRUITFUL with so many partners in the North as well as in the South fits in much better into the expertise and core business of the institutes than the private companies. Such a role does not suit the companies. In addition the institutes are needed to keep a project running and to keep companies executing their task.

Through the public-private partnership much knowledge and insight was gained at two sides. It proved to be a requisite to have representative research partners in both South Africa and The Netherlands.

Desired institutional development for FRUITFUL aims

The South-African fruit industry was very clear on the role of the government in moving towards standardization. Important choices ought to be made by the government. In addition an independent body (e.g. fruit board) should keep the standards. This also had the effect that companies somehow were reserved in initiating changes (as long as it was not compulsory or no choices had been made from the governmental top).

Important lessons learnt

One of the lessons that were learnt was that within a project like FRUITFUL most time (of the research institutes) ought to be booked for bringing people (stakeholders) together, e.g., the facilitation of workshops and meetings and communication. Very often this is very hard to 'sell' when submitting a project proposal as most of the budget will then be spent on less tangible issues. Yet, one of the requisites for practical success and implementation will be that everyone understands the project aims, builds relationships and trust with all the other participants, and buys in to the project right from the beginning and after that stays involved and interested.

PRESENT SITUATION AND FOLLOW-UP

Presently (August 2004) the situation in the fruit supply chain from South Africa to The Netherlands has progressed further.

- The clock is ticking towards compulsory traceability due to the General Food Law (January 2005).
- The South-African fruit industry has become more receptive to collaboration and change with regard to information than was previously experienced.
- A growth can be identified of both the South-African and Dutch institutional development towards the fruit industry.
- A national Fruit Industry Plan for South Africa is being developed and will be implemented (CIAMD).
- Integration of previously disadvantaged and emerging stakeholders in the South-African fruit export industry has become a political priority.

A&F, TNO Inro, CSIR Transportek and the South-African – Dutch fruit industry have taken the initiative to develop a follow-up proposal. FRUITFUL 2 would be a follow-up of FRUITFUL according to the same successful formula of running a project with pilot chains. Main objectives of FRUITFUL 2 would be:

- Strengthening of the position of the fruit chains from South Africa to The Netherlands from a win-win point of view.
- Further developing integrated exchange of information in the fruit export chain from South Africa to The Netherlands, which will comply with international developments and requirements, in a practical way.

- Giving special attention to small stakeholders and previously disadvantaged partners according to the South-African policy and the policies of the project partners in The Netherlands.
- Initiating sustainable outcome of the project through appropriate transfer of knowledge.

The business partners of FRUITFUL 2 would (partly) not be the same as in FRUITFUL. In the follow-up the aims would join with the present climate and developments, and all the expertise that was gained through FRUITFUL would be applied.

CONCLUSIONS

The FRUITFUL project aimed to improve the exchange of information in the fruit export chains from South Africa to The Netherlands in order to improve logistical performance and quality of the fruit at the end of the chains. This was required to prevent any further loss of the position of South-African fruit on the world market. Improving the performance of this fruit export would be a win-win situation for the South-African and Dutch stakeholders:

- The project contributed to improved information exchange between chain partners. To name but a few examples, from a supply-chain perspective exporters were convinced to start using E-booking systems offered by shipping lines; the discharge terminal was given direct access to the South-African data system making the exchange of separate, non-uniform files of each exporter superfluous; the possibility was created to up-load outturn reports and storage information per grower immediately in the South-African data system. The project also accelerated the start of the development of a Fruit Information Plan.
- The project contributed to a better understanding between stakeholders of each other's position and problems. Employees who are familiar with other role-players in the chain only through telephone or e-mails concerning day-to-day business from their own perspective, were found to be able to solve some key issues simply by meeting these other role-players face-to-face to discuss common issues and clarify roles and responsibilities. Bringing operational people from business partners together also seems to be more effective than having only contacts on commercial level.
- The project was carried out in a(n institutional) climate that was not completely ready for implementation of the results.
- The formula of running the project through three existing pilot chains proved to be very successful.
- The public-private partnership as in FRUITFUL proved to be a very successful formula, although recommendations for further improvement were identified.
- Without a follow-up the benefits of FRUITFUL will go to waste.

WAY FORWARD

All stakeholders agreed that a follow-up would be necessary and beneficial and therefore a project idea has been submitted to the DGIS-LNV International Agro-Food Chain & Network Programme. All improvements made in logistics, quality, food safety, etc. are also necessary for emerging farmers, and this will get more attention. More research is needed to define the conditions that are needed for these (previously disadvantaged and emerging) stakeholders to be able to operate in the fresh fruit export chain.

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