

Global Sourcing

How to combine Just-in-Time delivery with high quality demands?

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Who is Jack van der Vorst?

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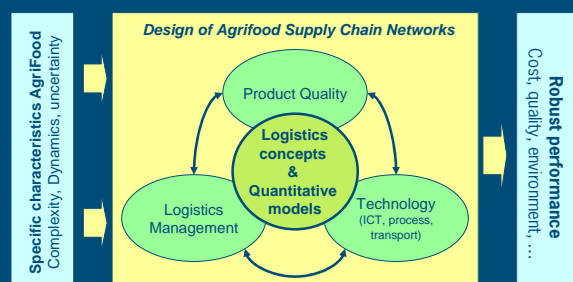
Focus areas:

- Efficient Replenishment of food products (supply chain management)
- Supply Chain Network design
- Inventory management of perishable products
- Tracking and Tracing
- Modelling and Simulation of Food Supply Chain Networks



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Research framework WUR-ORL



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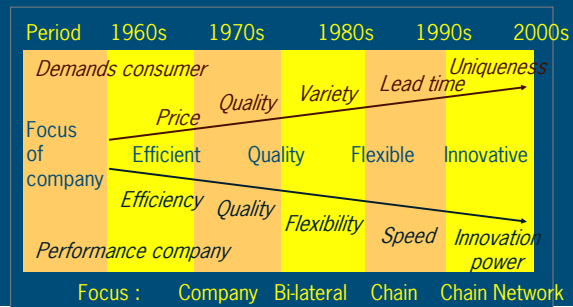
Menu

1. Developments in AgriFood
2. Developments in Logistics Management
3. Quality Controlled Logistics
4. Case example
5. Conclusions



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Market characteristics in time



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What happens at the demand (market) side?

- More powerful well-informed customers
- More stringent consumer demands
 - Higher quality, safety and convenience
 - Healthy and ecological
- Increasing product variety
 - More value-added products (ready to eat)
 - Shorter product life cycle
- Retail developments
 - Bigger firms (concentration)
 - 24 - 7 retail services
 - Battle between private and brand-label
 - Differentiation in outlets (out of home !)



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Tesco's store formats

- **Tesco superstore**, a very large unit on the outskirts of a town, designed to provide ease of access to customers.
- **Tesco Metro**, a city centre store meeting the needs of high street shoppers and the local community.
- **Tesco Express**, combining a petrol filling station with a local convenience store to give local communities a selected range of products.
- **Tesco Extra store**, a large hypermarket selling an extensive range of food and non-food.



OUR CORE PURPOSE IS
"TO CREATE VALUE FOR
CUSTOMERS TO EARN THEIR
LIFETIME LOYALTY". WE
DELIVER THIS THROUGH OUR
VALUES – "NO-ONE TRIES
HARDER FOR CUSTOMERS" AND
"TREAT PEOPLE HOW WE LIKE
TO BE TREATED".

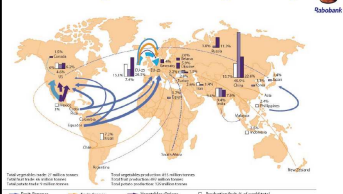


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Changes in the global food system

- Growth in food demand is shifting to emerging regions like Latin America and Eastern Europe and countries like China and India. These emerging countries are becoming major import markets.
- Production, processing and R&D, with lower cost and potential in terms of human capital, are also on the move, with Brazil, China, India and Russia as attractive destinations.

Fruit and vegetables trade is globalising



**Impact of
"rise of biofuel" on
product availability
(competing claims)
and logistics costs.**

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Food Miles have the attention

Checking the food odometer: Comparing food miles for local versus conventional produce sales to Iowa institutions

Eating Oil
Food Supply in a
Changing Climate

**Food Miles and Consumer
Perceptions of Locally Grown Foods**

Food Miles – Simple Metaphor to Contrast Local
and Global Food Systems
By Rich Ping, Marketing and Food Systems Research Program Leader,
Leopold Center for Sustainable Agriculture, Ames, Iowa

Food, Fuel, and Freeway:
An Iowa perspective on time for food travel,
fuel usage, and greenhouse gas emissions



**The Validity of Food Miles as
an Indicator of Sustainable
Development**

Final Report produced for DEFRA



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So what happens at the supply side?

- Internationalization / geographical transitions
- Specialization and consolidation
- New distribution channels
- Chain integration
- Outsourcing; focus on core competences
- Use of new technologies
- Strong branding strategy
- Focus on sustainability and transparency



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Increasing demands on logistics

Customers require higher:

- Product quality
- Delivery services: Just in time delivery
- Speed of replenishments
- Delivery reliability in time and volume
- Flexibility in service and time (adaptability)

... with lower costs ... as the roads get jammed ... and products come from further away .. and there is more attention for sustainability !



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As a result supply chain actors need to ...

- Focus on higher value added services
- Develop smart, flexible, sustainable and reliable logistics supply chain networks
- Work together in the international supply chain network



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Logistics is about ...

getting

- the right product
- in the right quantity
- and the right quality
- at the right time
- at the right place

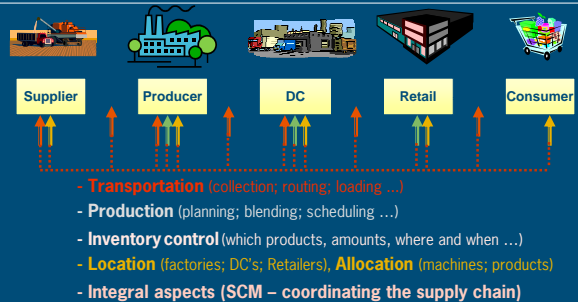
.... as **efficient** as possible !



Logistics is important!

- 1 out of 3 trucks on Dutch roads transports agricultural related products
- Logistics costs account for about 10% of turnover of FMCG-industry (about 67% is transportation)
- Main cost drivers are:
 - Transportation (all kinds of modes)
 - Inventory (raw materials, end products, etc.)
 - Facilities (production plants, warehouses, etc.)

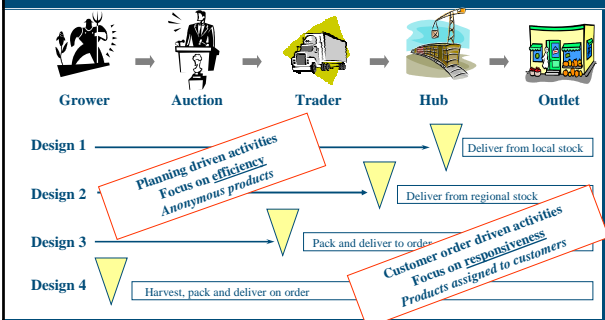
Topics in Supply Chain Logistics



Supply Chain Management is about ...

- matching supply and demand whilst dealing with uncertainty.
- managing supplier and customer relationships in such a way that suppliers and customers actively support the company's overall business strategy and value proposition.
- fostering a climate where suppliers are challenged to continuously improve their performance and value added contribution.
- developing the physical and information infrastructure to enable these new ways of working

Main decision: Where to position your inventory ?



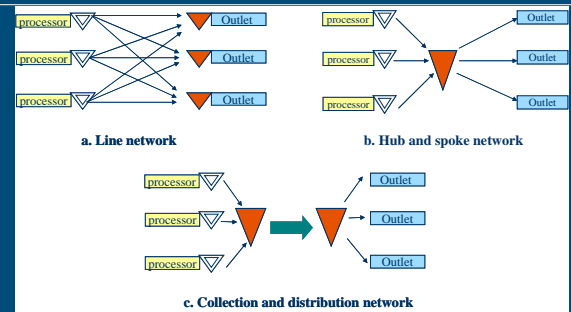
Where to position inventory?

A trade off between what is desired and what is possible:

- **Demand characteristics**
 - Demand for lead time, quality, flexibility
 - Demand uncertainty, assortment
- **Product characteristics**
 - Possibilities for modular products
 - Shelf life / Perishability of product
- **Production en distribution characteristics**
 - Lead time, frequency, flexibility
 - Supply uncertainty, transport unit, modality



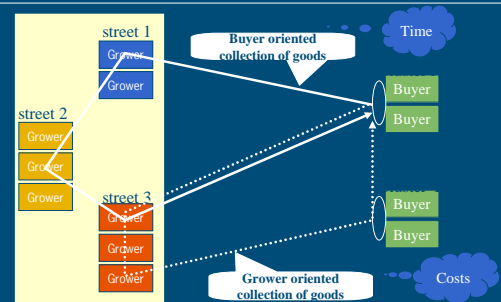
Network design



Logistics services: what role to play?

- | | | |
|----|--|-----|
| 4. | Orchestration supply chain network | 4PL |
| 3. | Value Added Logistics
(packaging, labelling, sorting, etc.) | 3PL |
| 2. | Warehousing / storage | 2PL |
| 1. | Transport and transfer | 1PL |

Example



Orchestration of the flower supply chain network

- *"In 5 years time 80% of all flowers will have a buyer before they are harvested. The auction will then function as a logistics chain orchestrator instead of a logistics service provider within four walls."*

Timo Huges, Flower Auction Aalsmeer
Vakblad Logistiek, 16-11-2007



Levels of chain coordination

- | | | |
|----|---|---|
| 4. | Role coordination
Vendor Managed Inventory, Chain orchestration | New roles, functions, activities. |
| 3. | Control coordination
Just in Time deliveries, cross docking, CPFR | Sharing of sales and stock information. |
| 2. | Information coordination
Barcodes, EDI, ERP linkages | Exchanging orders and bills. |
| 1. | Physical coordination
Standardisation of logistical units | |

Logistics innovations in AgriFood

Design Supply Chain Network

- International cooperation
 - Agribusiness Parks
 - Consolidation of flows
 - Outsourcing logistics

Control Supply Chain Network

- Transparency
- Joint planning (CPFR)
- Cross docking
- Pro-active control concepts (VMI, Orchestration, ...)

Enabling Technologies

- Multi-modal transport
- Chain Information Systems/ E-business
- Barcodes, RFID, GPS, intelligent labels
- Storage and processing technologies (reefer containers)



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Essence of current innovations

- a speeding up of processes via rapid fulfilment techniques (using the potential of new information capturing and processing capabilities);
- a general focus on cost effectiveness with more and more attention for the combination of Profit, People and Planet;
- a redefinition of value propositions, roles and processes of actors in the FSCN;
- an increase of (international) cooperation in supply chains (focus on consolidation) whilst maintaining a high flexibility in partner selection;



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What does cooperation bring you?

- Higher delivery reliability
- Shorter throughput time
- Increasing flexibility
- Less miles
- Calculations show:
 - Average truck utilization degree from 65% to 95%.
 - Early / better transport information: cost reduction of 5 - 20%
 - Central planning of all volume: 20 - 40% reduction in transport costs
- *Of course, the exact added value depends on the specific situation.*



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Problem setting

- The design of global agrifood supply chain networks is complicated by an intrinsic focus on product quality.
- Investments in network design should not only be aimed at improving logistics performance but also at the preservation of food quality (reduction of product waste) and reduction of environmental load.
- Optimization and simulation models need to incorporate these additional performance indicators to make an integrated trade-off.



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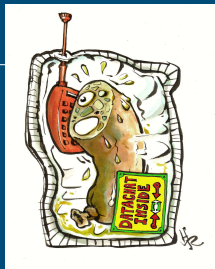
Examples of new technologies

- Supachill, new quick chilling technology
- New CA (Controlled Atmosphere) & MA (Modified Atmosphere)
- Intelligent transport carriers with e.g. RFID.
- Objective quality measurements with RNA markers
- Reefer containers with satellite communication
- (Virtual) Simulation platforms for fresh networks
- Internet-based benchmark tools
- Etc.



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How are you?



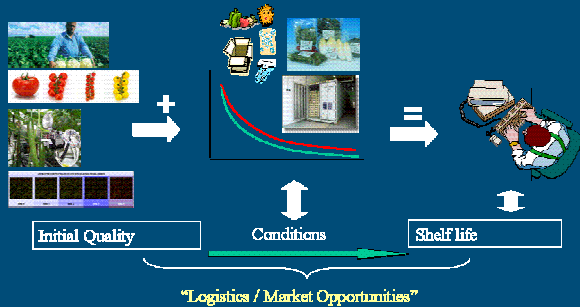
Problem description

- Heterogeneity in products, producers and market segments.
- Long supply chains of perishable products suffer from high risk of quality degradation.
- Best before dates are a best guess.

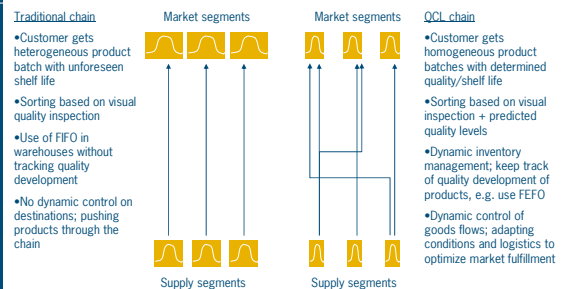
Opportunity

- Can we exploit variability strategically through the flexible management of quality differences for specific market outlets.

Quality Controlled Logistics



Comparison of the traditional chain & QCL chain

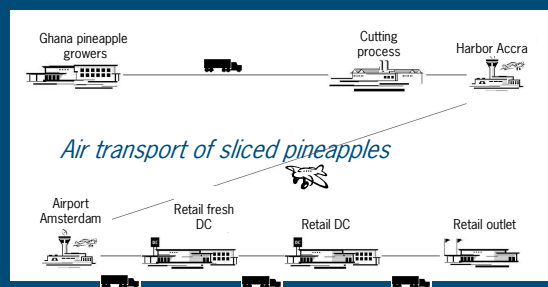


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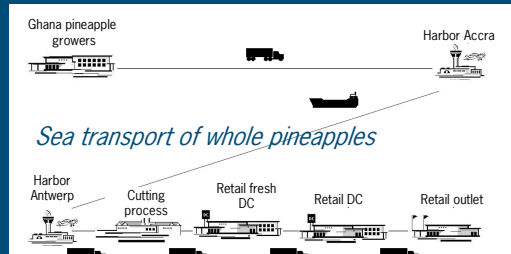
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Chain 1: processing in Ghana (wtt. S. Tromp, AFSG)



Chain 2: processing in the Netherlands



Research question

- What supply chain design – from farm to retail outlet - regarding imported pineapples performs best on people-planet-profit indicators?
- Performance indicators:
 - Per **activity**: Throughput time, Temperature, Cost, Energy use, Emissions
 - Per **chain scenario**:
 - Product quality at the outlet
 - In best-before-date
 - In remaining calculated quality (using quality decay modeling)
 - Total chain costs
 - Total emissions

Comparing results

	Product quality	Logistics costs	Energy and emission
Air chain Ghana	+ (BBD 3,9 days; Below BBD 5,9%)	- Index 100	-- Index 100
Sea chain Ghana	+ / - (BBD 3,7 days; Below BBD 10,6%)	+ Index 66	+ Index 19

Business impact !



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Conclusions

- Developments in product quality monitoring and modeling enable innovative ways of managing fresh product flows.
- Quality Controlled Logistics provides means to optimize product quality and availability in market outlets concurrently and minimizes shrinkage.
- Future research will focus on further developing the QCL concept, and quantifying the potentials in performance improvements for multiple cases.

WUR research on SCM

- Optimization of network designs
 - Factory & warehouse location
 - Product allocation to factories and warehouses
- Impact of collaborative planning/ collaborative logistics
 - Pull strategies: shorter lead times and higher delivery frequencies
 - Supply chain planning + scheduling of production lines
 - Multi-modal transportation networks
- Inventory Management / Ordering policies
 - Reduction of (safety) stocks
 - Perishable inventory systems
- Robust Supply Chains
 - Dealing with vulnerability/uncertainty



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