

Vegetable flow from Argentina to Europe

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Welcome & thanks

■ Third visit to Argentina

- First visit we learned a lot about the export chain by talking to most of the **stakeholders**
- You also participated in the results of this project

■ We use the export chain of Pronature as an example / case study

- SPN SA
- Freska SRL
- Endivias Belgrano SA
- Lowey and Benedetti
- Agroeste
- COFRUSAR
- Bahia Solano SA
- Coop. de Neuquén
- Guenguel
- Wageningen - UR
- SAGPyA
- Senasa
- INTA
- OIA
- LNV BsAs
- Freshwell
- Levahrt
- Hermans
- Gourmet
- De Groot en Slot
- Bejo zaden



This presentation

■ Introduction

- Wageningen – UR
- Changes in Agro Supply Chains
- The project

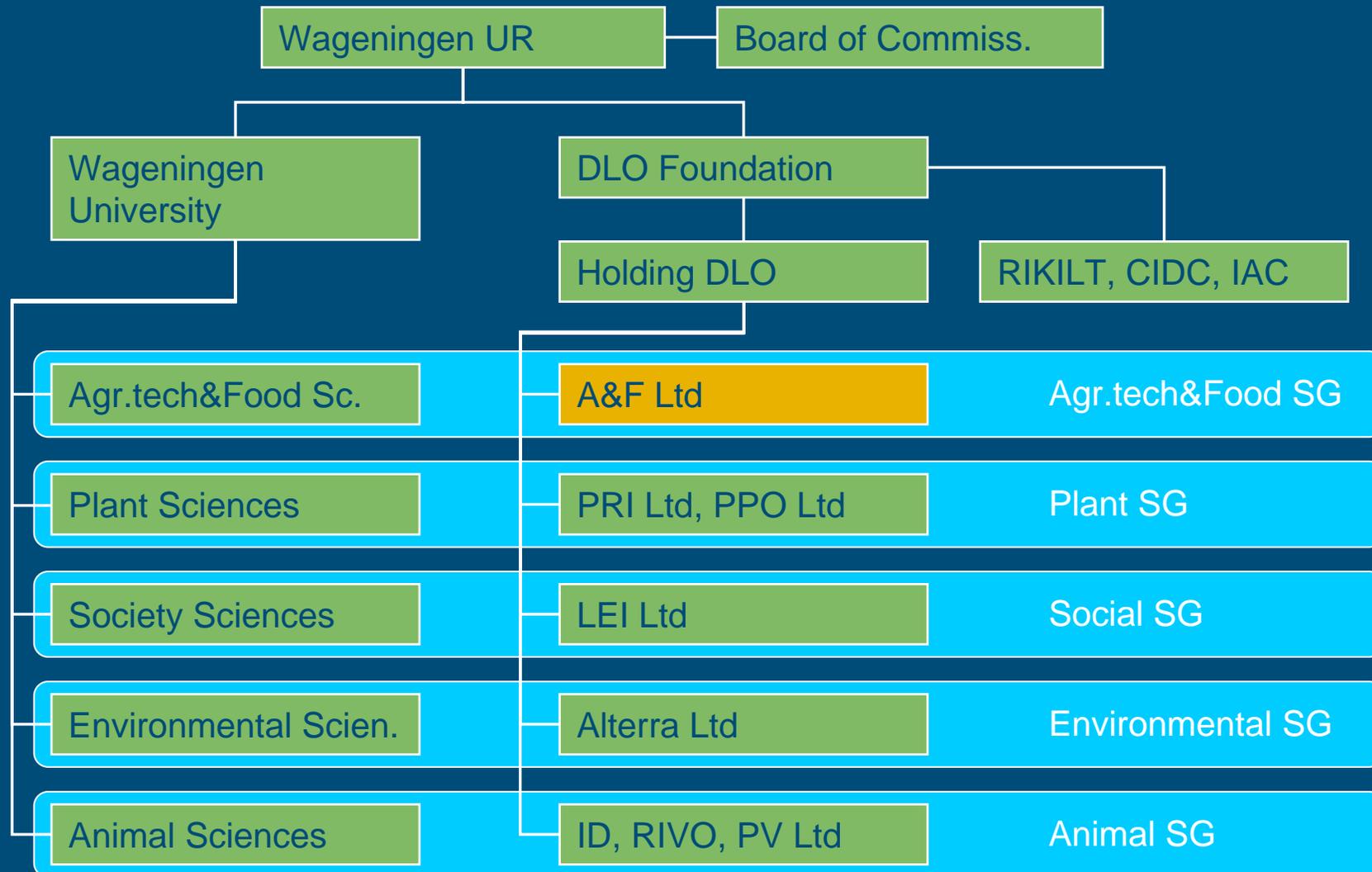
■ Approach

■ Results

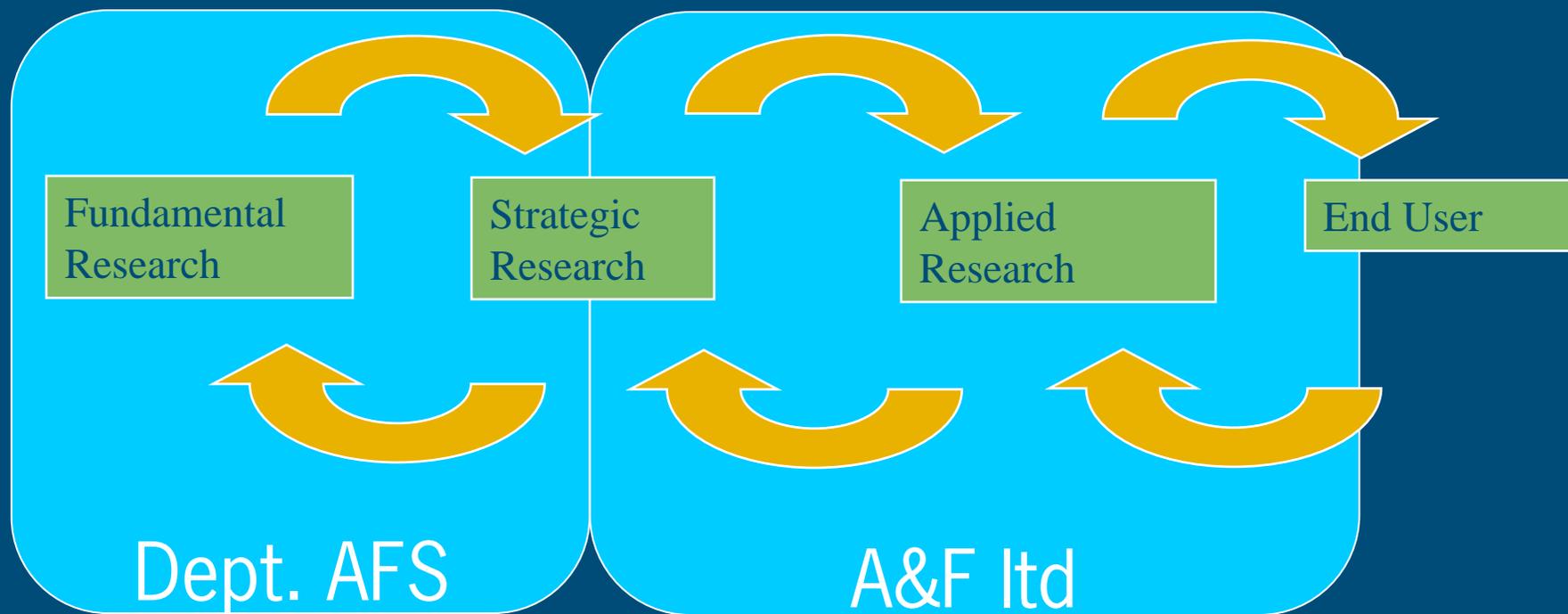
- 'status'
- How to make it work
- Pilot
 - Radicchio
 - Maize



Wageningen UR and its Sciences Groups



Wageningen UR and its Sciences Groups



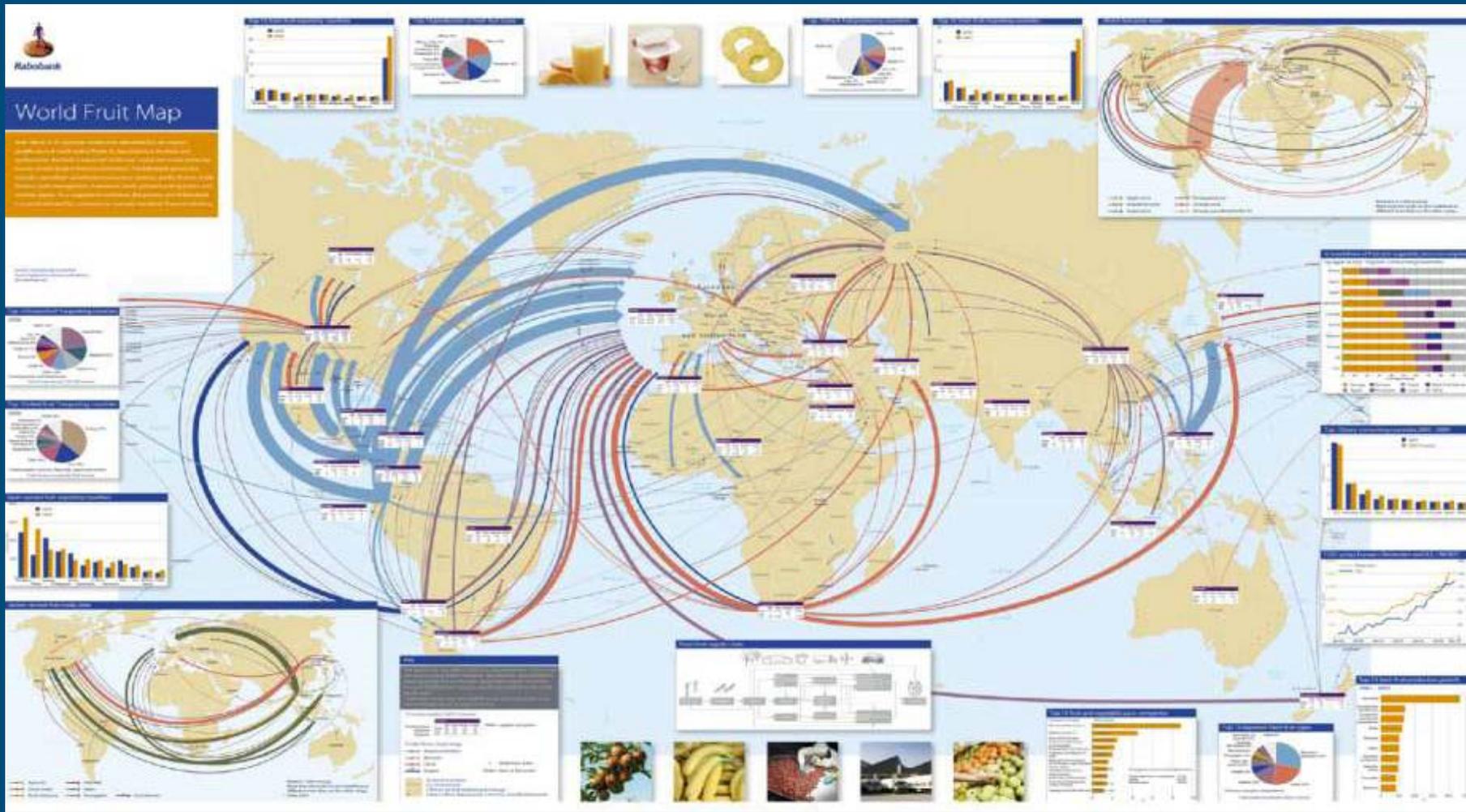
Dominant Trends in Agriculture Supply Chains

- Dominant power of big retailing companies
- Supply Chain Consolidation
- Outsourcing
- Increased focus on traceability
- **Wider sourcing of supplies: more and more globally**
 - Lower prices (low cost countries)
 - Diversification of the product range beyond what can be produced locally
 - Year round product availability
 - Advances in IT have increased the visibility of long supply chain and therefore easier to manage



Trend: Globalisation

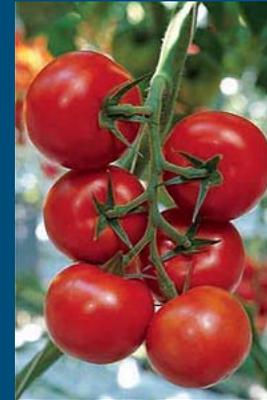
Balancing production and consumption (World Fruit Map)



Transport modalities: pepper/tomato/flowers

Replace air by sea transport:

- Product: initial quality, cv's
- Climate conditions
- Packaging
- Logistics:
 - transit time
 - organisation



- Integral solution !



Trend in Retail: "From Dry Ware to Fresh"



Quality management as systems innovation

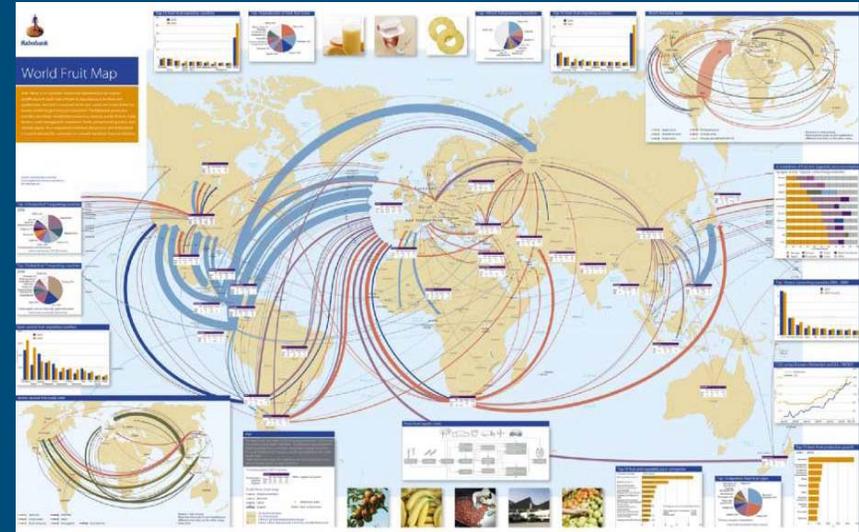
- From licence to produce towards licence to deliver
- From retail backwards quality management is forced upon every single link in the chain.
- Autonomous control in Control upon control system



Introduction - Goal

■ Advantages of Argentina

- Year round availability
- Counter season (Europe)
- Good connection by sea
- Developed

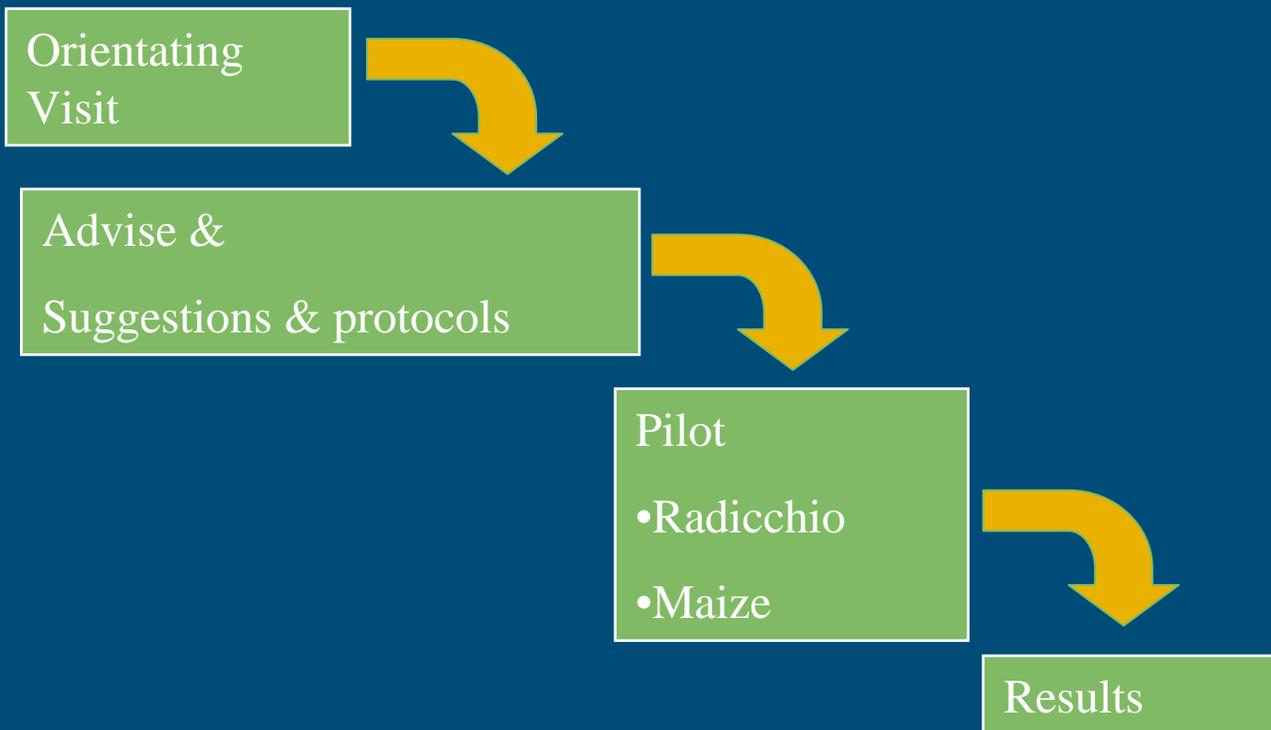


■ Goal

develop a **framework** i.e. a setting in order to facilitate the start of a sustainable vegetable and fruit flow from Argentina to the European market on an acceptable risk level



Research approach



Results



Results

- Status
 - Infrastructure
 - Technology
 - Organization
 - Initial Q

- How to make it work
 - Closed chain
 - Reefer on location (Stuffing)
 - Protocols
 - Inspection
 - Packaging
 - Post harvest treatment



Infrastructure

- Farms
 - Infrastructure present for post harvest treatment
 - Cooling facilities
 - Packing facilities
- Inland transport
 - Infrastructure present for (container) transport
- Harbor
 - Infrastructure present for container handling, but:
 - No conditioned storage facility for consolidation
- Airport
 - Infrastructure present for handling perishables
 - Good alternative for 'emergencies'



Technology

- Reefer containers suitable for maintaining optimal product temperature, but:
 - Initial quality must be perfect
 - Use appropriate packaging material
 - Stuff the container correctly
 - Not above the red line
 - No 'false' air
 - Close the T-bar floor completely
- Liners can help to reach optimal climate
 - Research INTA



Organization

- Stuffing and shipping a container needs good organization
 - Products need to be ready and on temperature
 - SENESA needs to be informed and must have inspected the product before stuffing
 - Customs needs to be informed so that customs inspection can be optimized (on farm)



Initial Quality

- Initial Quality is of high importance!
- The product needs to maintain quality during shipment and the after sales quality must be good
- Rubbish in = Rubbish out
- Pronature quality is excellent for export
- Argentina quality label can help

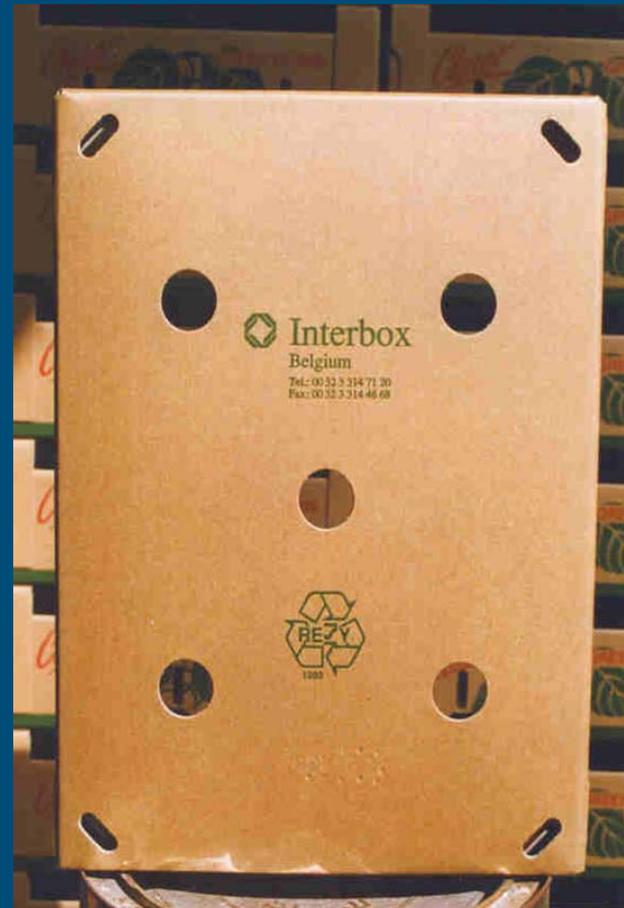


How to make it work



How to make it Work

- Closed Chain
 - Stuffing container at location
 - Cooled inspection site
- Reefer and Genset availability
- Packaging
 - Corrugated board
 - Liner yes/no?



How to make it work

- Post harvest treatment
 - Quick reduction of field heat
 - Peeling or trimming of products yes/no?

- Protocols
 - Step by step
 - Do's and don'ts

Preliminary recommendations for transportation of Radicchio in reefer containers

1) General

- Turgid leaves or firm, compact head with bright appearance typical of variety. Generally, bright white midribs with no cracking or splitting. Absence of marginal leaf necrosis, insect damage, harvest or packaging damage. Absence of bacterial decay at the root end.
- After long-term storage, there can be problems in de-hydration.
- Desiccation can lead to necrosis of the leaf margins. Wilting can occur after a few days of display if plants are not misted. Leaf abscission is common for some varieties and reconditioning is often required.
- Rough handling during the harvest or packing causes cracking of leaves or, in the case of abrasion, appearance of browning stains on the white midribs.
- Radicchio is susceptible to bacterial soft rot caused by *Erwinia carotovora* at warmer temperatures and pectolytic *Pseudomonas* at lower temperatures. *Botrytis cinerea* can be frequent, even with good temperature control.
- Storage temperature 0.5°C (33°F).

2) Harvesting stage

- Maturity is generally based on marketable size after threshold days beyond seed sowing has been reached (commonly 75 to 85 days). Some varieties transition from green to red or red-purple leaves at maturity or the onset of cool weather. Head-forming radicchio are firm and compact at maturity. Leaf radicchio have a long conical shape similar to Romaine lettuce.
- Radicchio should be harvested with a small stub of root remaining to help retain leaf attachment.

3) Pretreatment:

- No pretreatment
- Handle with care!

4) Packaging

- After harvest, Radicchio should be graded, packed and cooled as soon as possible to the target temperature.
- Pack to reduce movement and avoid bruising.
- Packing systems that immobilize the product should be chosen.
- Boxes should have holes for facilitating pre-cooling.
- Use special boxes designed for sea transport if these are available.

5) Cooling/pre-cooling

- It is very important that radicchio is cooled down to about 0.5°C (33°F) using either a regular cool room or a forced-air pre-cooler.
- Make sure the room is at a very low temperature: 0.5°C (33°F)
- Make sure the cold air can enter the box and reach the product
- Check the temperature in the middle of the box, should be around 0.5°C (33°F)
- Time between harvest and target temperature should preferably be less than 12 hours.

6) Loading and Stacking

In reefer containers, the cold air enters from beneath the load, is directed through or alongside the boxes to the upper part of the container where it is directed to the cooling equipment. In order to ensure proper temperature control in the whole load, appropriate stacking of the boxes is essential

- Use special reefer boxes (holes in the bottom of the box, closed side walls).
- Make nice vertical stacks.
- Use corner pieces and strapping to make stable stacks.
- Cover the top-layer to prevent de-hydration.
- If these are not available please consult with AFGS about optimal stuffing.
- Fill up the whole container with boxes, do not leave huge open spaces as it will create "false air".
- Do not load above the red load line.



Pilot



Radicchio

- Liner vs No Liner
 - Liner reduces weight loss
 - Liner gives less loss due to peeling
 - Liner gives whiter cutting
 - With liner rotted crops were observed

- However:
 - Price → Italian production early (2007)



Pilot - Radicchio

liner



no liner / top carton



Pilot - Maize

- Problems with caterpillars

- Remarks customer
 - In general positive about quality
 - Bags not necessary
 - Pack untrimmed and uncut
 - Taste was less



Pilot - Maize

■ Bags

- No apparent differences between bags

■ Acid

- Amcor: Acid
- LongLife: Slightly Acid
- HDPE: Little to no Acid

A



B



C



General Conclusion

- Export to Europe by reefer container possible
 - Product quality needs to be excellent
 - Cold chain unbroken
 - Quick reduction of field heat
 - Organization in place
 - On site inspections (Customs, Senasa)
 - Fast transit time (< 20 days)
 - Availability of reefer containers and Gensets



Questions?



Future Research

- Tests
 - Pilots
 - Testing and updating protocols
 - Packaging
 - Possibility to increase shelf life

- New products
 - Butter squash
 - Leek
 - Sjalottes

- Organic



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