

Inland shipping in the Netherlands

General overview and cases

Paul van de Lande
Amsterdam Consultants, The Netherlands

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Inland shipping in the world

	United States	China	European Union
Surface area in km ²	9.6 million	9.6 million	3.5 million
Population	297 million	1.3 billion	459 million
Gross national product	10.9 trillion	1.4 trillion	10.1 trillion
Trade % Gross national product	18.3%	49%	34.9%

	United States	China	European Union
Transport in billion tonne/km	480	171	125
Transport in million tonnes	800	815	440
Percentage of total transport	18%		6.5%
Length of navigable waterways	40,000 km	23,000 km	37,000 km

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Transport issues

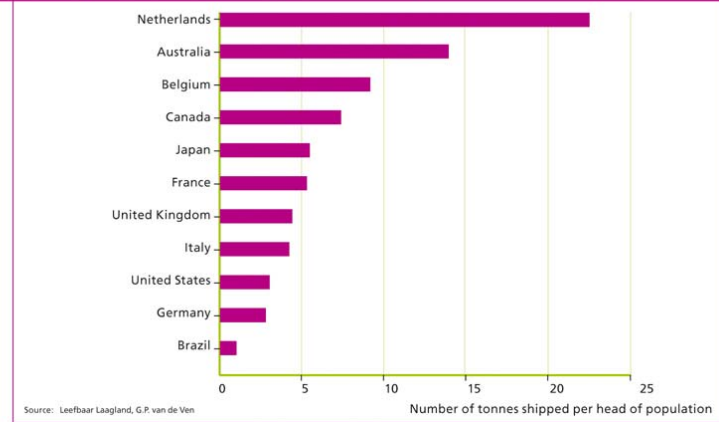
- Congestion and accessibility
- Climate change and CO₂-emission
- Dependence on fossil fuels
- Scarcity of space
- Air quality
- Safety

***Modal shift from road to inland navigation
beneficial for society and companies***

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Freight flows per capita

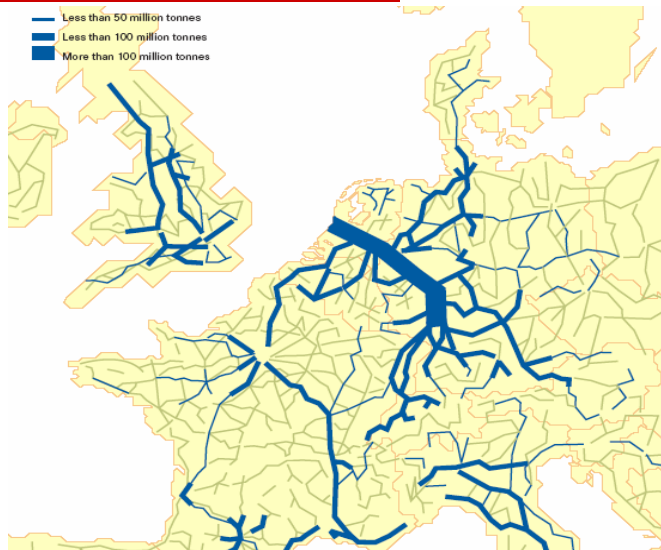
All freight flows in tonnes per head of population



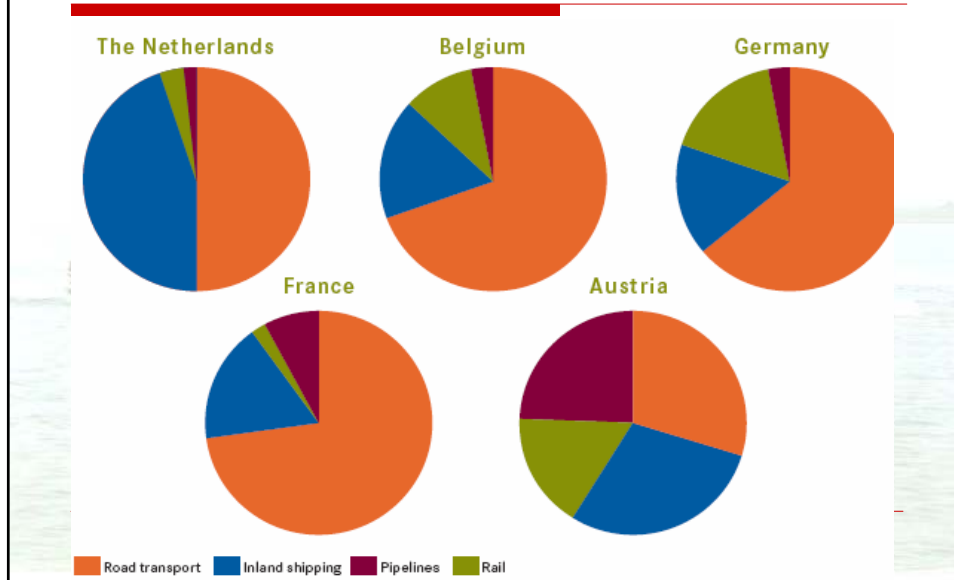
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Inland freight flows (all modes)

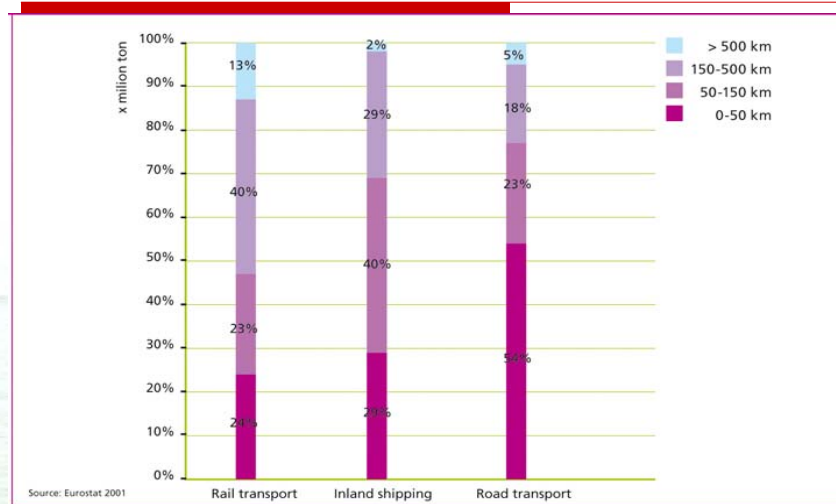
- Less than 50 million tonnes
- Less than 100 million tonnes
- More than 100 million tonnes



Modal split in the relevant countries



Modal split per distance category



Source: Eurostat 2001

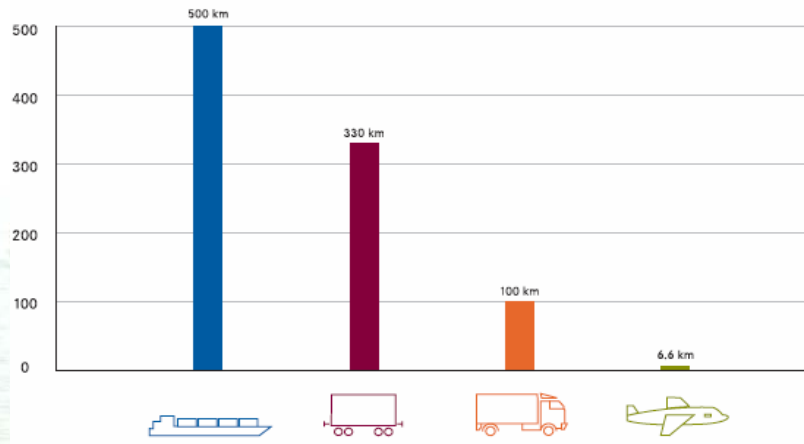
The inland navigation network



Accessibility of inland navigation















Transport distance with 5 l / tonne



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Types of vessels

 Splits length 38.50 metres - width 5 metres - draught 2.20 metres - capacity 350 tonnes	 Car vessel length 110 metres - width 11.40 metres - draught 2.50 metres - capacity 600 tonnes
 Kempenaar length 50 metres - width 6.60 metres - draught 2.50 metres - capacity 550 tonnes	 Container vessel, Kempenaar class length 63 metres - width 7 metres - draught 2.50 metres - capacity 32 TEU
 Europa vessel length 85 metres - width 9.50 metres - draught 2.50 metres - capacity 1,350 tonnes	 Container vessel length 110 metres - width 11.40 metres - draught 3.00 metres - capacity 200 TEU
 Four-barge tow length 193 metres - width 22.80 metres - draught 2.50/3.70 metres - capacity 11,000 tonnes	 Container vessel Jowi class length 135 metres - width 17 metres - draught 3.00 metres - capacity 470 TEU
 Tank vessel length 110 metres - width 11.40 metres - draught 3.50 metres - capacity 3,000 tonnes	 Ro-ro vessel length 110 metres - width 11.40 metres - draught 2.50 metres
 Tank vessel length 135 metres - width 21.80 metres - draught 4.40 metres - capacity 9,500 tonnes	 Pallet ship length 63 metres - width 7.20 metres - draught 2.75 metres - capacity 540/680 pallets

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The container case

- ❑ Containerisation world wide growth
- ❑ New markets and globalisation
- ❑ Immense increase containers in mainports Europe (Rotterdam, Antwerp, Hamburg)
- ❑ Road transport insufficient for hinterland transport
- ❑ Barge and rail competitors for hinterland transport
- ❑ Barge strong on distances between 50 and 500 km

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Container vessels



32 TEU



500 TEU

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Container terminals

- ❑ Network of app. 100 European inland container terminals
- ❑ Mainly on Rhine corridor
- ❑ Daily services
- ❑ Increase of services in small waterways
- ❑ Congestion in deepsea terminals



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Innovative services

- ❑ Container services on short distances
- ❑ Self-unloading ships
- ❑ Network concepts



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Short distance service reefers

- ❑ Reefer service from Rotterdam APM to Barendrecht (fruit centre)
- ❑ Via terminal in Ridderhaven
- ❑ 50 km barge, 2 km endhaulage
- ❑ 800 containers/week
- ❑ Daily service with small container vessel
- ❑ APM terminal procedures need adaptation



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Self unloading vessel

- ❑ Medium-sized container ship
- ❑ On-board crane
- ❑ Capable of (un)loading containers at small terminals/clients
- ❑ No wall cranes required, low costs
- ❑ Round-trip services



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Network concepts

❑ Waterslag: push-barge concept on small waterways

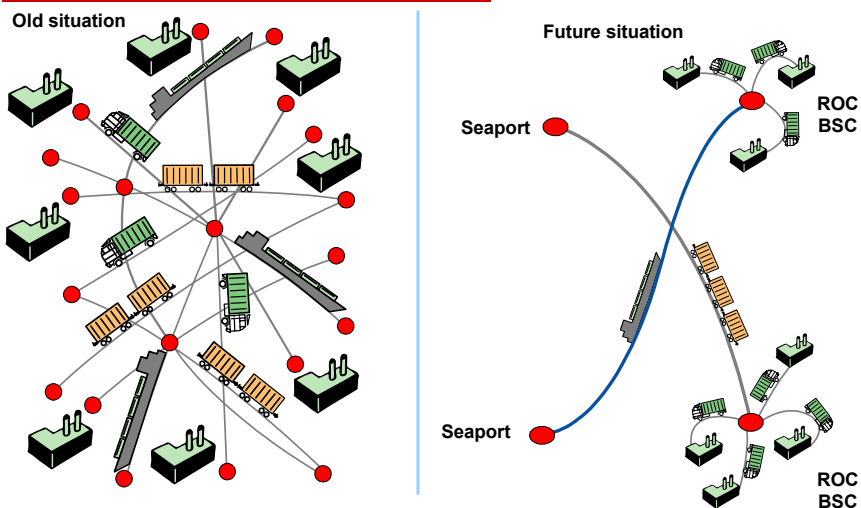


❑ Distrivaart: pallet transport in roundtrip



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New chances for inland shipping by consolidation of goods



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The orange juice case

- ❑ Cutrale terminal in Rotterdam
- ❑ 500.000 tonnes per year
- ❑ Inland transport by road: 400 trucks per week
- ❑ Extreme long waiting time: > 4 hours
- ❑ Congestion in hinterland



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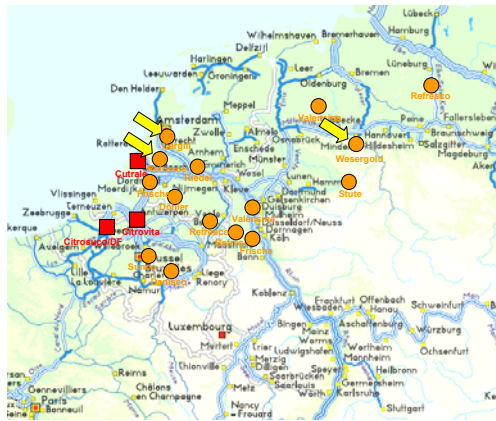
Objectives case study

- ❑ Determine the technical, operational and organisational feasibility for a barge service for the transport of frozen orange juice concentrate (FCOJ)
- ❑ Identify potential partners and their flows
- ❑ Define recommendations for the implementation of the service



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Orange juice flows



Directly at waterfront:

- Cargill, Amsterdam

< 500 m:

- Döhler, Oosterhout

< 1500 m:

- Wesergold, Rinteln

< 2500 m:

- Refresco, Uelzen

- Valensina, Rheinberg

- Stute, Paderborn

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Locations with highest potential

Company	Location	Vicinity water	Flow size
Cargill	Amsterdam (NL)	+++	++
Döhler	Oosterhout NB (NL)	++	++
Refresco	Uelzen (D)	+/-	++
Stute	Paderborn (D)	+/-	++
Sunco	Ninove (B)	++	+
Wesergold	Rinteln (D)	+	++
Valensina	Rheinberg (D)	+/-	+

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The bulk concept

- Ship type:
 - Kempenaar:
 - 50 x 6,6 x 2,5 m, 600 tonnes, class II
- Capacity: app. 600 – 1000 tonnes, 2 or 3 tanks
- Typical service: 1 client per roundtrip
- FCOJ only, NFC more complicated
- Few companies directly at waterfront

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Milk ship, to be adapted for orange concentrate



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Economical aspects

- ❑ Model calculations: assumptions
 - 3 port terminals: Antwerp, Rotterdam, Gent
 - 2 companies: Oosterhout, Amsterdam
 - Options: tank trailer, tank containers, bulk ship
 - 3 sizes bulk ship: 600, 1000 and 1200 tonnes
 - Annual costs ship: 400.000 tot 535.000 euro
 - Unloading speed: 50 or 100 tonnes/h
 - 60 h per week operational
 - 100 % empty leg, 100 % modal shift
- ❑ Economic viable with two companies participating
- ❑ > 5.000 truck movements avoided

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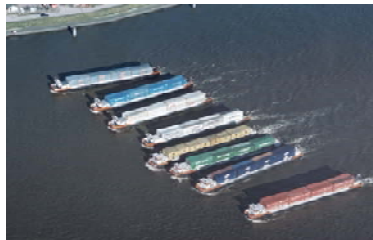
Conditions for a service

- ❑ Optimal capacity ship app. 600 tonnes (ship weight app. 900 tonnes (class II waterways)
- ❑ Ships with high energy efficiency required
- ❑ No endhaulage
- ❑ High unloading capacity barges (100 tonnes per hour)
- ❑ Maximum distance to storage/production facility: 500 - 750 m

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Epilogue

- Inland shipping is ready for the future
- Reduction of the emission of particles and NOx is a major challenge
- New capacity required
- Congestion free!



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Contact

- Paul van de Lande
- Amsterdam Consultants
 - Haaksbergweg 75
1101 BR Amsterdam
 - T: +31 20 715 4006
 - F: +31 20 715 4009
 - E: info@amsterdam-consultants.com
 - W: www.amsterdamconsultants.com
- Dutch promotion council for inland shipping
 - www.inlandshipping.com

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