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Management of the North Sea flatfish fishery: exploring alternative ITQ systems

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K. G. Hamon, H. Bartelings, F. Buisman, J. A. E van Oostenbrugge, B. de Vos

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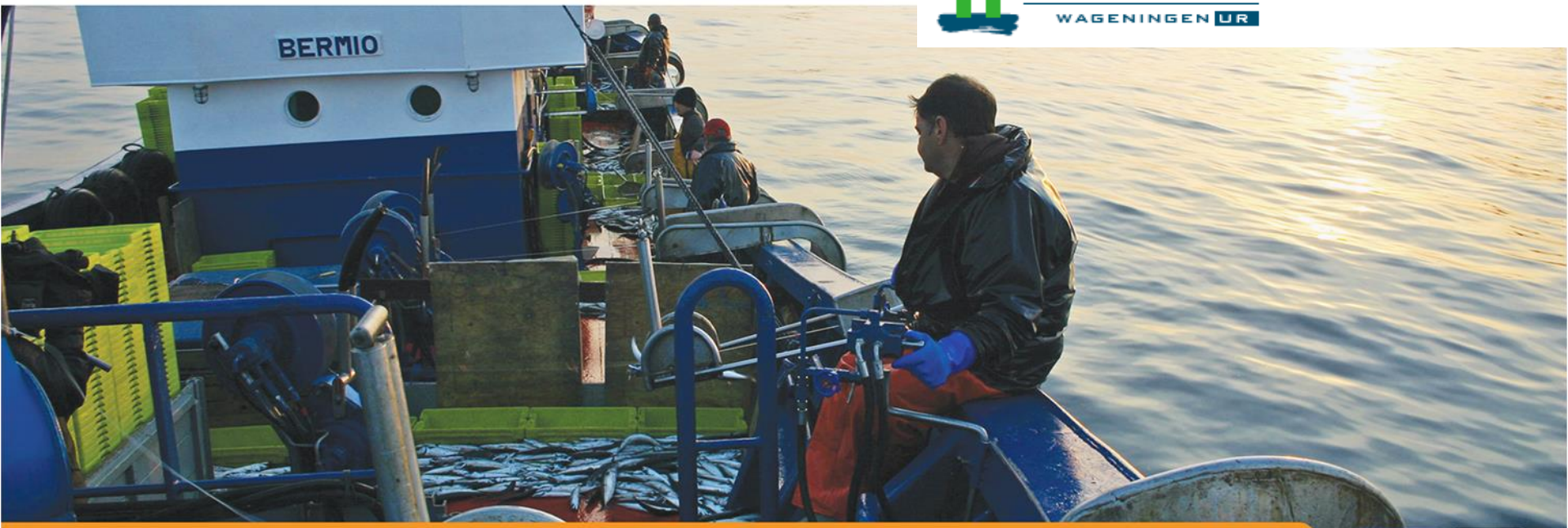


The fishery

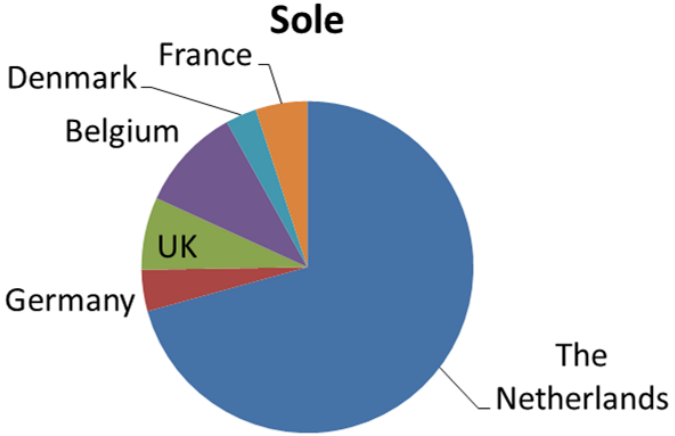
- 2 main species

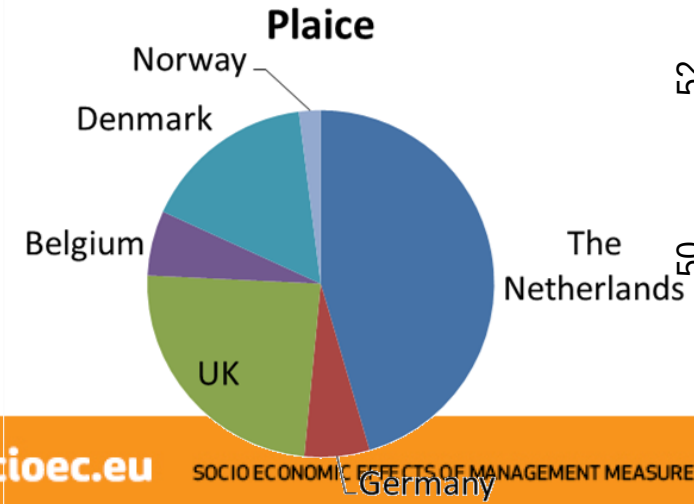
Plaice

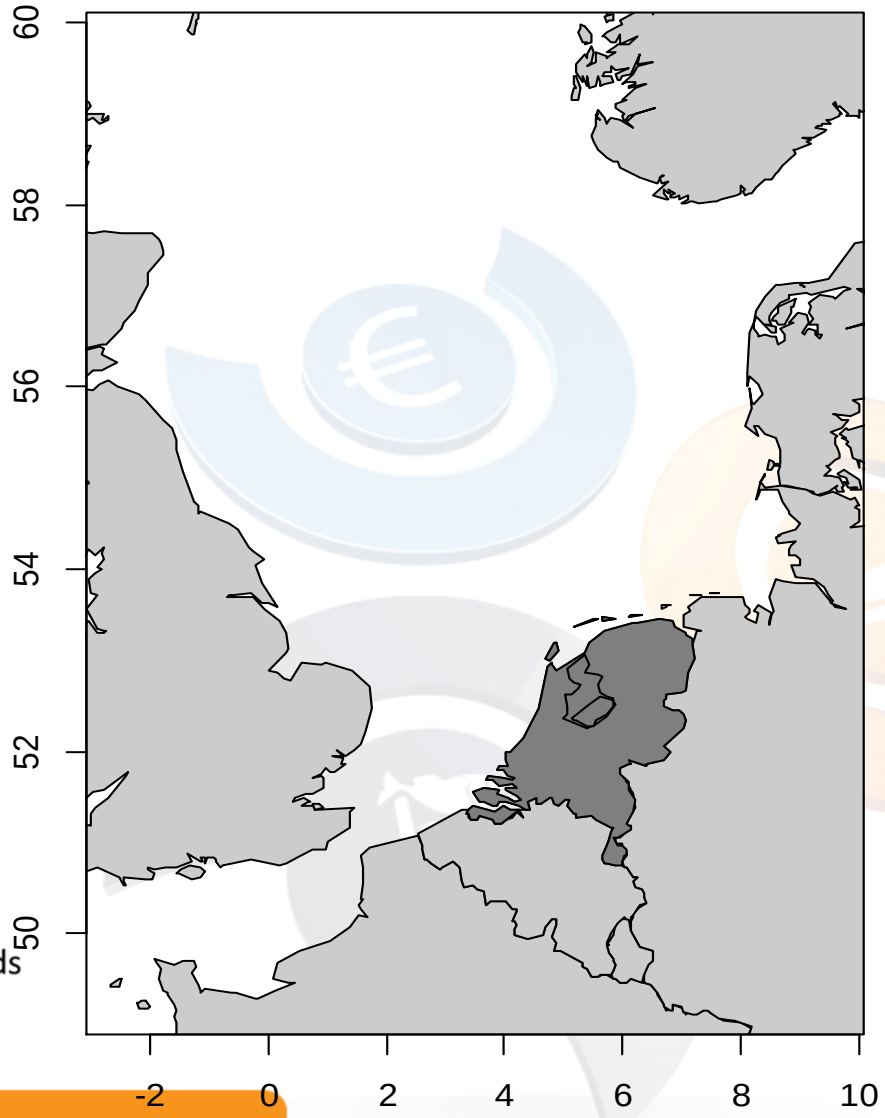
Sole

The fishery

- 2 main species
- 7 countries







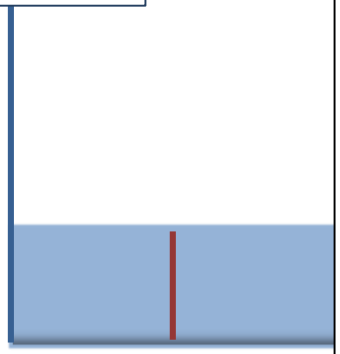
The fishery

- 2 main species
- 7 countries
- Beam trawls and demersal trawls

Managing the (Dutch) fishery

70’s introduction of individual quotas

Individual quotas



1976

1975 TAC decrease catch of sole 40% and plaice 10%

➔ intensified race for fish

➔ 1st individual quotas in the world

BUT

TAC not really enforced

Trade not allowed but happened

Managing the (Dutch) fishery

80's enforcement and tradability

Individual quotas

Transferability allowed

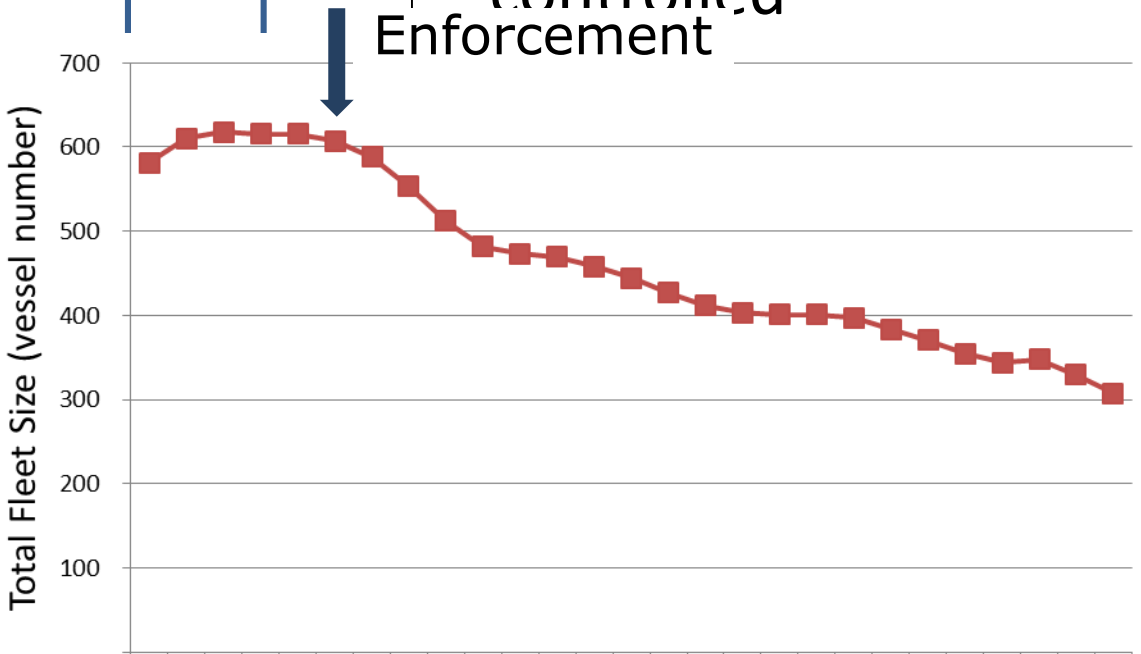
TAC enforced

- Trade of quota officially allowed
- Landings monitored and controlled

roperty

rship

1976



Managing the (Dutch) fishery

90's co-management and buy-back

Individual quotas

Transferability allowed

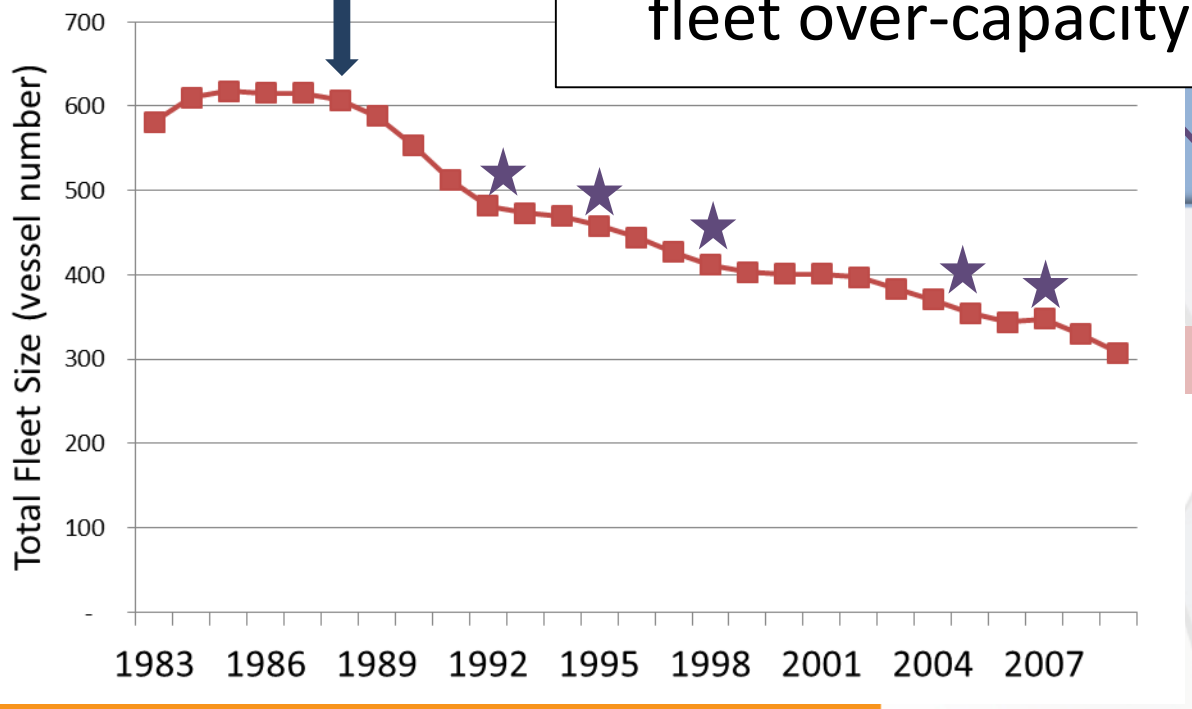
C manag gro

TAC enforced

1976

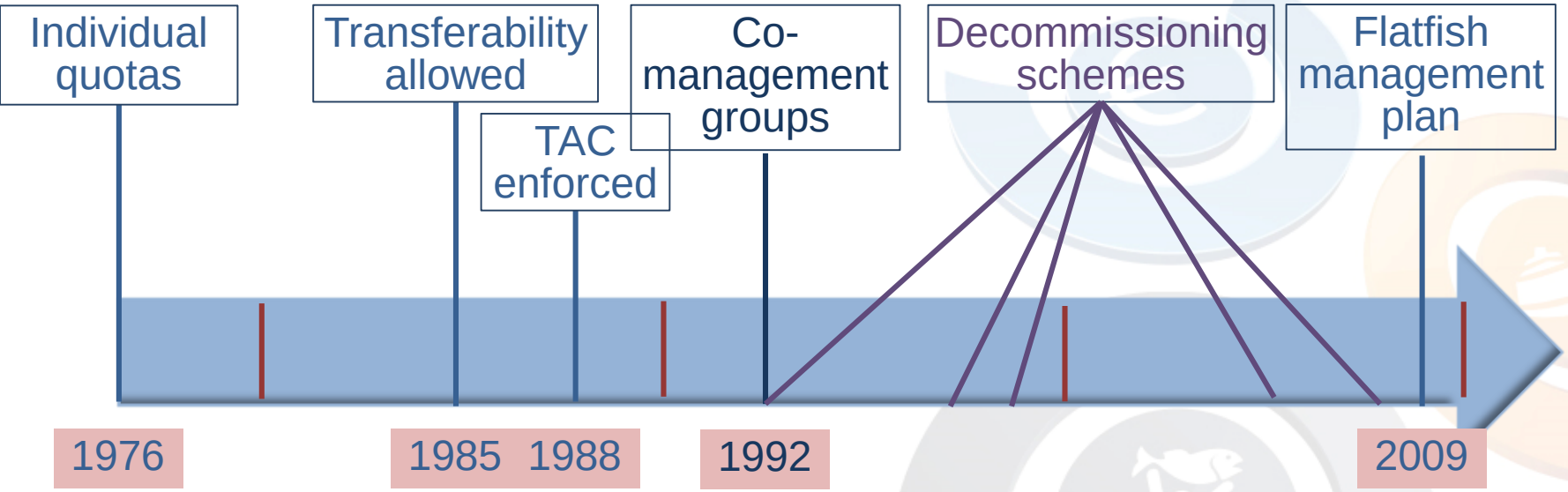
2008

- Groups → more efficient use of quota
- Buy-backs helped decreasing fleet over-capacity



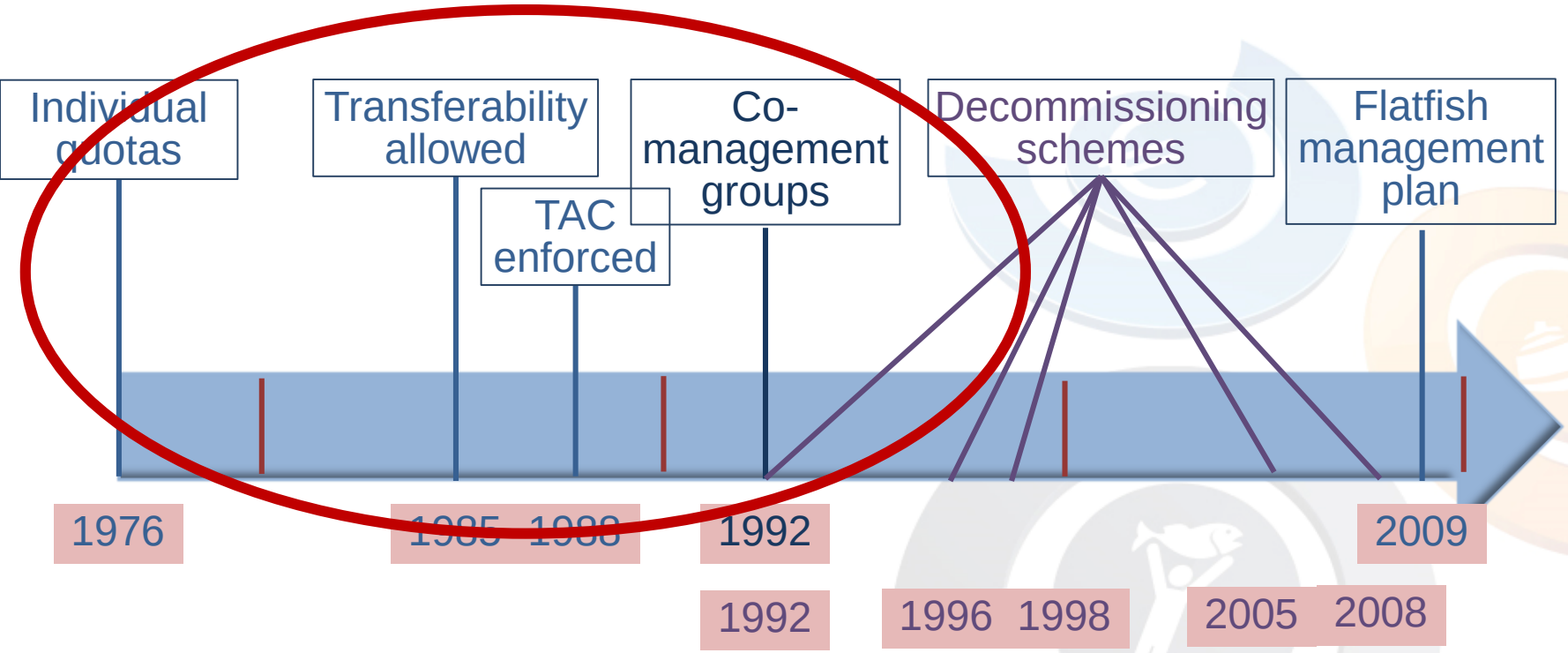
Managing the (Dutch) fishery

2000 Long term management plan



- TAC on advised levels
- Sole and Plaice recovering

Managing the (Dutch) fishery



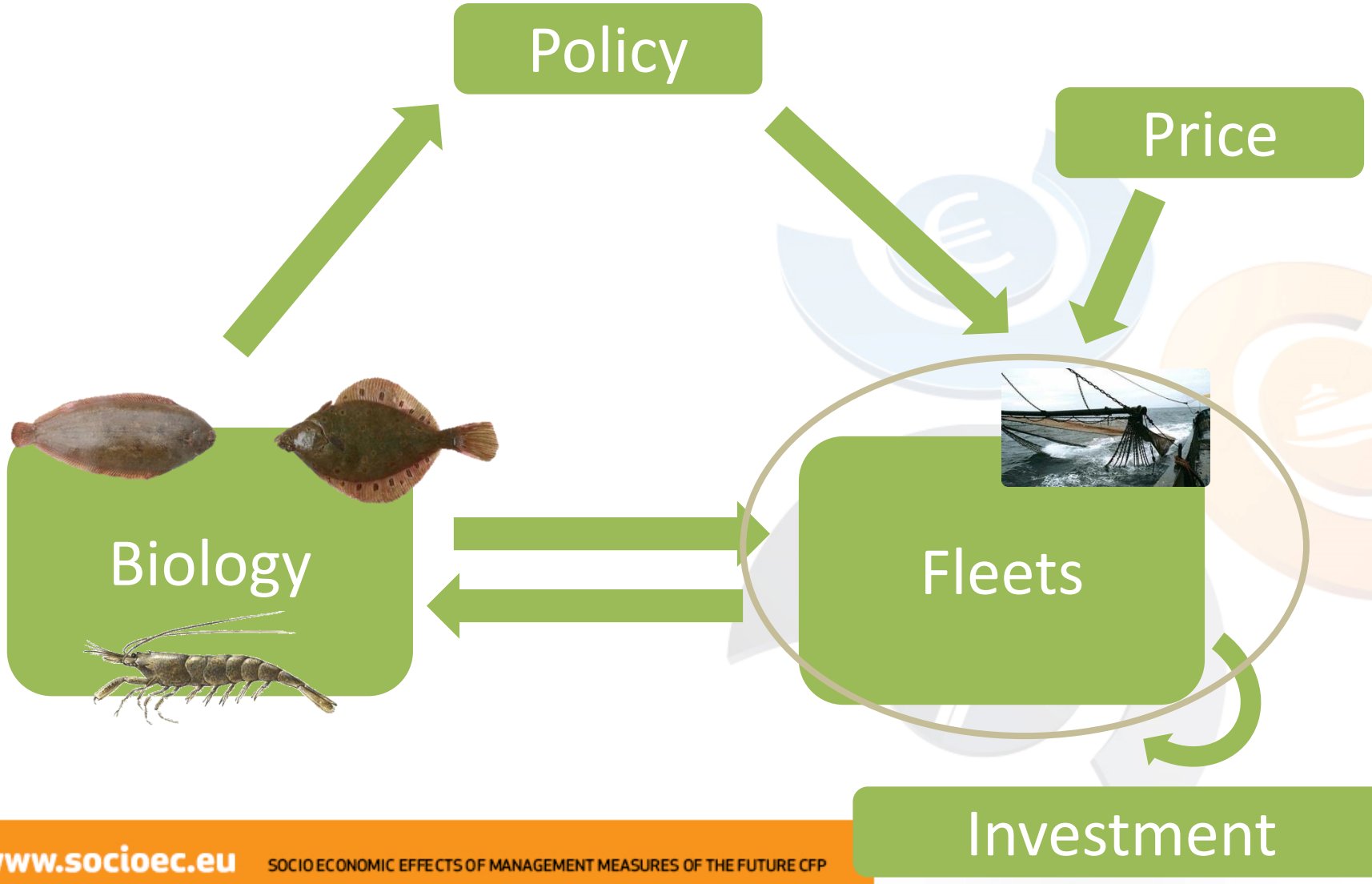
ITQ and co-management

- Quota linked to vessels → no external investors
- Trade intensified within groups

→ how do constraints on the quota trading impact the fishery?

- Investigation using bio-economic model

Model

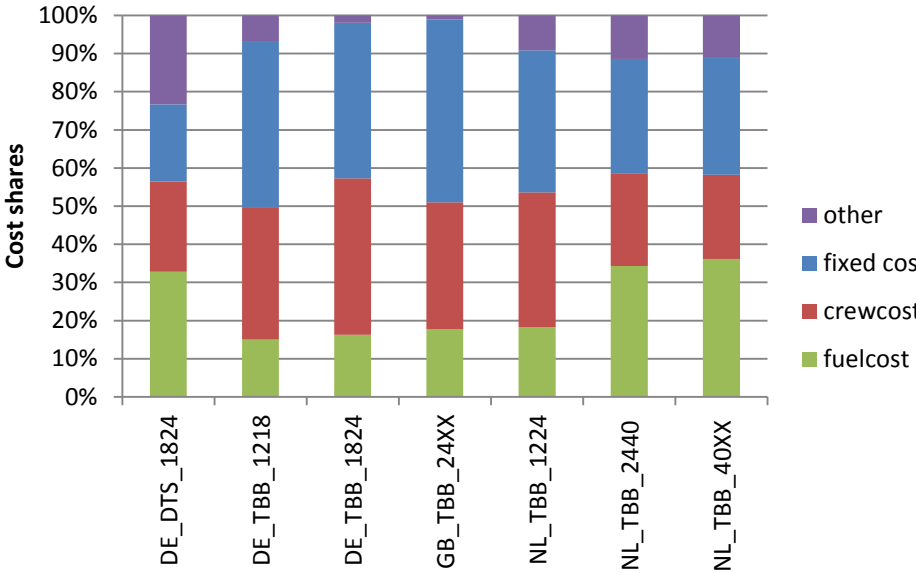


Model description

- Bio-economic model of fisheries
  - Multi-species
  - Multi-fleet
  - Spatially explicit
- Calculate the optimal effort allocation given that
  - Total profit is maximized every year
  - Quota can be traded (lease only)
    - Within fleets (default)
    - Between fleets of a country (National trade – relative stability)
    - Between fleets of all countries (international trade – loose relative stability)

Model description

- Economic module
  - 7 fleets from NL, DE and defined in DCF data
  - Cost structure from 200 data
  - Costs depend on the fish area
  - Revenue (value of landings) depends on catch composition
  - Profit depends on renting quota



Model description

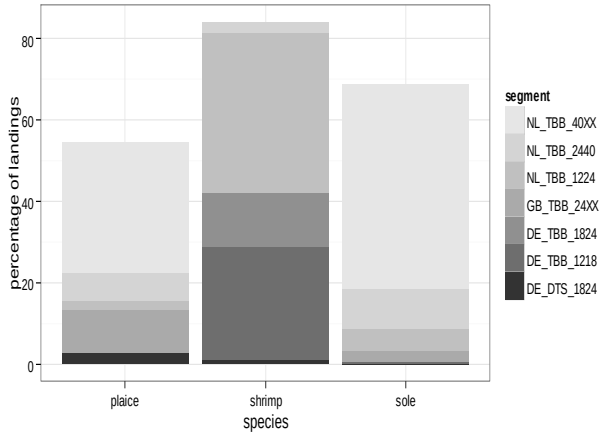
- Price module
  - 2010-2012 real prices used
  - Then scenarios:
    - 5% fuel price increase per year
    - 5% fish price decrease per year
    - Price elasticity for shrimp (price decreases when landings increases) and sole
  - Price quota calculated as shadow prices (marginal increase of profit due to one extra ton of quota)

Model description

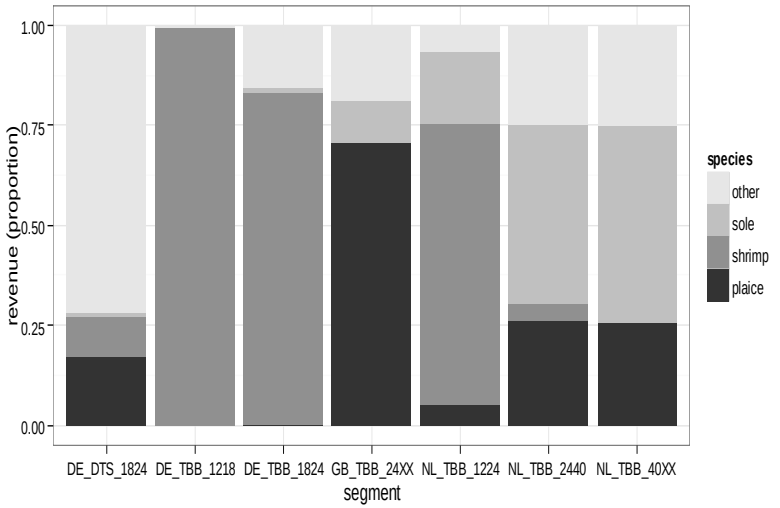
- Entry-exit module:
  - Based on past profitability
  - New vessels have same characteristics than current vessels (no introduction of new gears)
  - Free access to the fishery (no licence or quota access limits)

Model description

- Stock-fleet interactions:
  - Non linear relation between catch, effort, biomass: Cobb-Douglas function
  - landings coverage by fleets:
    - Plaice 54%, shrimp 84%, sole 69%
  - Weight of species in fleet revenue
    - 29 to 100%

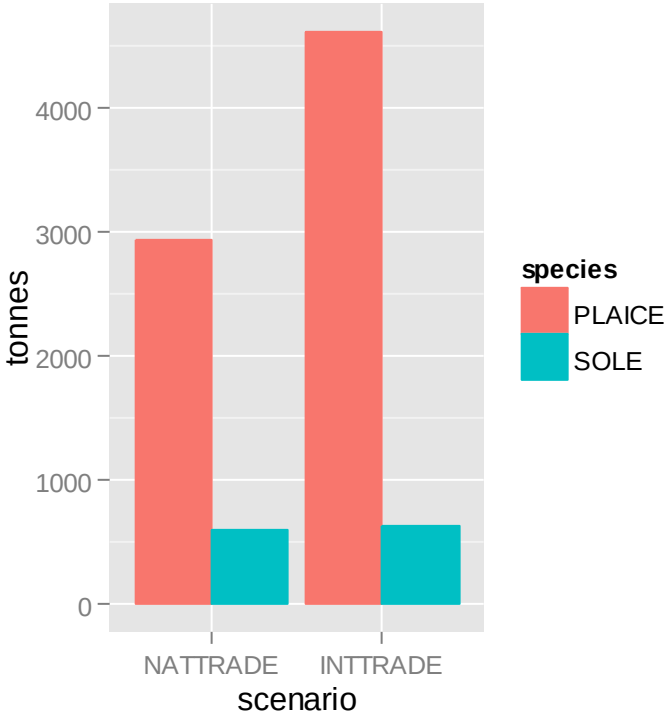


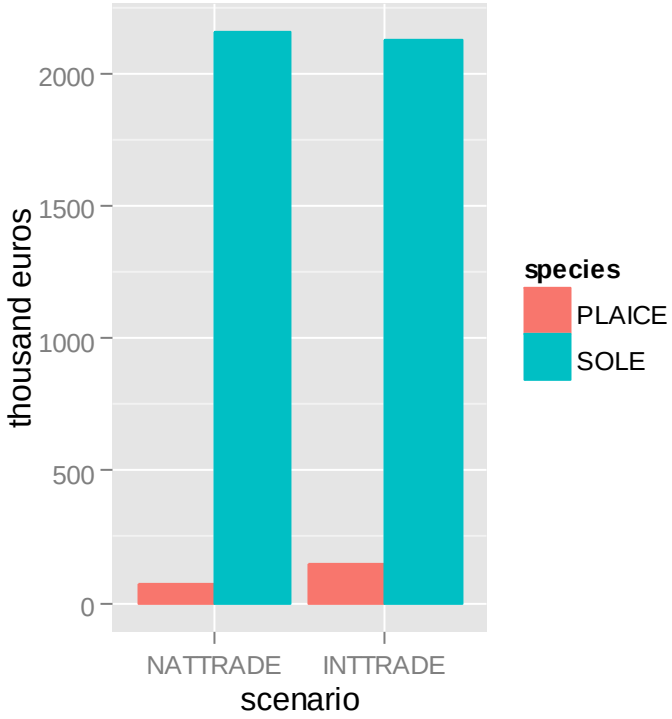
- Potential shortcoming
  - No change in selectivity (innovative gears
  - Other species taken as proportion of sole plaice and shrimp
  - Limited data to parameterise the Cobb Douglas function



Results

- What is traded?

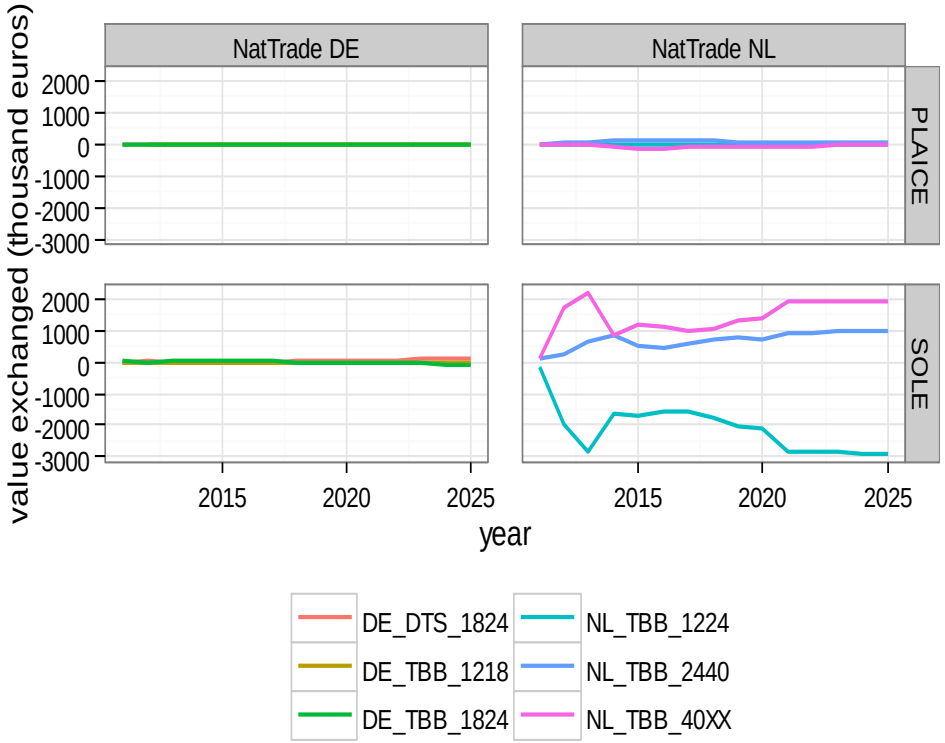


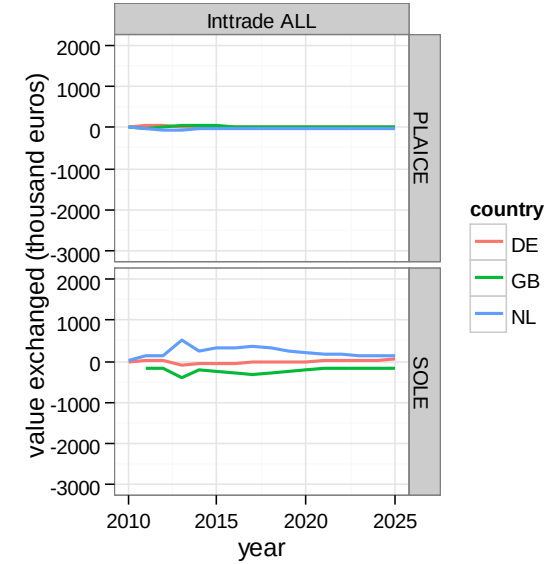


➔ In weight plaice, in value sole

Results

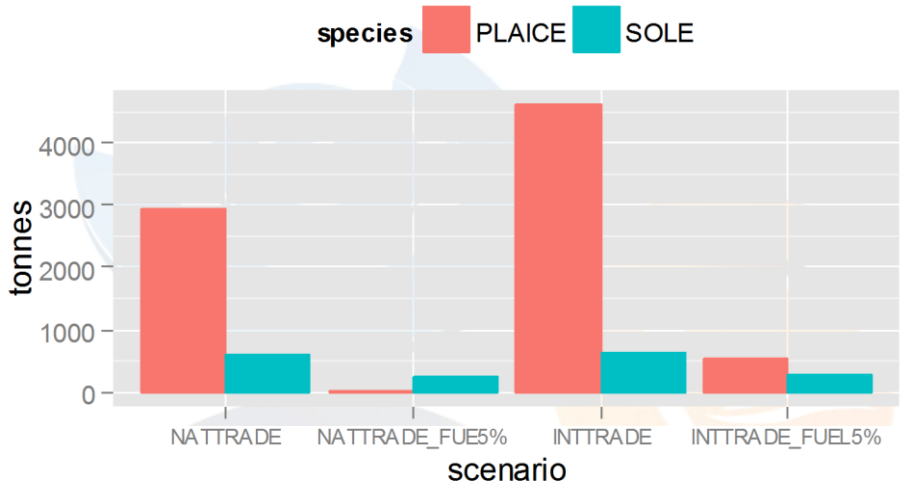
- Who would trade with who?



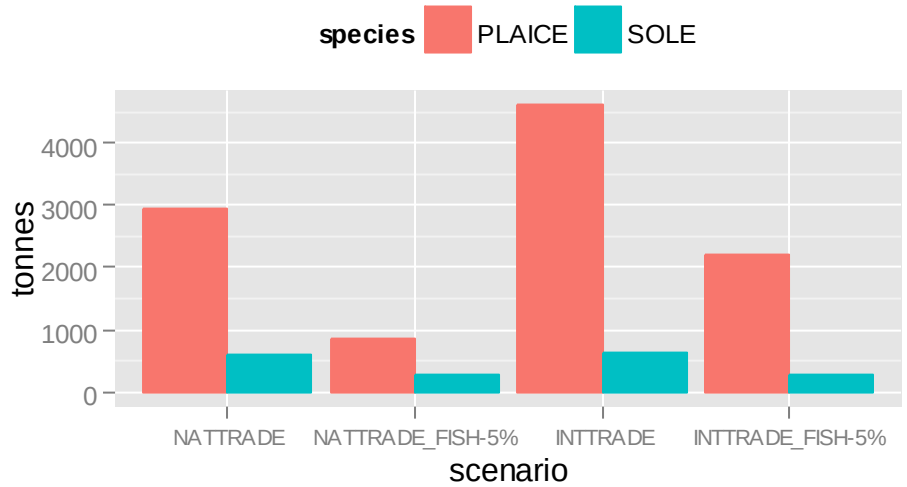


Results

- How external factors affect the quota trade?
  - Fuel price increase
    - no demand for plaice
    - Lower demand for sole

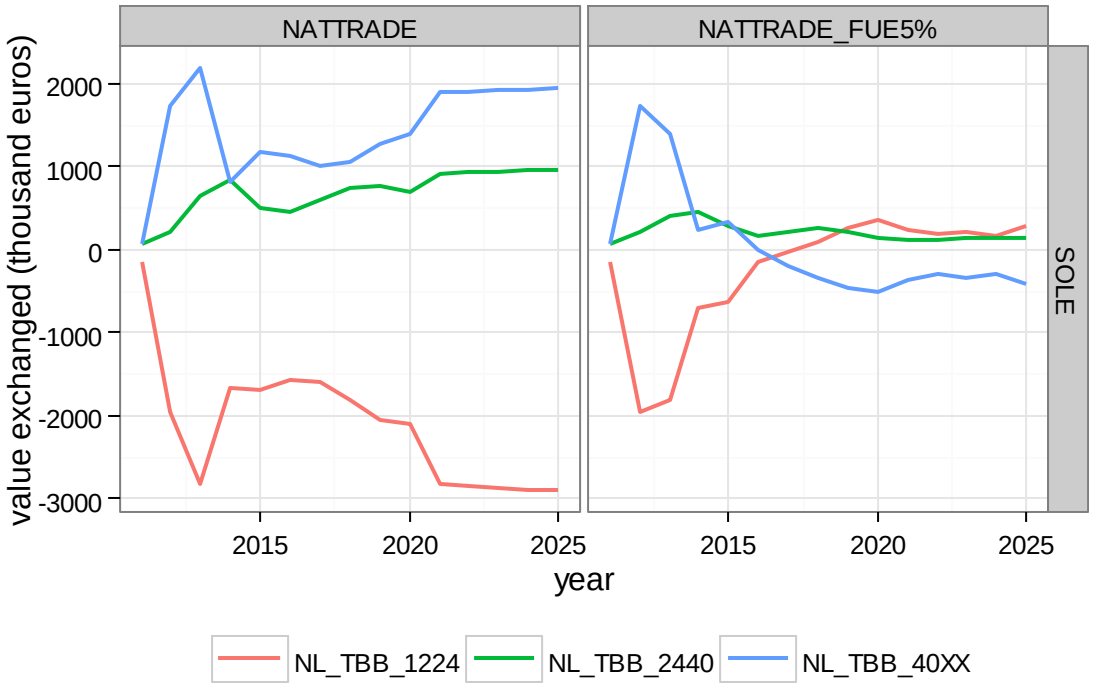


  - Fish price decrease
    - Decrease in demand for both sole and plaice



Results

- How external factors affect the quota trade?
  - Larger beam trawlers decrease their activity
  - Lower demand for quota



Conclusion

- Market driven by limiting species: sole
- Fuel & fish price changes will have high effect on trade
- Fleets with high fuel consumption particularly vulnerable

  → Explain switch to alternative gears

Further work

- Rough quota trading model, need to be more dynamic
- Inclusion of new gears less fuel intensive
- Understanding the dynamics and opportunities to switch to alternative fisheries

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Thank you for your attention

katell.hamon@wur.nl

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