

Practices in managing finfish aquaculture using RAS technologies, the Dutch example

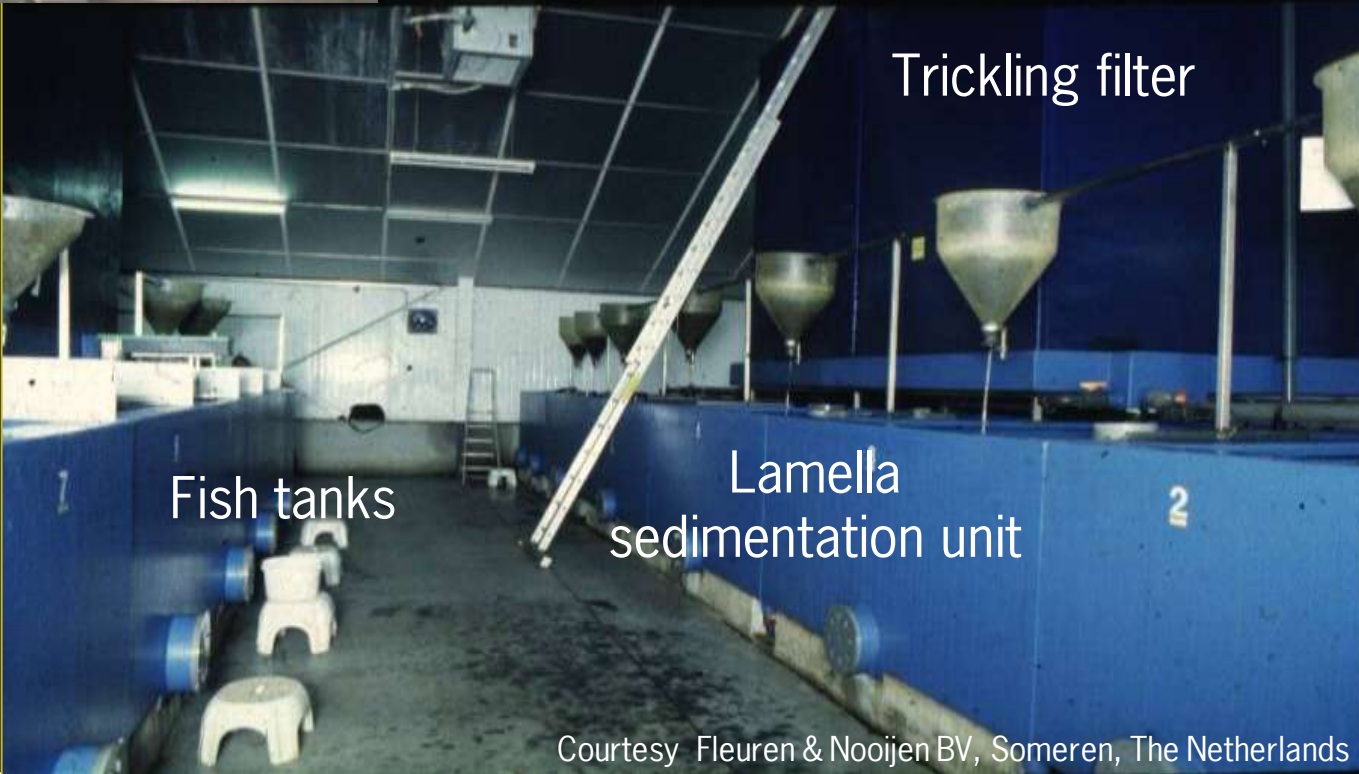
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A. Rothuis², A. van Duijn³, H. van der Mheen¹



Outline

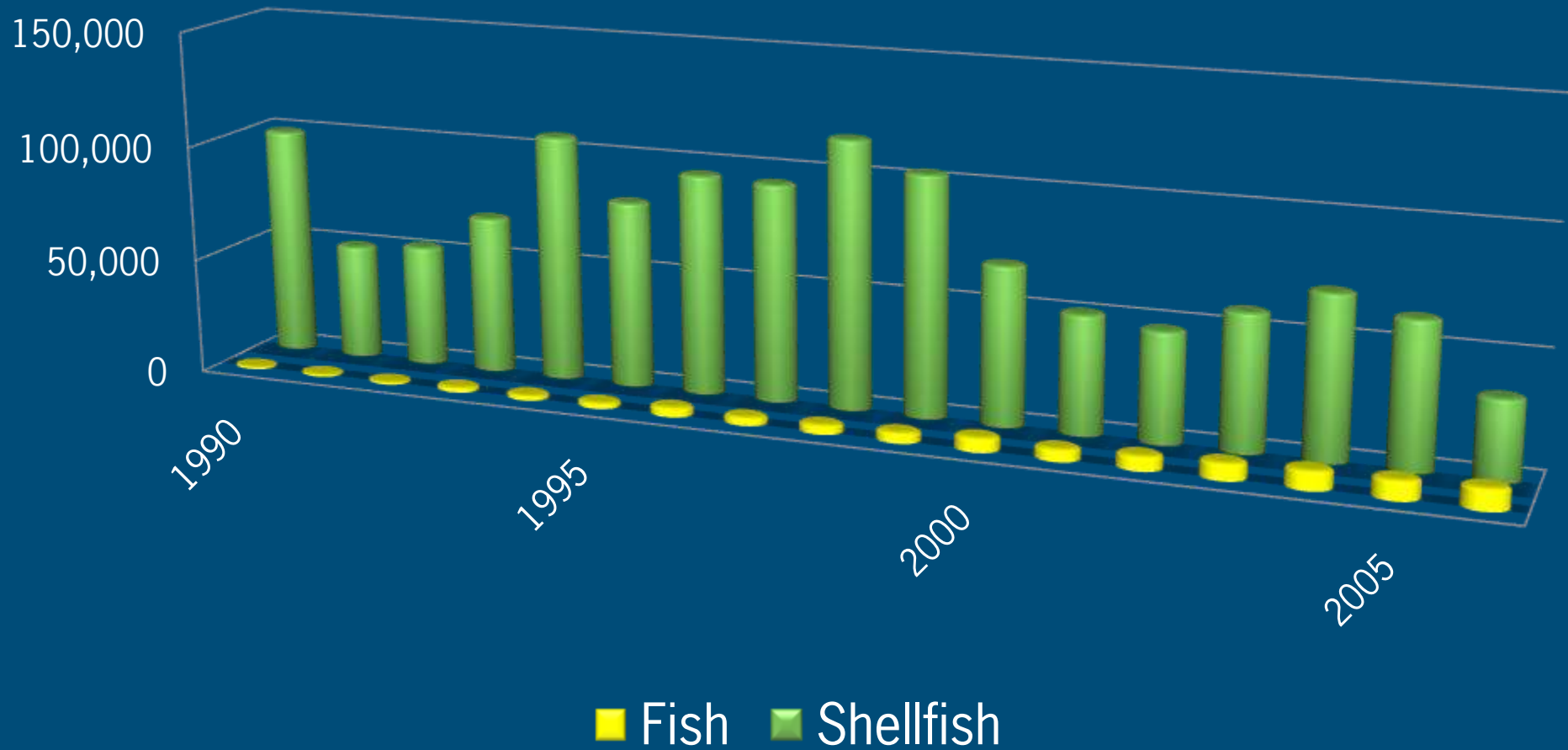
- Dutch aquaculture sector
- Sustainability
- Pitfalls, Challenges & Opportunities
- Conclusions

Dutch aquaculture sector



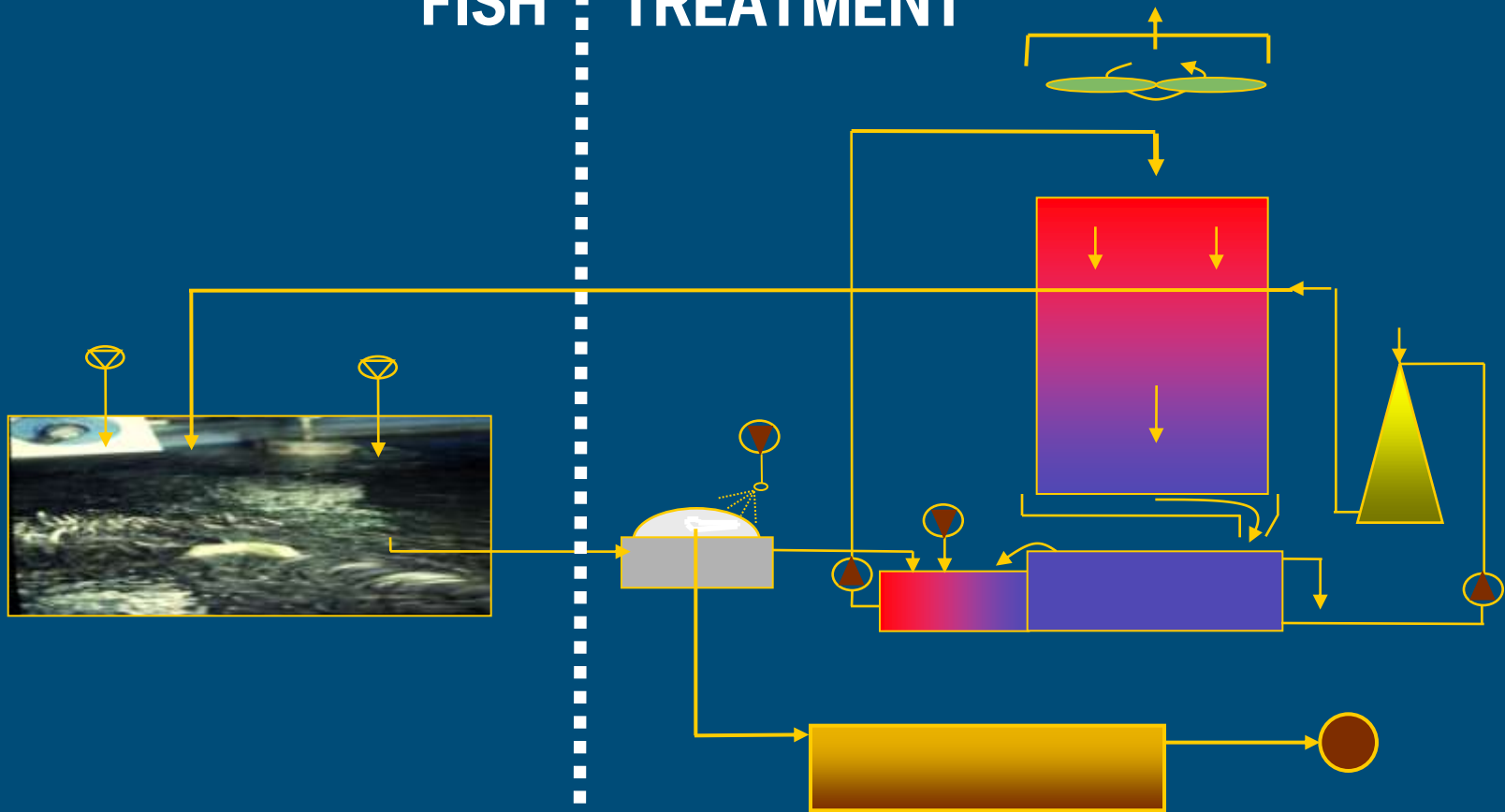
Courtesy Fleuren & Nooijen BV, Someren, The Netherlands

Dutch aquaculture sector



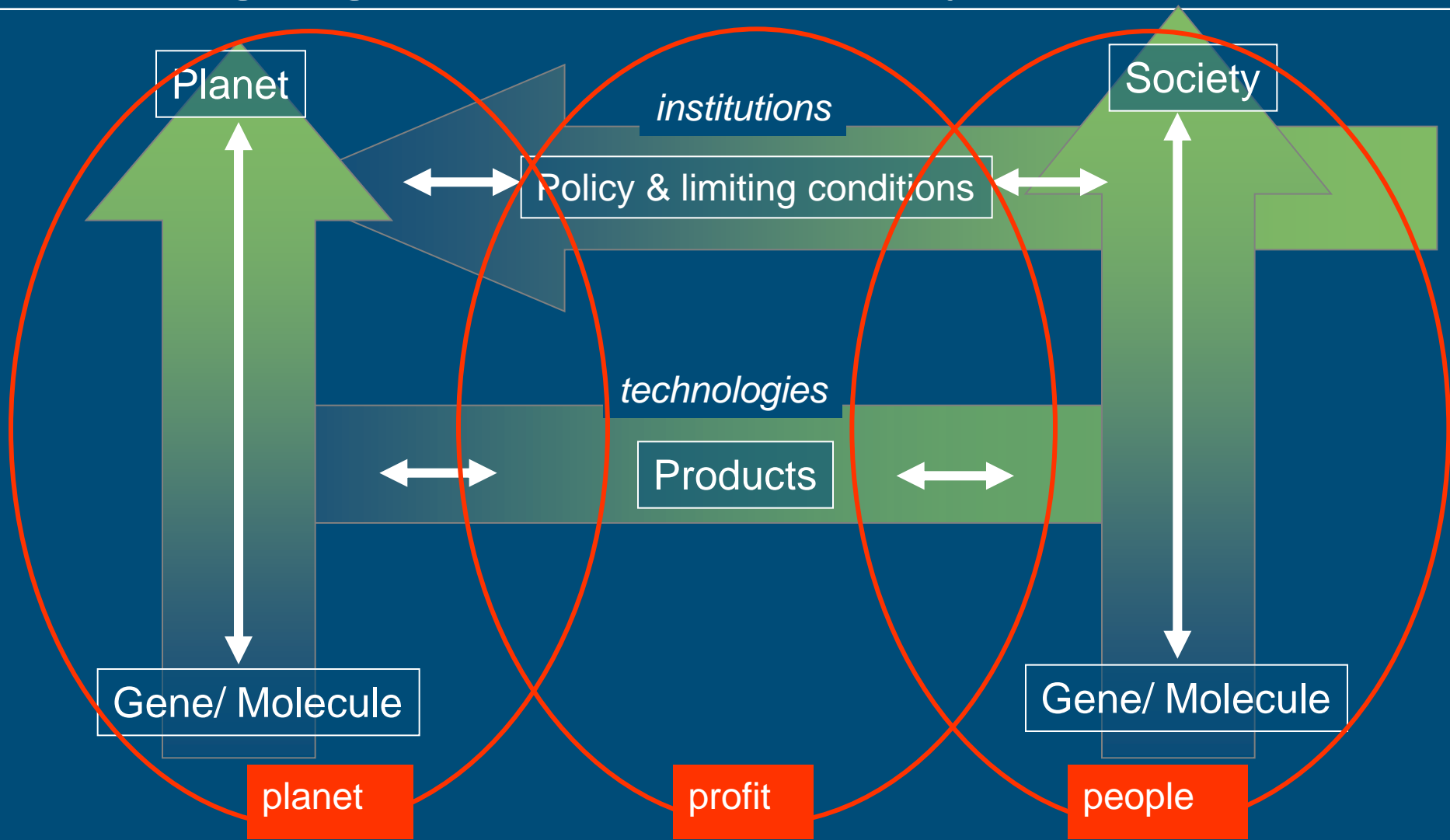
RAS – technical concept

FISH TREATMENT

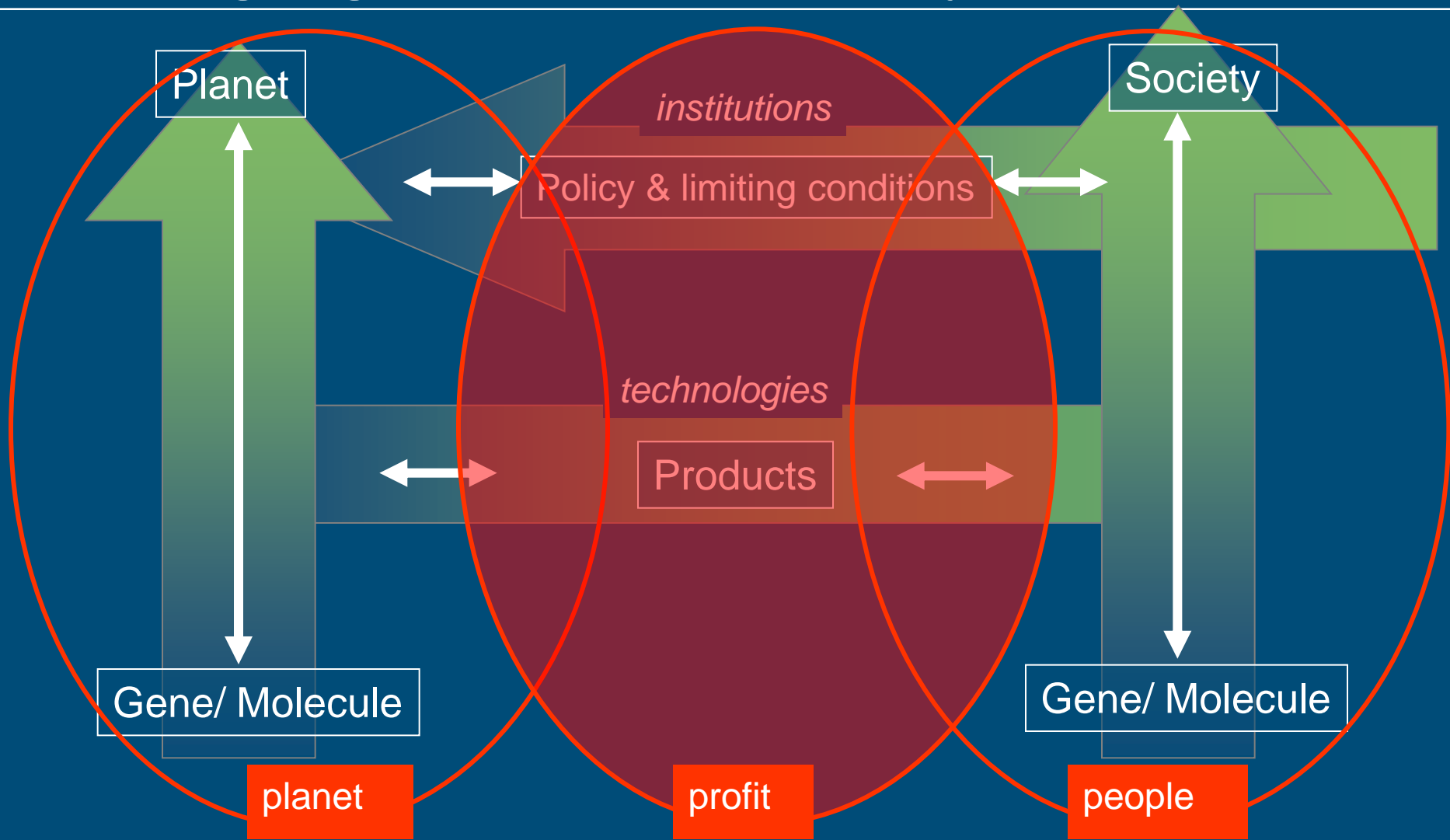


After Kamstra, 1998. Wegwijzer in de paling teelt.

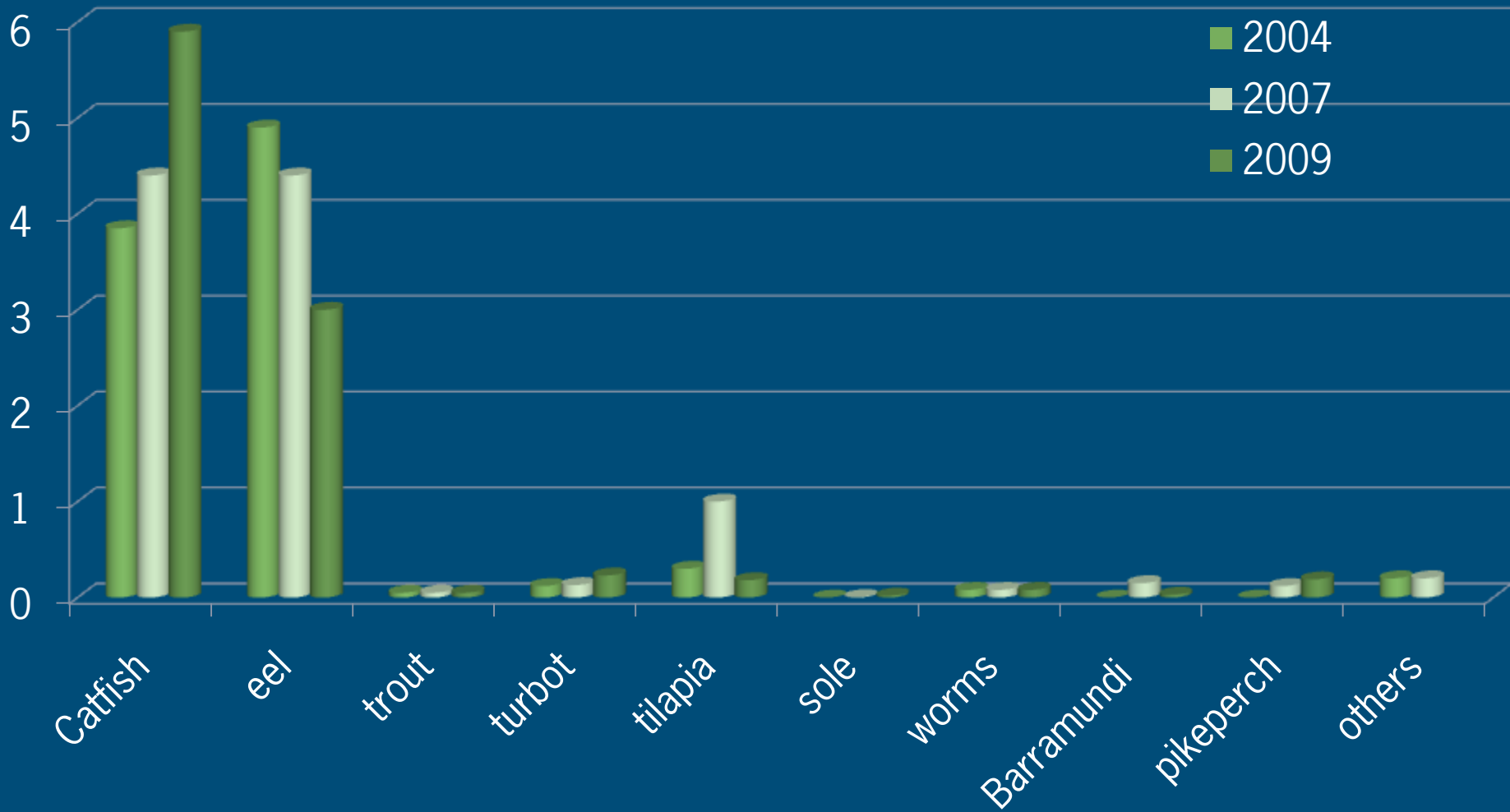
The Wageningen approach to Sustainability: biological & social



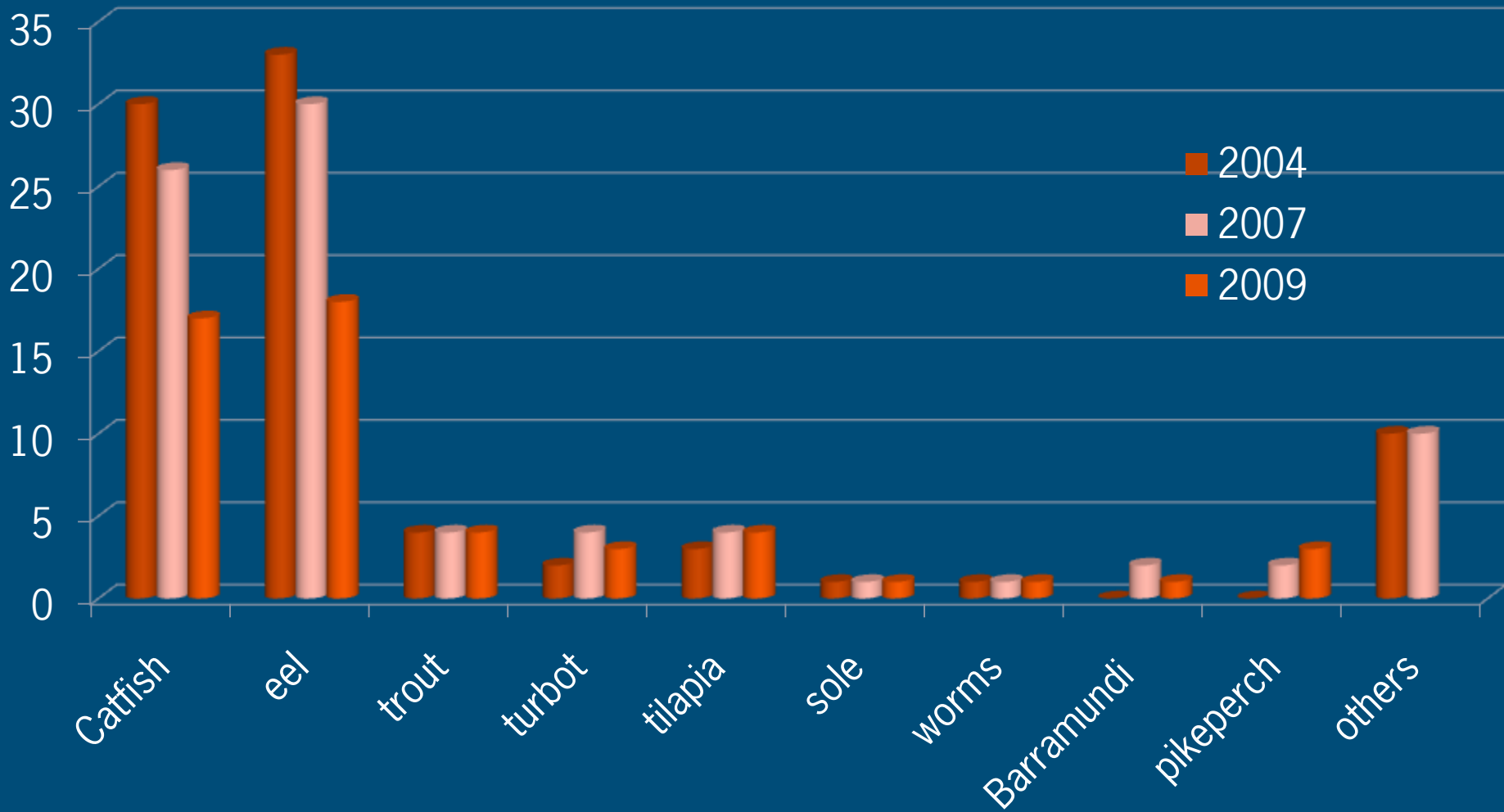
The Wageningen approach to Sustainability: biological & social



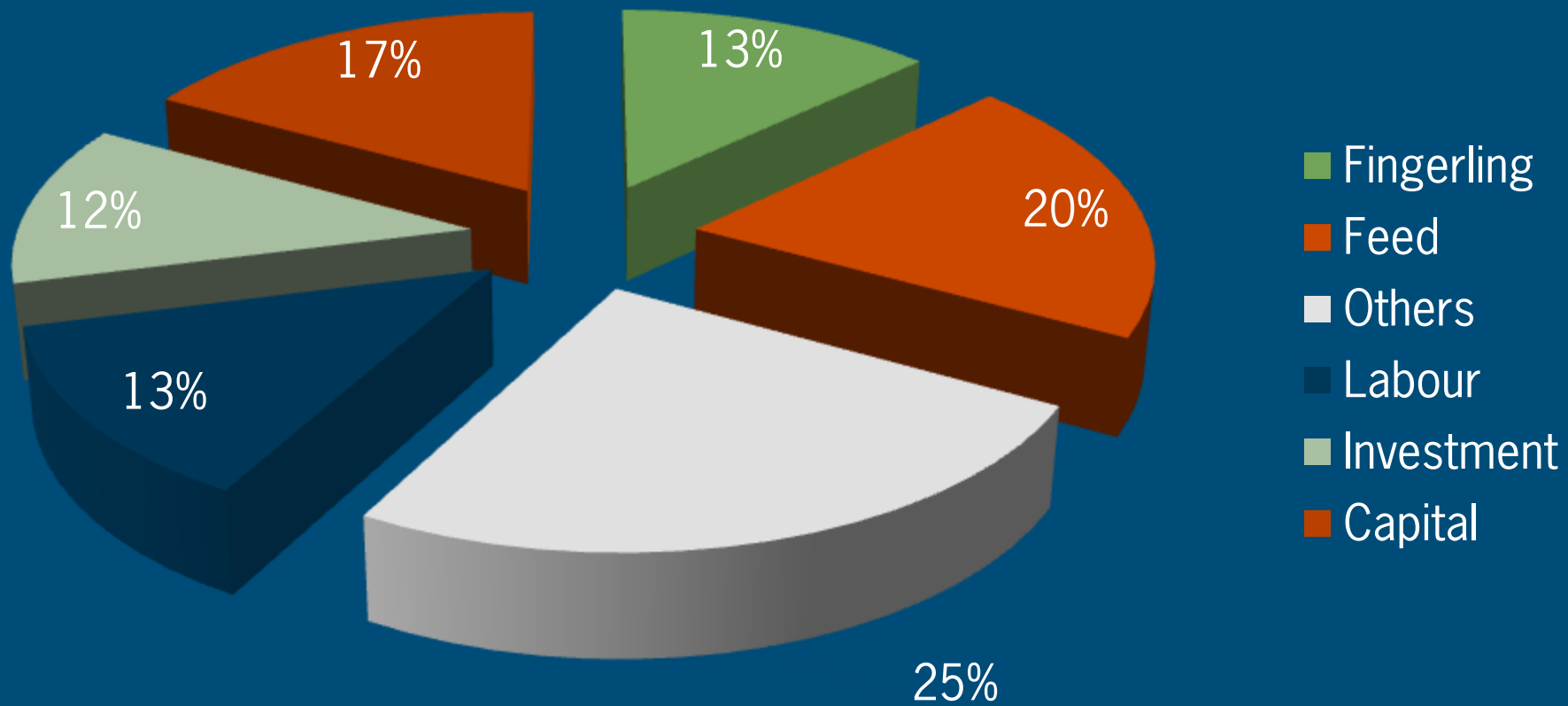
RAS - the Dutch context (production 1000MT)



Sustainability – Economy (no of farms)

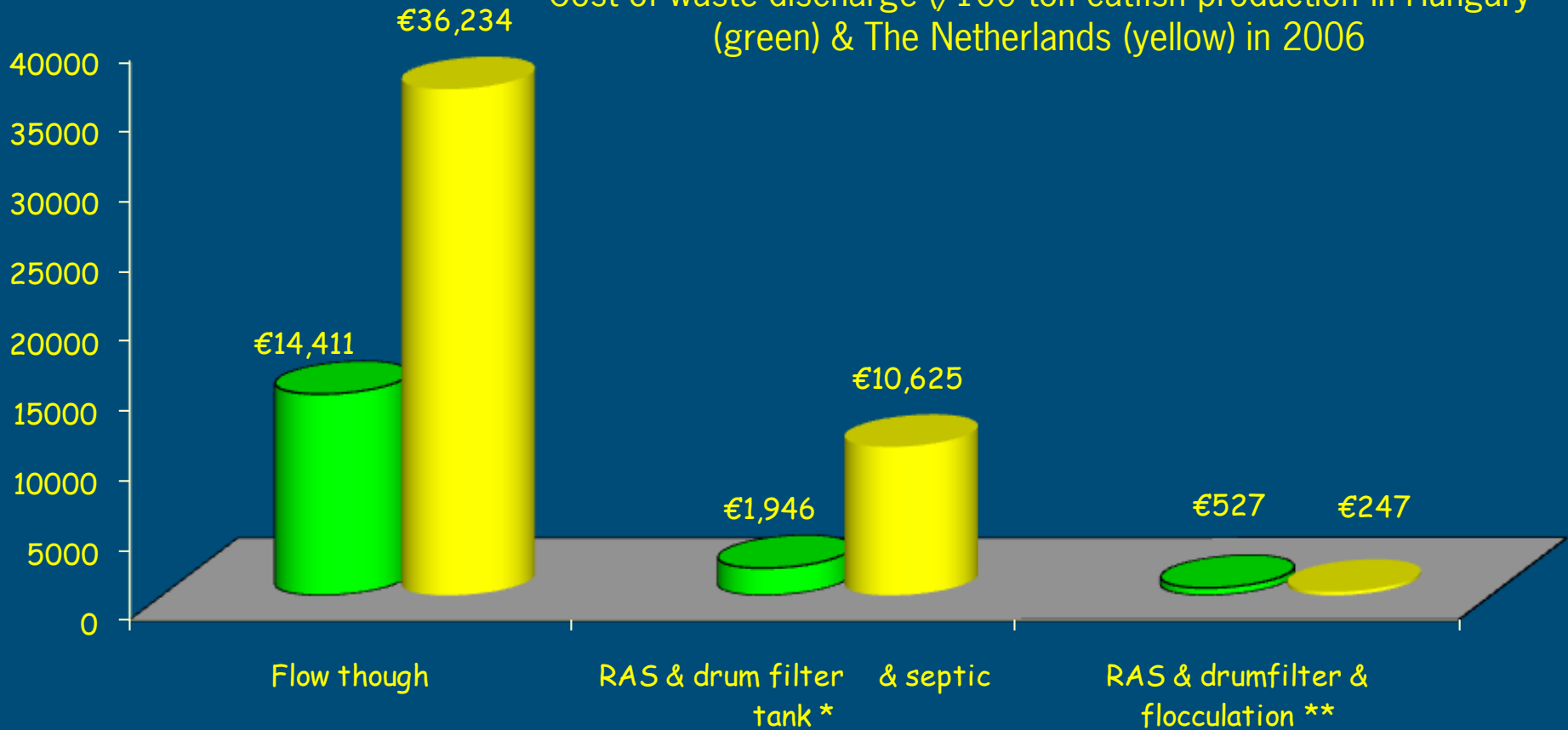


Sustainability – Economy (e.g. turbot)



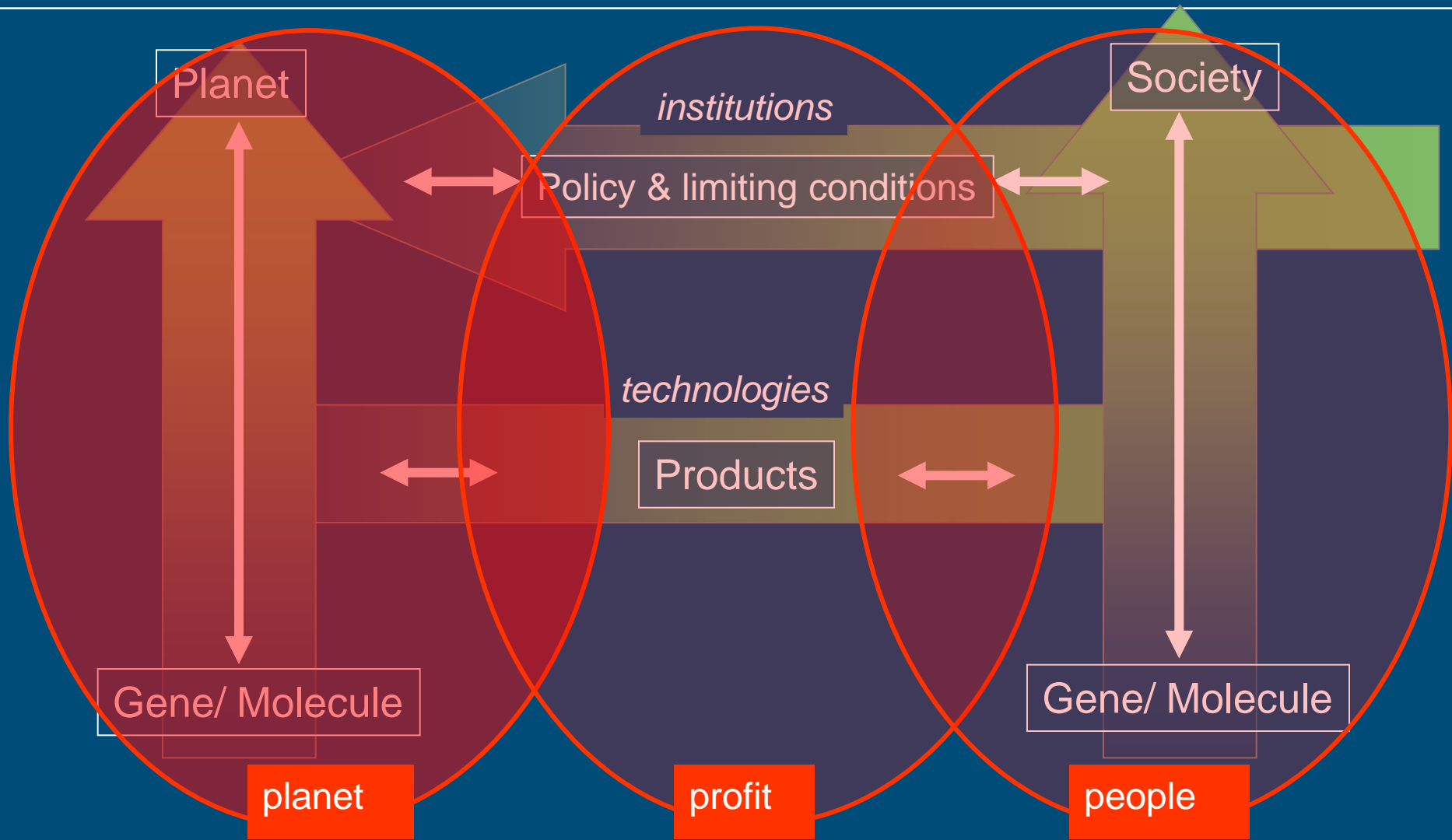
Sustainability – Economy meets Ecology

Cost of waste discharge (/100 ton catfish production in Hungary (green) & The Netherlands (yellow) in 2006

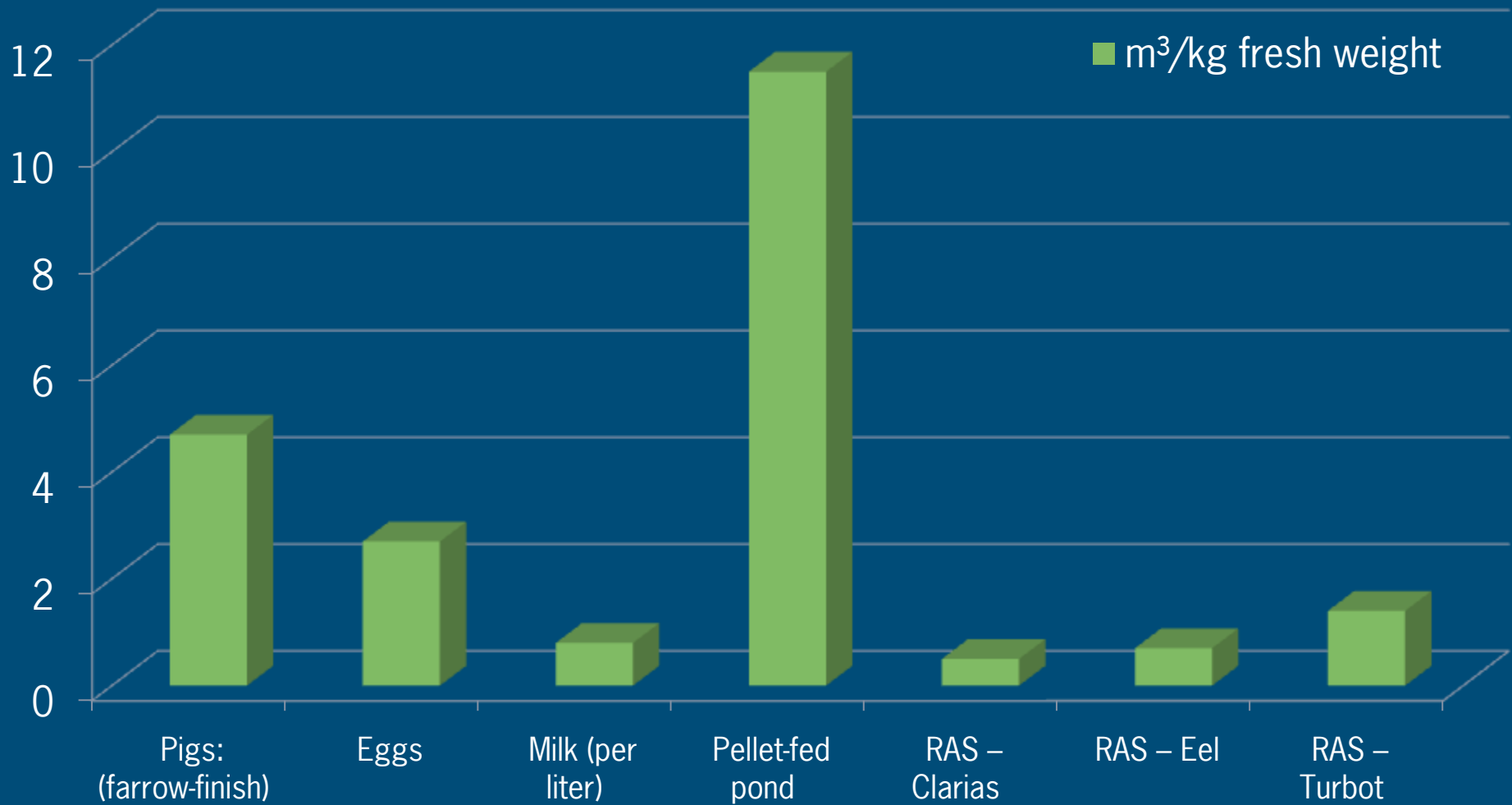


*Based on Kamstra & vd. Heul, 1999, ** based on Ebeling et al., 2005

The Wageningen approach to Sustainability: biological & social



Sustainability – Ecology (water use)



Verdegem et al

IMARES

Sustainability – Ecology (feed/waste manipulation)

Faeces from basal diet

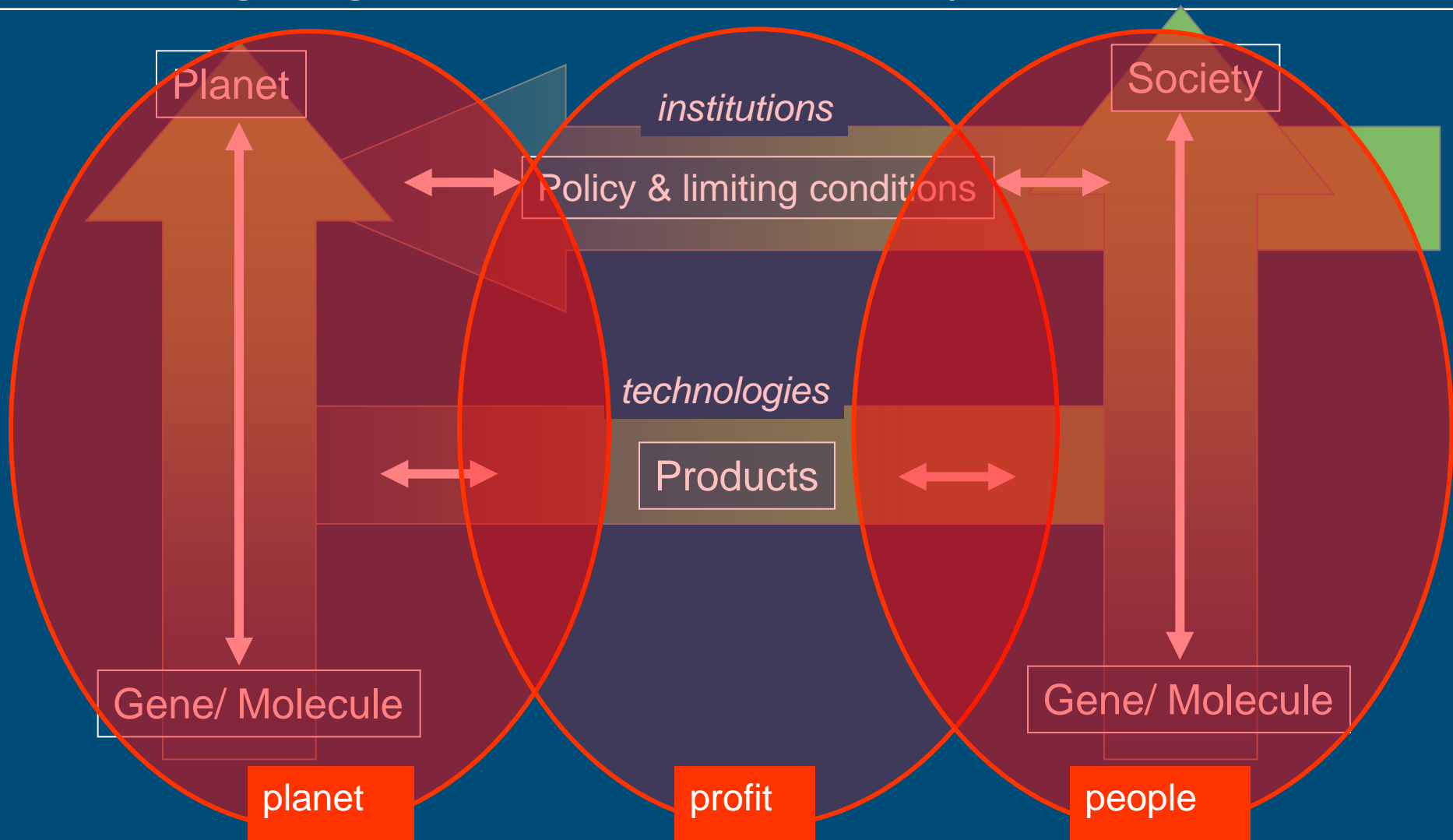


Faeces from modified diet



Courtesy Brinker et al 2010

The Wageningen approach to Sustainability: biological & social





Feed



System



Foot-
print

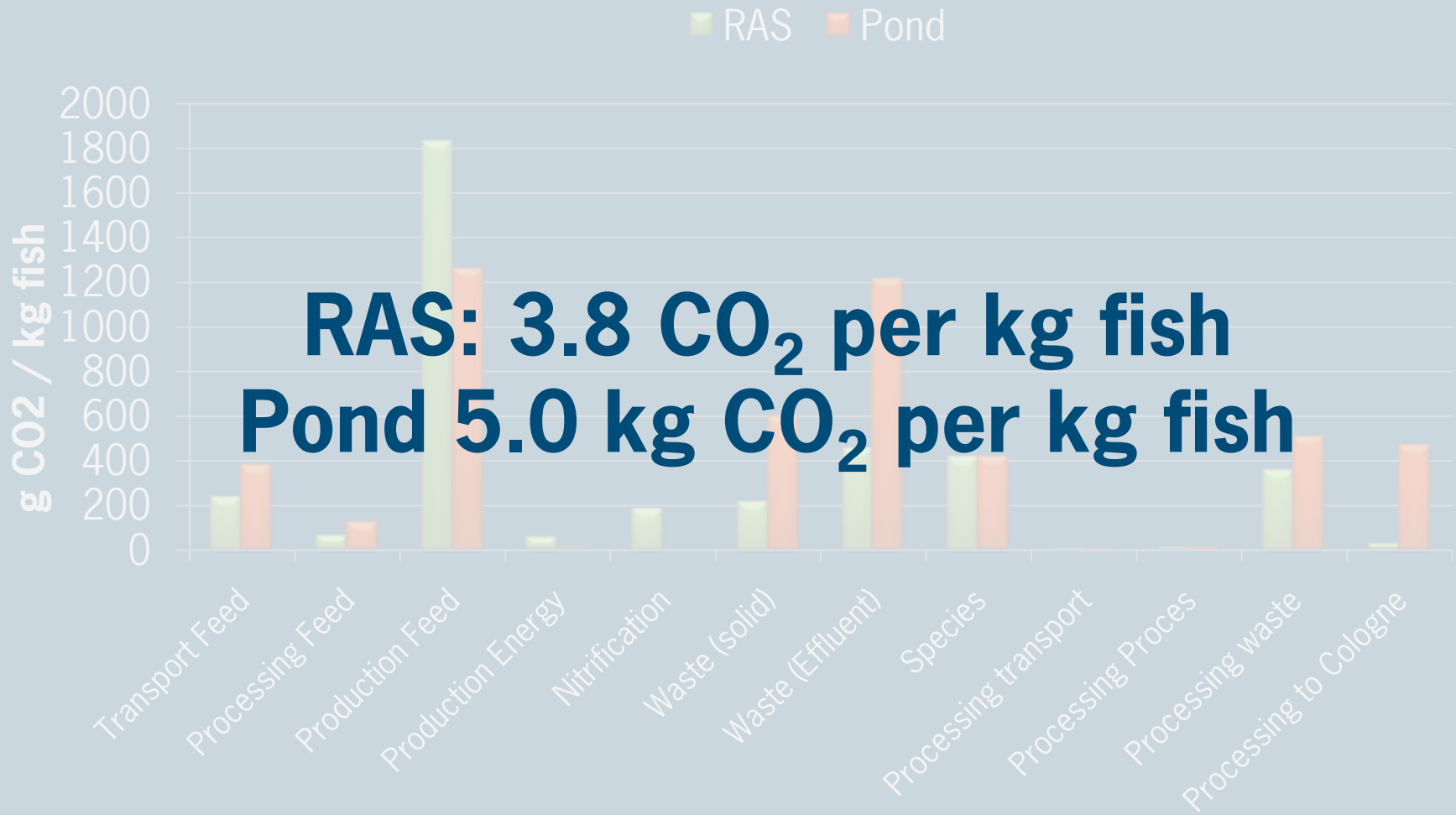


Waste

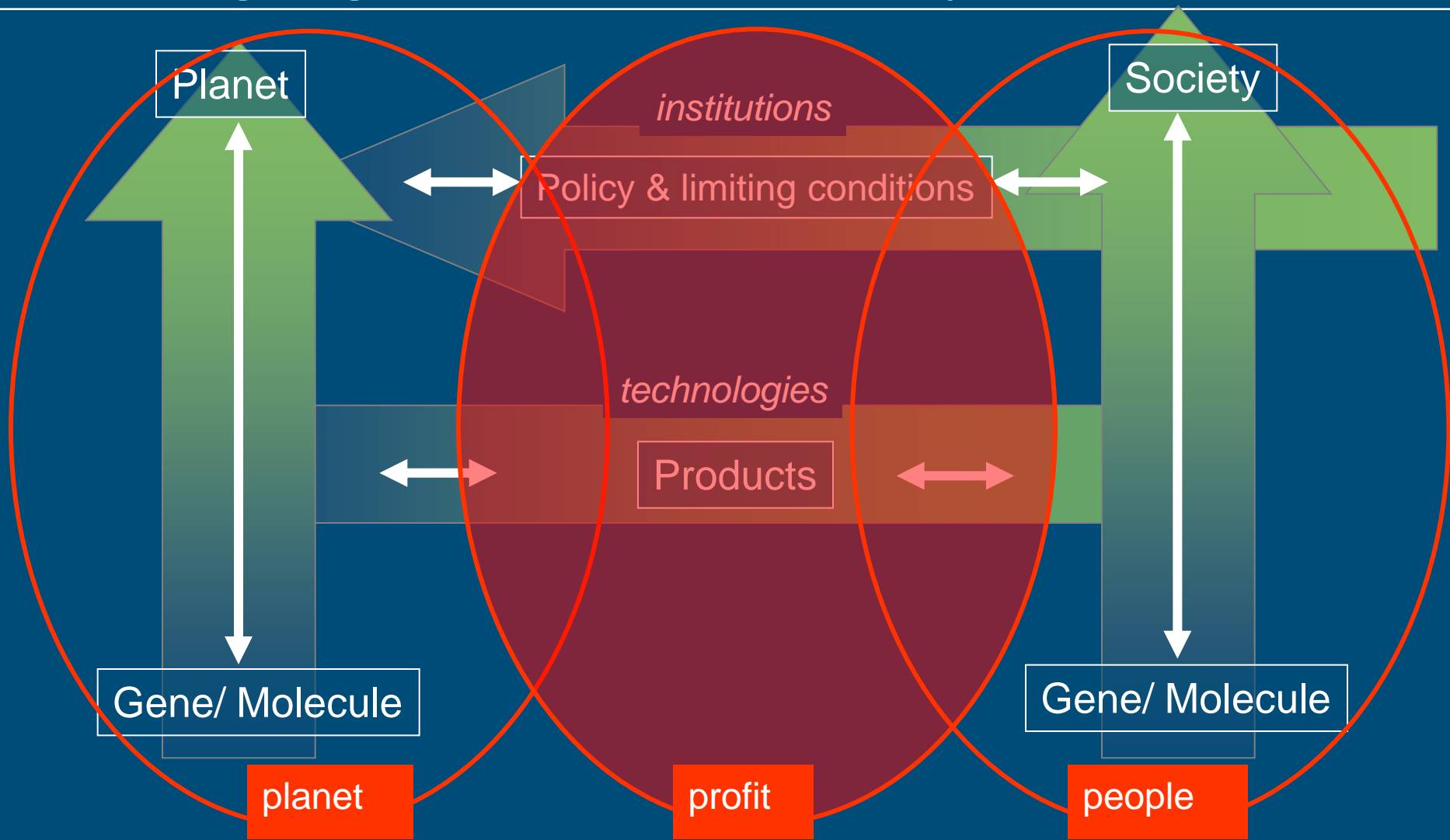


Transport

Sustainability – Ecology (CO₂ Foot print & LCA)



The Wageningen approach to Sustainability: biological & social



Sustainability – Social & Governance

■ Society

- Natural resources (fish meal & oil, seeds, water, energy, food miles)
- Welfare (husbandry, transport, slaughter)
- Stichting Milleukeur, Global GAP, ASC
- Self organization (NeVeVI, NGVA, Future for eel)

■ National Governance

- Rules & Frameworks
- Financial stimulation based on sustainability indicators

■ European Governance & Strategy

- Water directive
- Veterinary directive
- Exotic species directive

Pitfalls, Challenges & Opportunities

African catfish

- ~30 years, no substantial market

Barramundi

- no market, 1st placement inferior quality

Happy Shrimp

- limited market, too high cost price

Tilapia

- not competitive

Pitfalls, Challenges & Opportunities

Profit

- Pangasius, Tilapia, Cod, Turbot, Flounder
- Supermarkets (sustainability & product safety & quality)
- Cost price

Planet

- Resource use
- Waste management

People

- Eel
 - Reproduction & sustainability dialogue
- (Marine) Waste management
- Certifications (GlobalGAP, Aquaculture Stewardship Council)

Pitfalls, Challenges & Opportunities

Species driven

- African catfish → Consolidation
- Claresse → new market
- Eel → dialogue & assessment
- Sturgeon → Caviar → less fisheries & illegal practices
- Sole → product replacement
- Yellowtail kingfish → product replacement
- Worm → pond culture

System driven

- Zeeland Sole → extensive IMTA on land
- Shrimps → Biofloc systems
- Urban RAS
- RAS export (e.g. to Norway, Africa, South America & Asia)

Conclusions

- Dutch aquaculture sector = innovative
- Well structured governance framework
- Stakeholders dialogues & several umbrella organisations
- Instruments in place to develop sustainable sector
 - animal welfare, nutrient emissions, new species, drug use & others
- Some pitfalls & issues, but as well several opportunities

Dutch Seafood for the future?

