

Advances in long-run models

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4th SUSFANS stakeholder core group workshop, Amsterdam Airport Schiphol
06 June 2018

H2020 Research
Grant no. 633692
"SUSFANS"



Advances in long-run models

	GLOBIOM	CAPRI	MAGNET
Supply	Enhanced crop supply specification	Improved yield responses to fertilizer application rates	Differentiated meat sector
	Fish and aquaculture modelling		
Demand		Extended nutrient inventory	Socio-economic detail & nutrition module
	Link to SHARP model (forthcoming)		

Advances in long-run models – importance for analysing sustainable food and nutrition security

- Increased accuracy in sustainability metrics related to agricultural production and env. impacts
- Better capture of diets
- Synergies/ Trade-offs: sustainability and nutrition

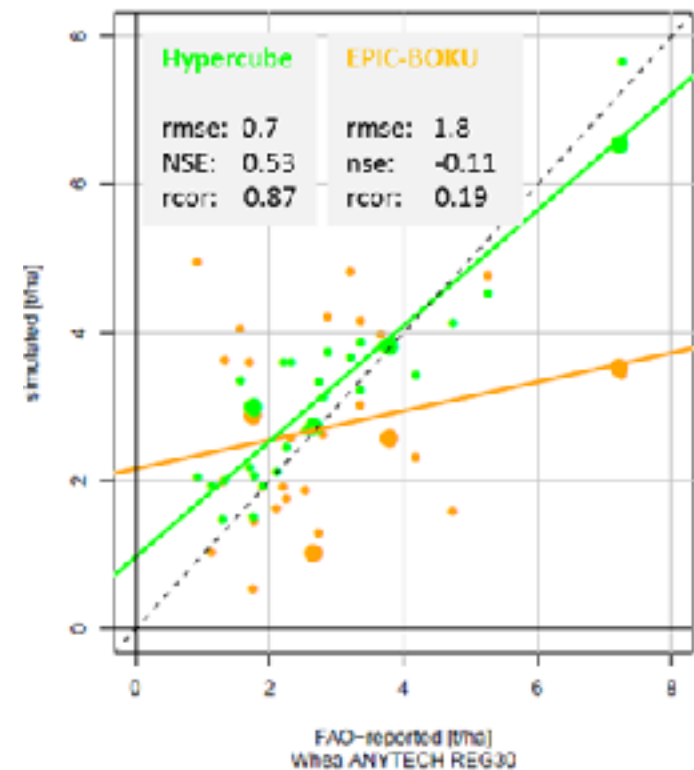
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- Fish part of healthy diet
- Competition for land (feed)
- Preference shift towards seafood

Supply advances in GLOBIOM – Enhanced crop supply specification

- New set of EPIC crop growth simulations (“Hypercube”)
 - better representation of intensification gradients
- Elasticity estimation based on Bayesian Vector Autoregression
 - renewed crop supply elasticities governing crop expansion

c) Fit to FAO: Hypercube vs. EPIC-BOKU (Wheat)



Source: Heckeley et al. 2018

Supply advances in GLOBIOM – Enhanced crop supply specification

- Calibration procedure revised
- model outputs aligned with reported cropping pattern statistics

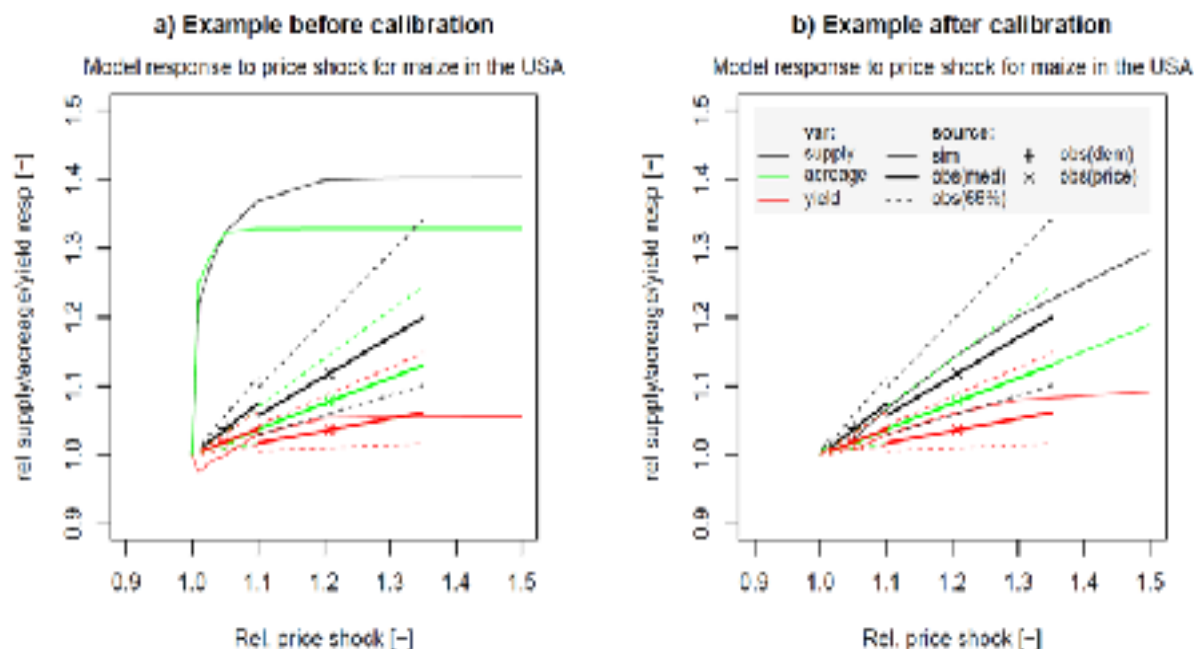
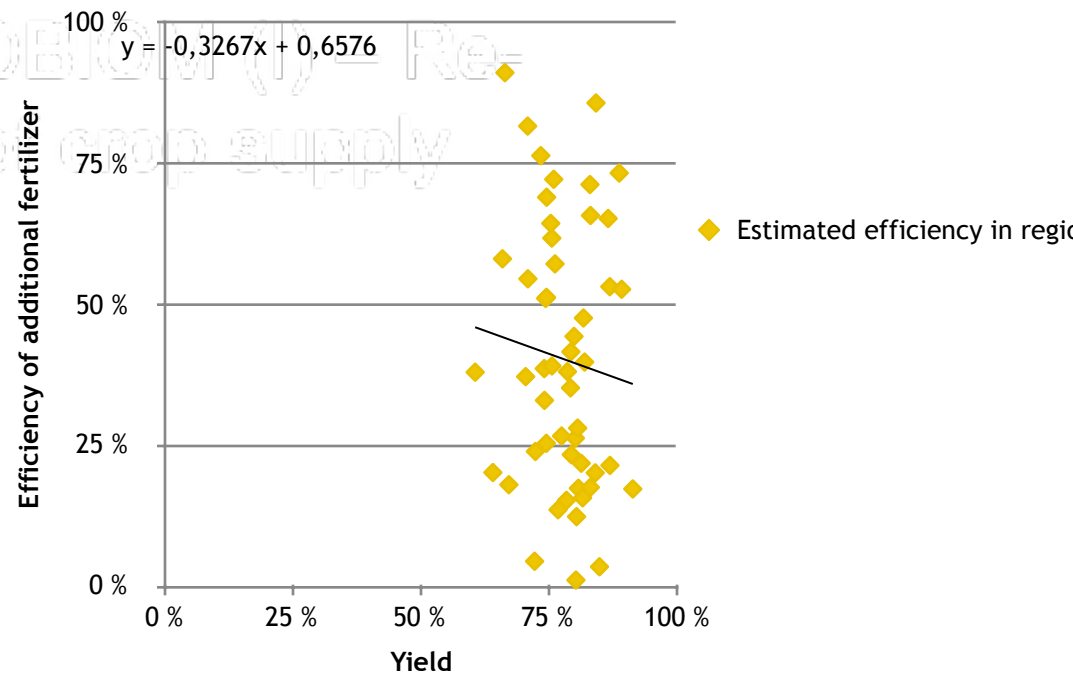


Illustration of
calibration results
for the case of USA

Source: Heckeley et al. 2018

Supply advances in CAPRI – Improved yield responses

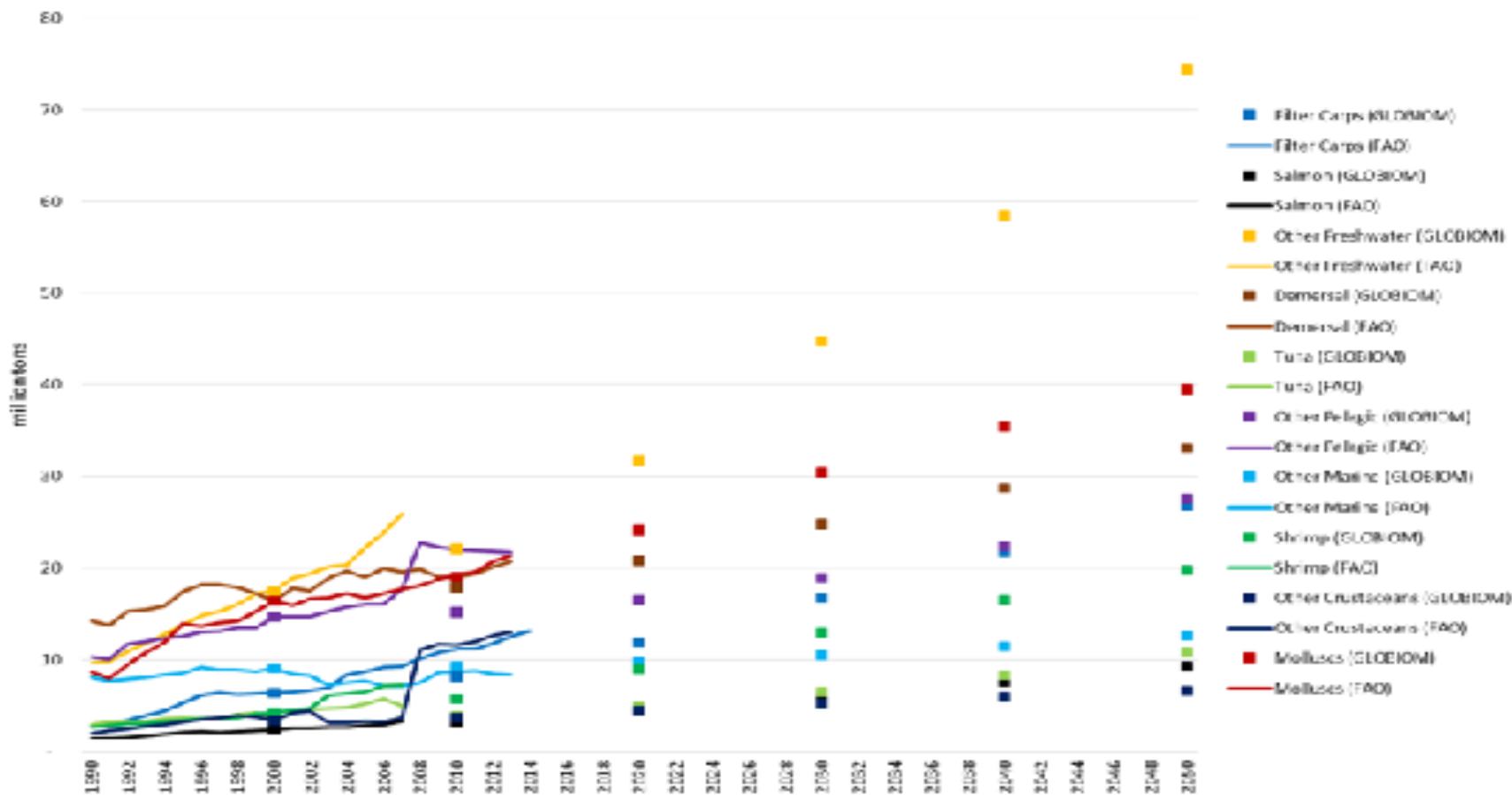
- Yield technology specification in CAPRI revised depending on regional yield gaps observed
- Improved yield response to fertilizer application rate



Source: Heckeley et al. 2018

Supply advances in GLOBIOM – Fish and aquaculture modelling

Historical Fish Food Use Data (FAO) and Calibration of Future Food Demand Estimates (GLOBIOM)

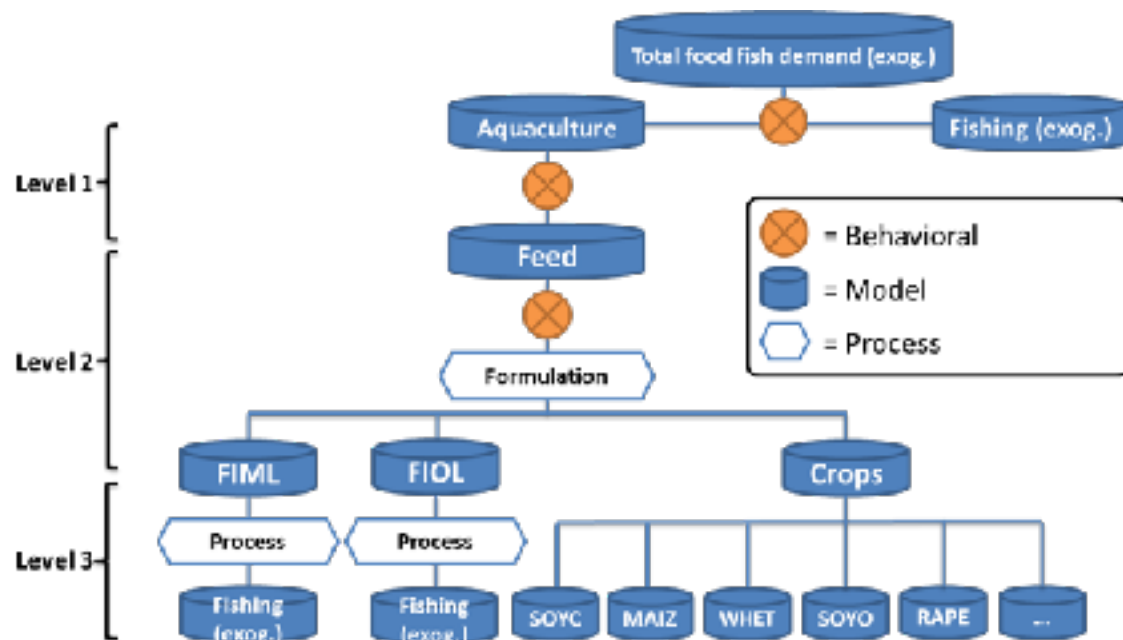


Source: Heckeley et al. 2018

Supply advances in CAPRI – Fish and aquaculture modelling

- Inclusion of aquaculture in CAPRI database

Conceptual framework of the CAPRI fish module

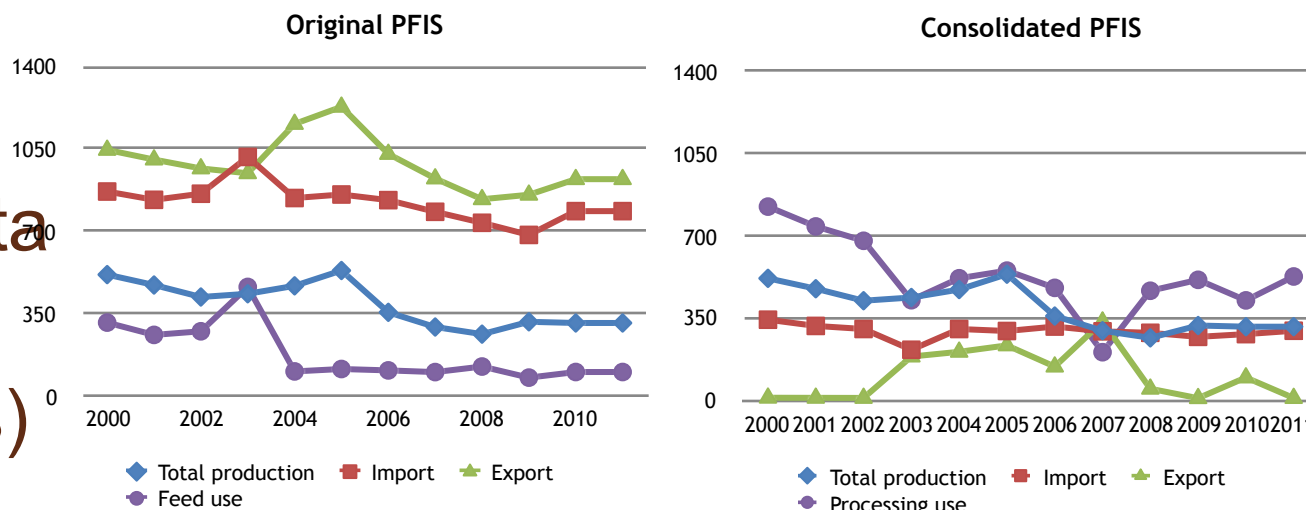


Source: Chang et al. 2018

Supply advances in CAPRI – Fish and aquaculture modelling

- Overcoming inconsistencies between data sources (FAOSTAT FBS and FAO FISHSTAT)

Original and consolidated pelagic fish data of Denmark (thousand tons)



Source: Chang et al. 2018

Supply advances in MAGNET – Differentiated meat and fish sectors

- Differentiation of primary and processed livestock sectors
- Extended fish sector representation
 - Wild catch
 - Aquaculture
 - Fish processing sectors
 - Feed (explicitly modelled)
 - Competition for feed between aquaculture and cattle sectors

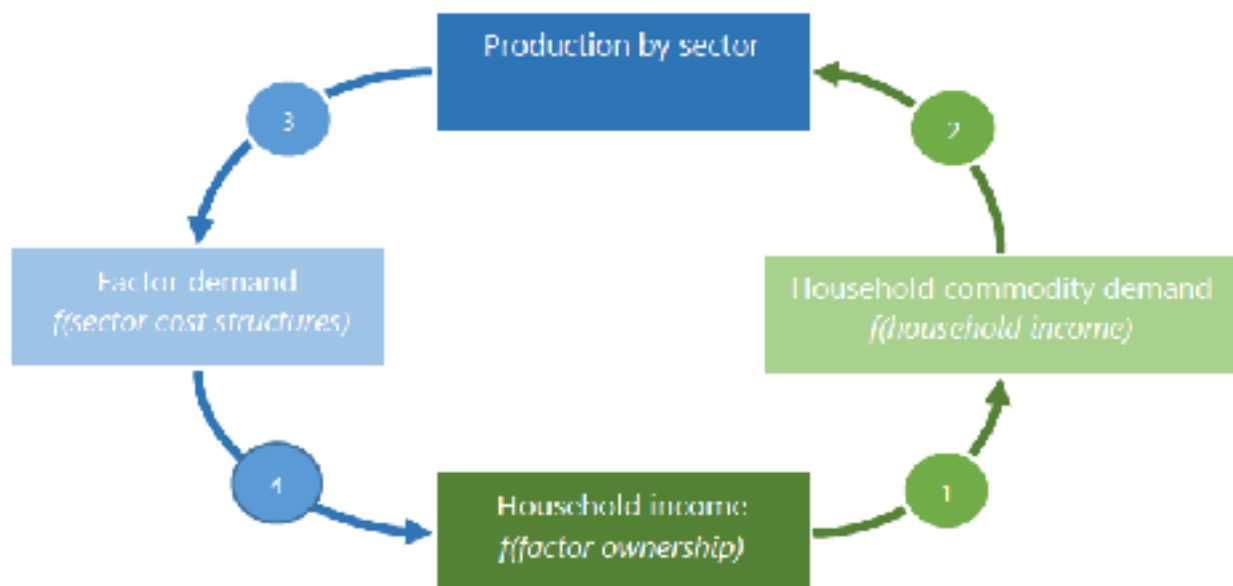
Demand advances in CAPRI – Extended nutrient inventory

- Reported as daily intakes per capita
- Based on commodity nutrient data from the USDA Food Composition Database

	Added
<ul style="list-style-type: none"> • Calories • Protein • Fat 	<ul style="list-style-type: none"> • Fiber • Sugar • Calcium • Iron • Magnesium • Potassium • Sodium • Zinc • Selenium • Vitamins (A, C, D, E, B1, B2, B6, B12) • Folate • Saturated fatty acids • Mono-unsaturated fatty acids • Poly-unsaturated fatty acids

Demand advances in MAGNET – Socio-economic detail

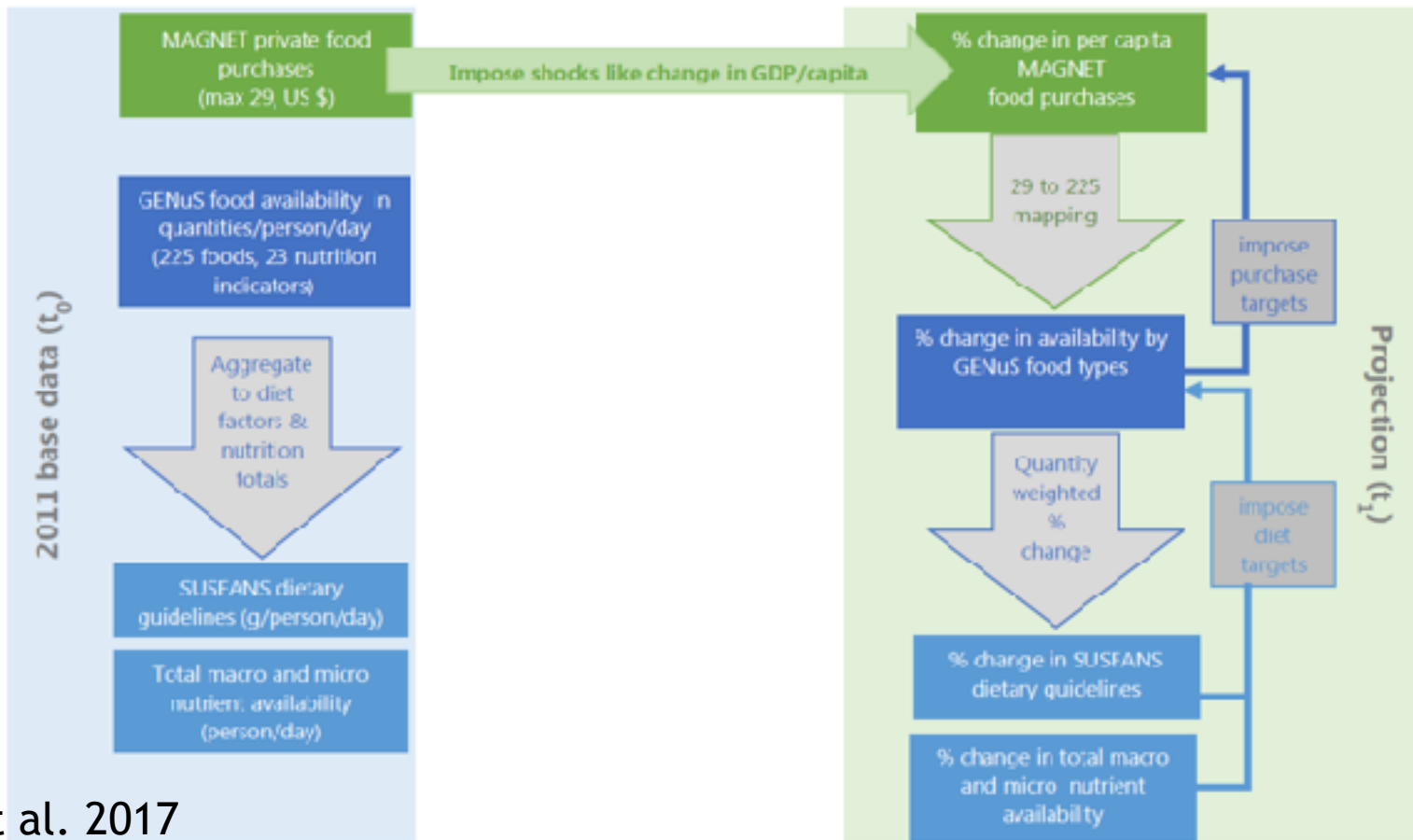
- Adding a household layer to MAGNET using micro data
- Direct link from macro variables to micro level impact



Source: Kuiper et al. 2017

Demand advances in MAGNET – Nutrition module

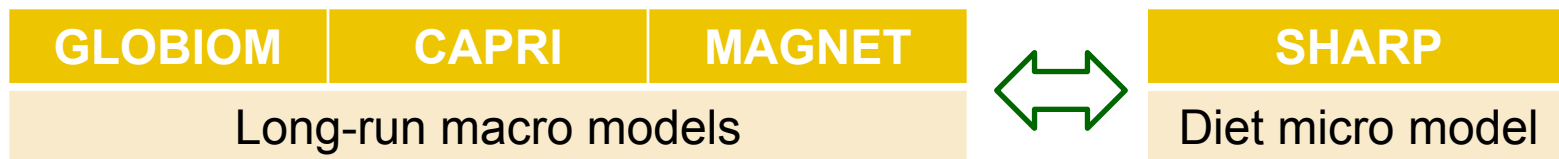
GENuS nutrition module: to assess nutrition of diets and constrain purchases



Source: Kuiper et al. 2017

Advances in all long-run models – Ongoing work

- Fish and aquaculture modelling
 - Trade of fish and aquaculture products
 - Policy simulations and foresight (e.g. maximum sustainable yield)
- Link to SHARP model



Pillar 2 Paper – a joint activity of SUSFANS and AGCLIM50 II

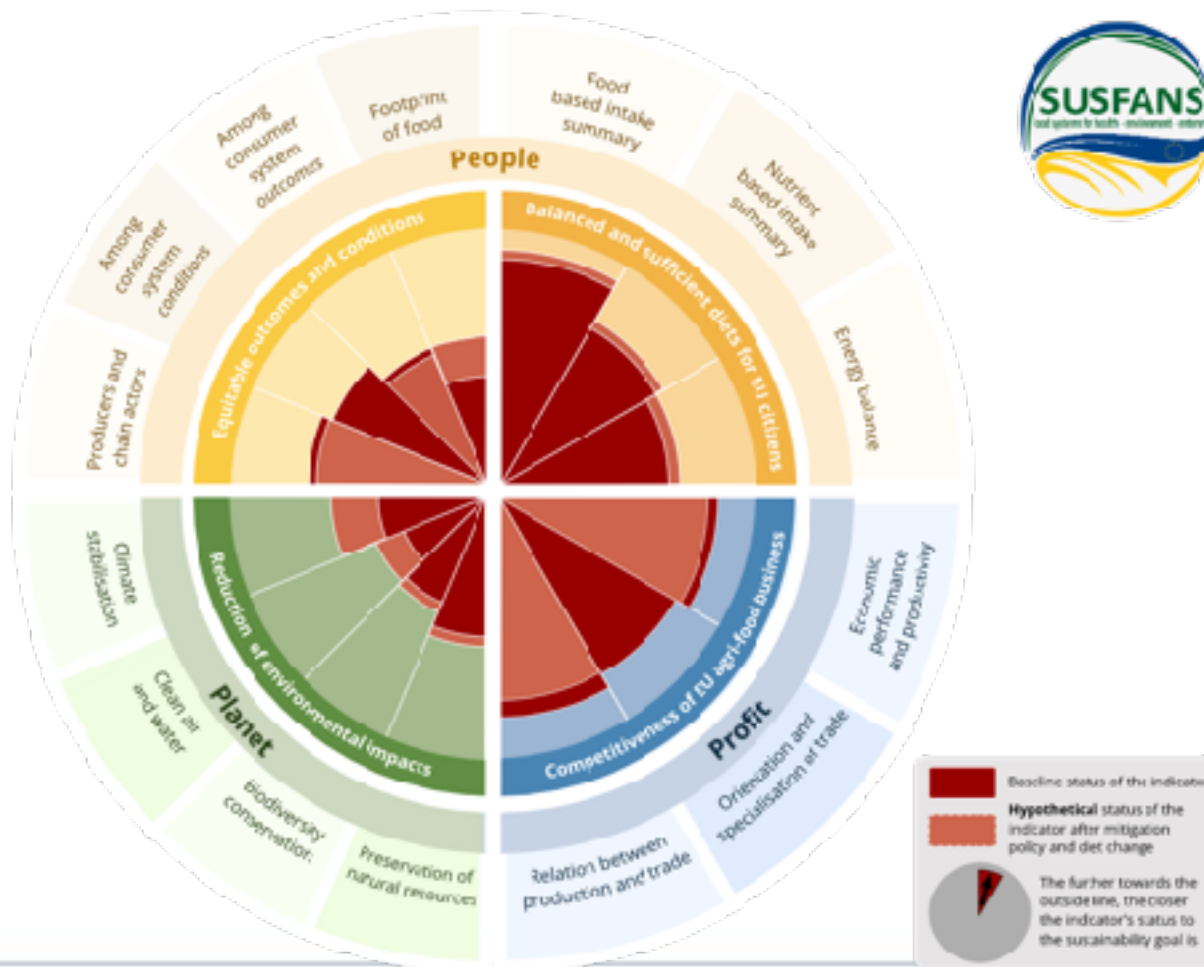
- Recent AGCLIM50 II activities

GLOBIOM	CAPRI	MAGNET	IMAGE		
Business as usual (SSP2)					
6 mitigation scenarios				Carbon prices	↑ Non-CO ₂ GHGE ↓
1 diet scenario				max. animal kcal	↓ Non-CO ₂ GHGE ↓

Pillar 2 Paper – a joint activity of SUSFANS and AGCLIM50 II

- Idea: Understand trade-offs and complementarities between Climate Change mitigation and diet preference shift regarding sustainability impacts
- Here comparison between baseline and combination of strongest mitigation with diet shift
- Diet shift: imposing recommendation (USDA, 2015) → 428 calories of animal products

Pillar 2 Paper – a joint activity of SUSFANS and AGCLIM50 II



- Chang, C.-Y., Witzke, H.-P., Latka, C. 2018. A Model for Data Consolidation of the Fish Market in CAPRI. To be presented at 30th International Conference of Agricultural Economists, Vancouver, July 28th – August 2nd 2018.
- Heckelei, T., Batka, M., Chang, C.-Y., Havlík, P., Kuiper, M., Latka, C., Leclere, D., Tamas, L., 2018. Enhanced modelling of sustainable food and nutrition security: food supply and use of scarce resources. Deliverable 9.3 of the SUSFANS project H2020 / SFS-19-2014: Sustainable food and nutrition security through evidence based EU agro-food policy, GA no. 633692.
- Kuiper, M., Oudendag, D., Bartelings, H., Shutes, L., Verma, M., Tabeau, A., 2017. Enhanced modelling of sustainable food and nutrition security: food consumption and nutrition behaviour of European households. Deliverable 9.2 of the SUSFANS project H2020 / SFS-19-2014: Sustainable food and nutrition security through evidence based EU agro-food policy, GA no. 633692.