Socio-economic drivers and plausible developments under alternative global futures

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MEGATRENDS, SOSIOECON. DEV.

Global population growth

Urbanization

Technological development, digitalization

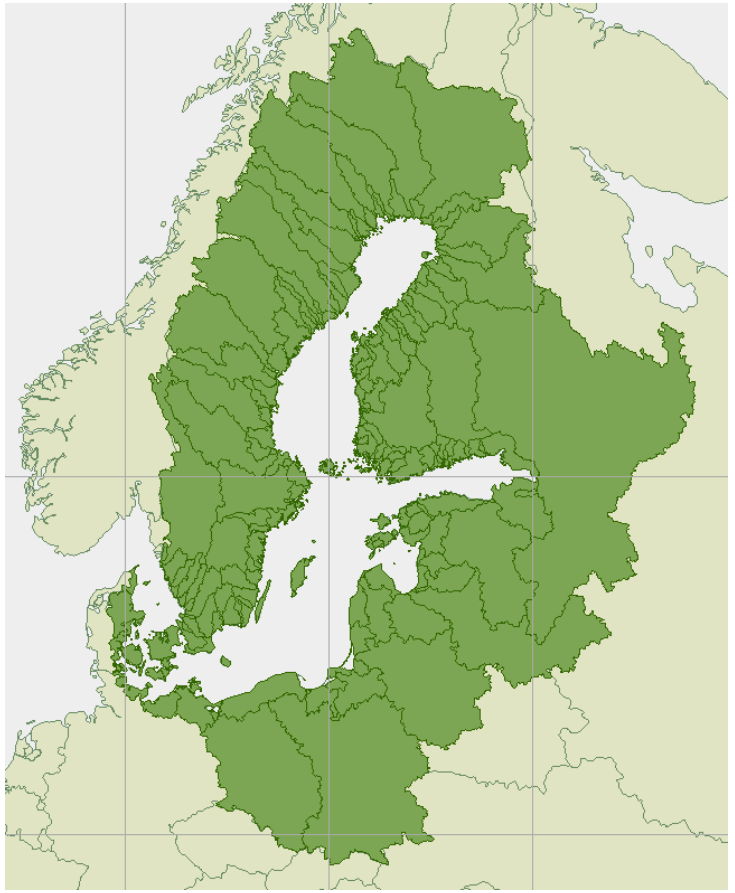
Consumption patterns, life styles

MULTIPLE PRESSURES

Nutrient loads

Fisheries

Hazardous substances, Plastic, pharmaceut.

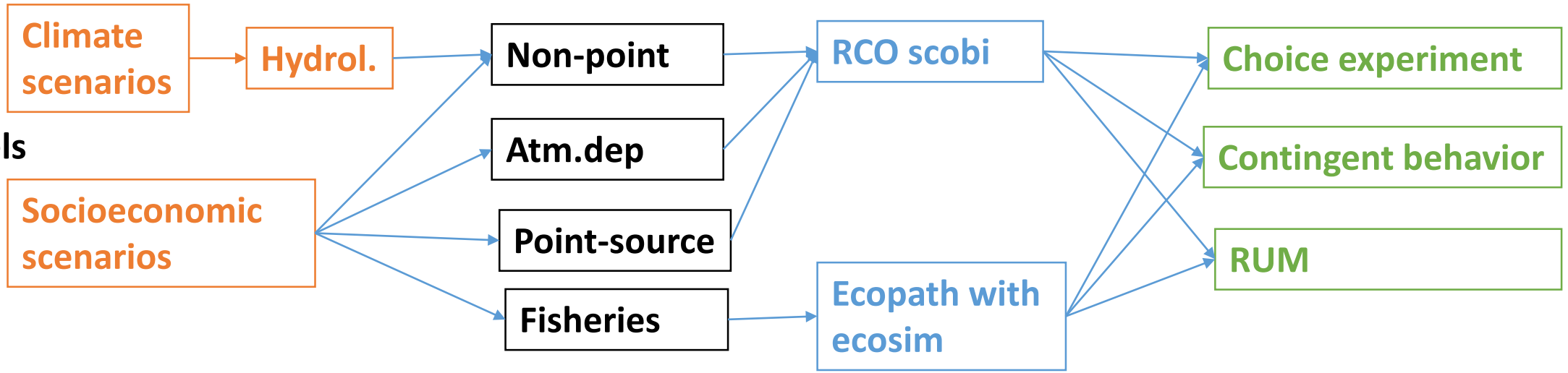


Source: Baltic NEST

Integrated modelling as the tool to describe the causal human-nature-human interactions

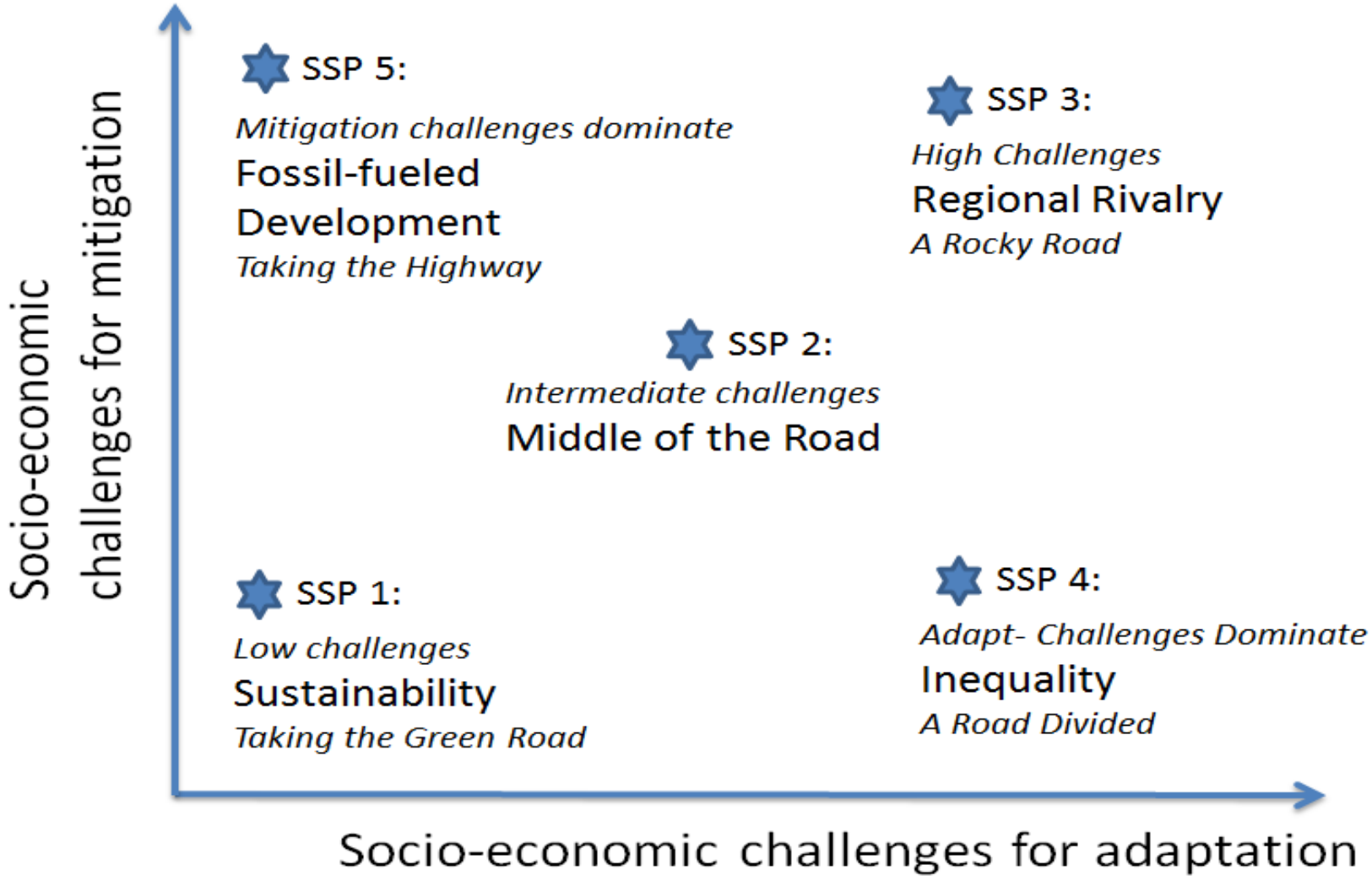
Causal framework

Data & models

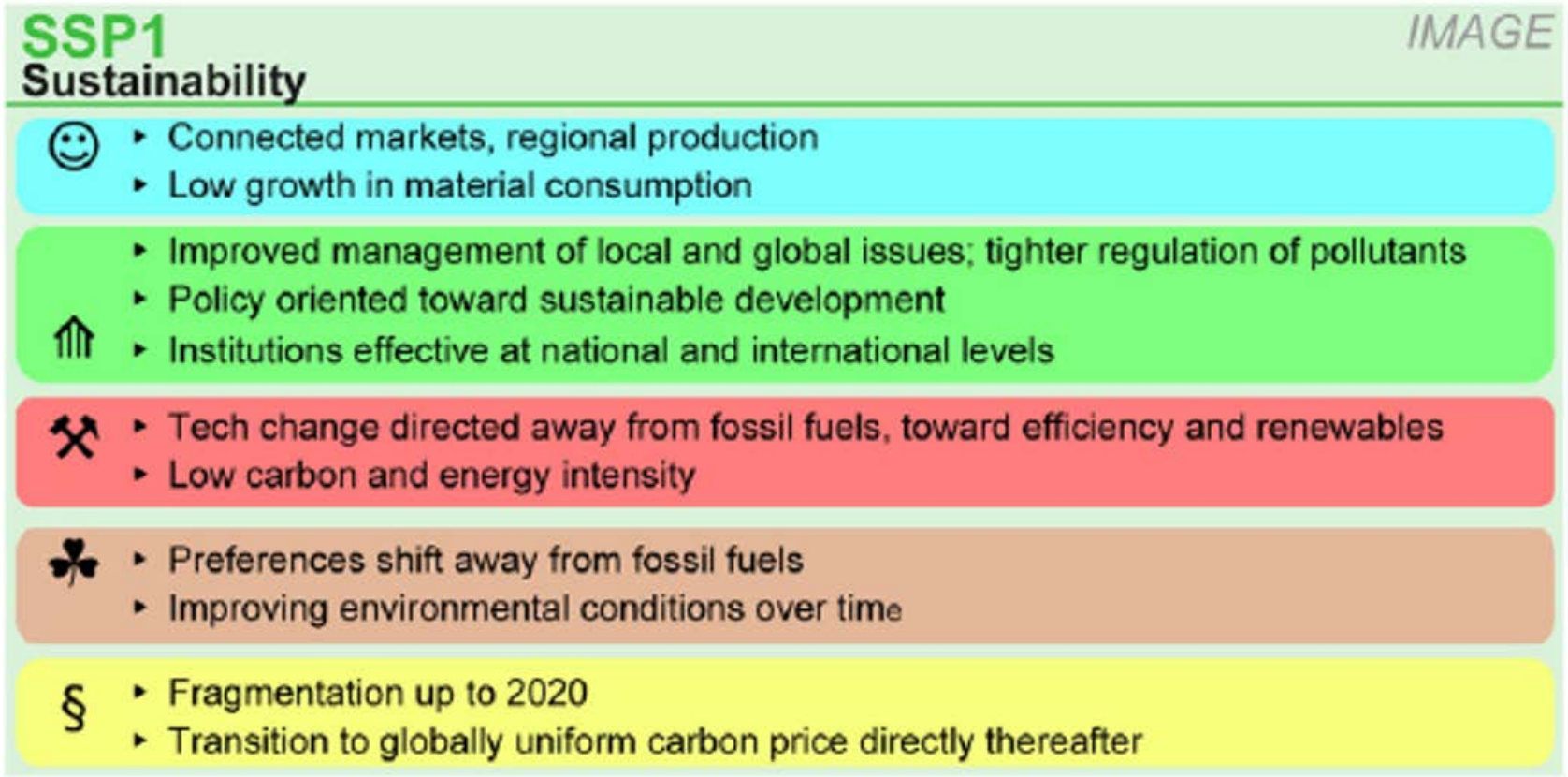


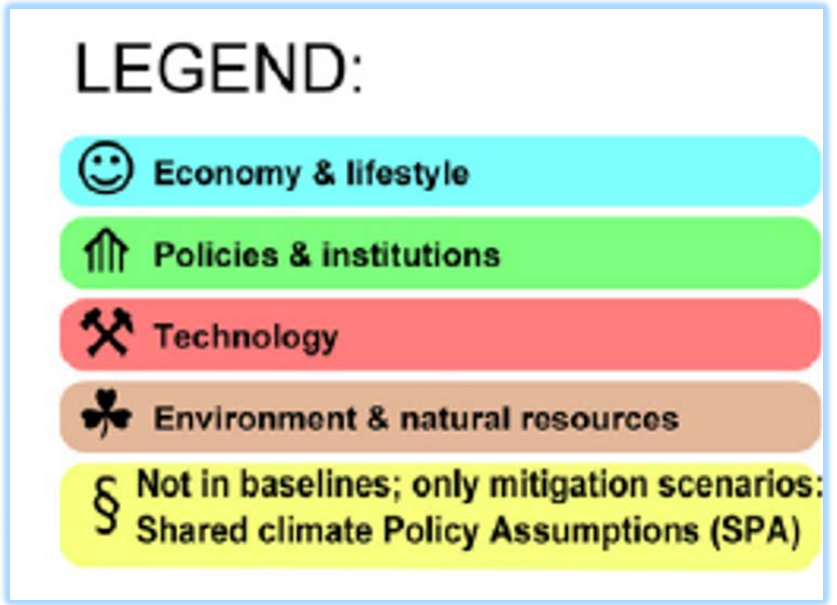
What tools/results are available, global scale?

Shared socioeconomic pathways

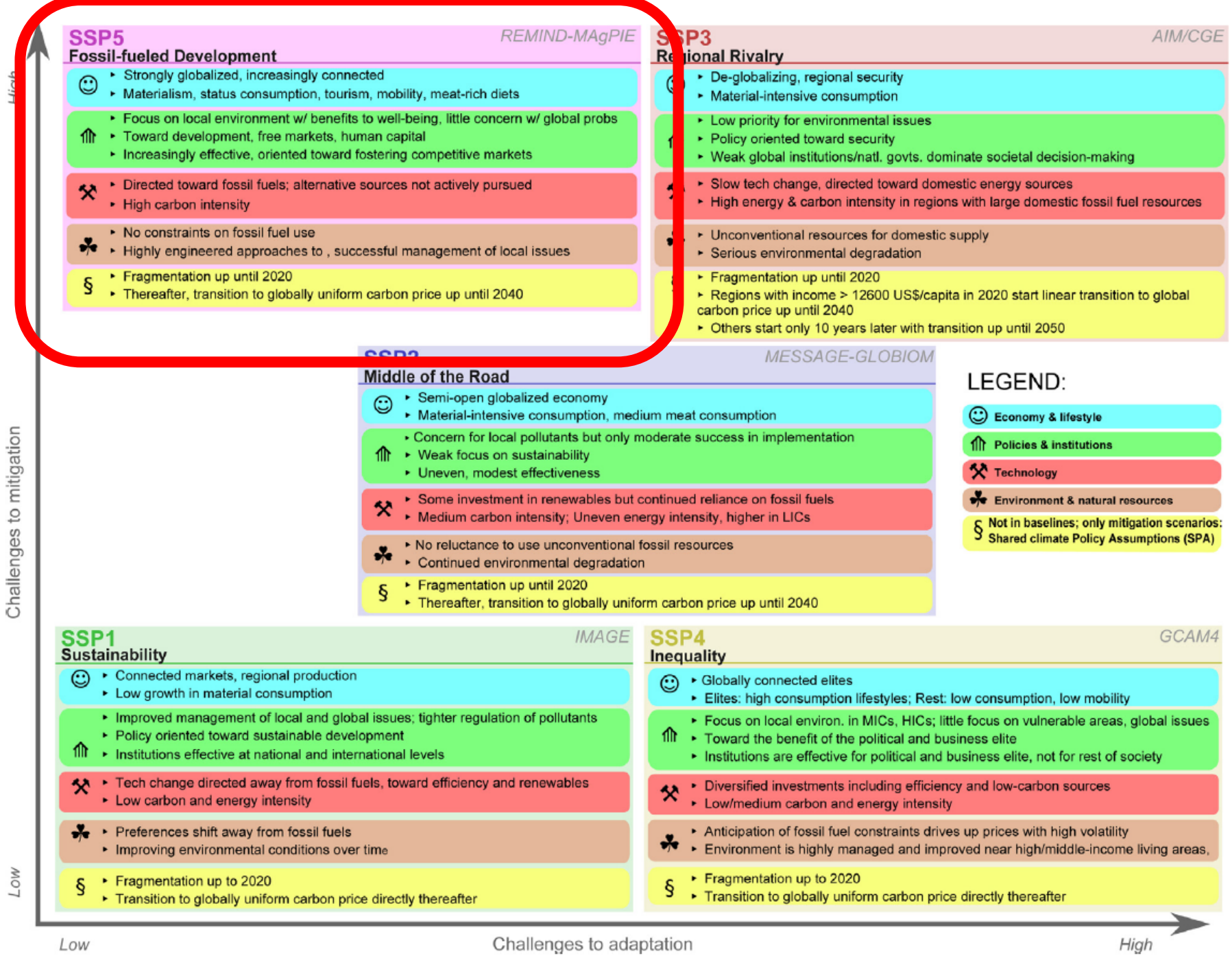


Source: Bauer et al. 2016





Source: Bauer et al. 2016



Source: Bauer et al. 2016

SSP5
Fossil-fueled Development

REMIND-MAgPIE

- Strongly globalized, increasingly connected
- Materialism, status consumption, tourism, mobility, meat-rich diets

- Focus on local environment w/ benefits to well-being, little concern w/ global probs
- Toward development, free markets, human capital
- Increasingly effective, oriented toward fostering competitive markets

- Directed toward fossil fuels; alternative sources not actively pursued
- High carbon intensity

- No constraints on fossil fuel use
- Highly engineered approaches to , successful management of local issues

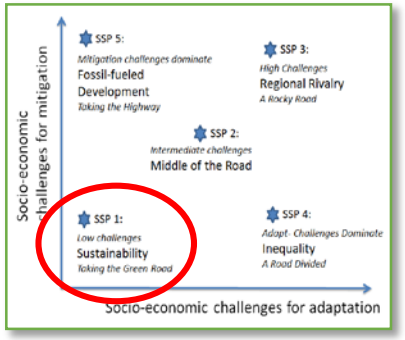
§
- Fragmentation up until 2020
- Thereafter, transition to globally uniform carbon price up until 2040

LEGEND:

- Economy & lifestyle
- Policies & institutions
- Technology
- Environment & natural resources
- § Not in baselines; only mitigation scenarios: Shared climate Policy Assumptions (SPA)

Extending global narratives at Baltic Sea scales

SSP1 - Sustainability

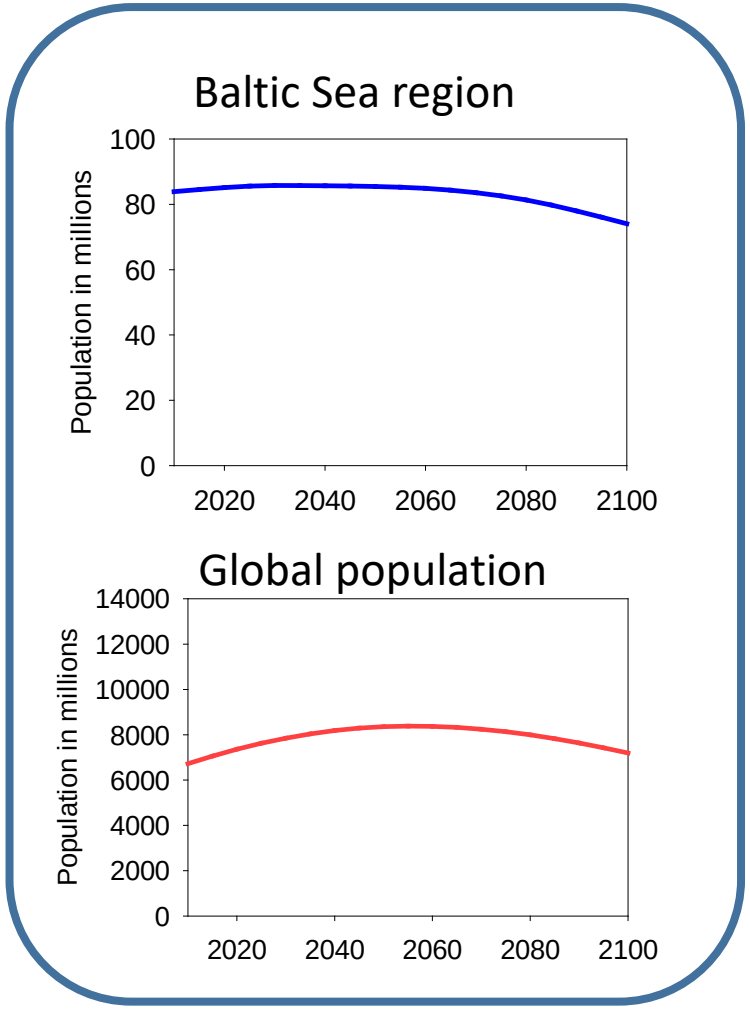


- Increased plant based diet
- High N efficiency, high share local & organic produce
- Reduced agricultural land cover & livestock

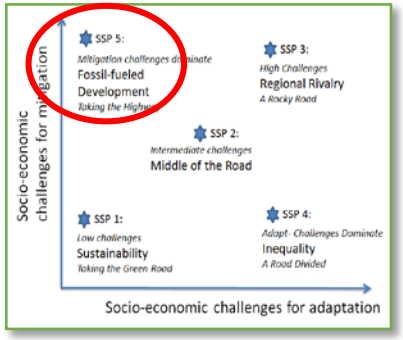
- Tertiary treatment becomes the standard in sewege treatment
- Separation of rainwater and sanitation
- Advanced on-the-site treatment common in rural areas

- Tourist shipping increases, bulk and oil shipping decrease
- Electrification in short sea shipping becomes a standard
- Emission of grey water, black water and waste discontinue

- Sustainable fisheries with high quality products
- Circular economy in aquaculture
- Small-scale, low impact fishes promoted; avoidance of habitat damaging gear and bycatch



SSP5 - Fossil-fueled development

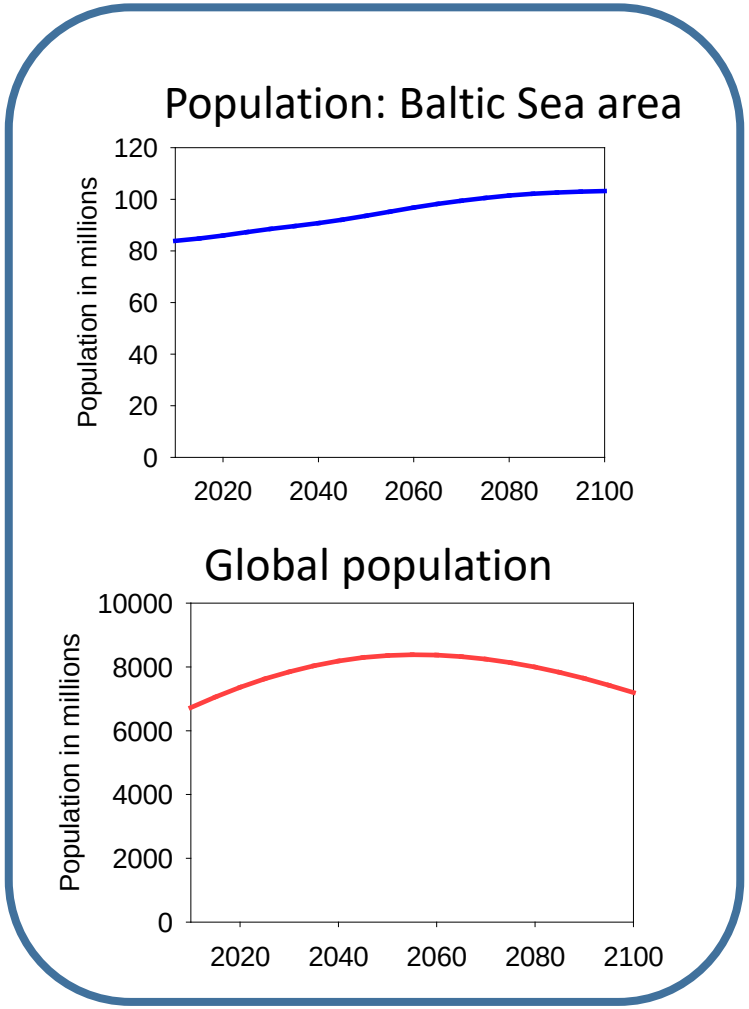


- Increased meat and dairy in diet
- Globalised, export oriented sector, intensification
- Increased livestocks => expansion of agricultural land cover

- New investments made to serve growing urban areas
- focus on human health rather than environmental quality
- Some upgrading due to technology spill-overs

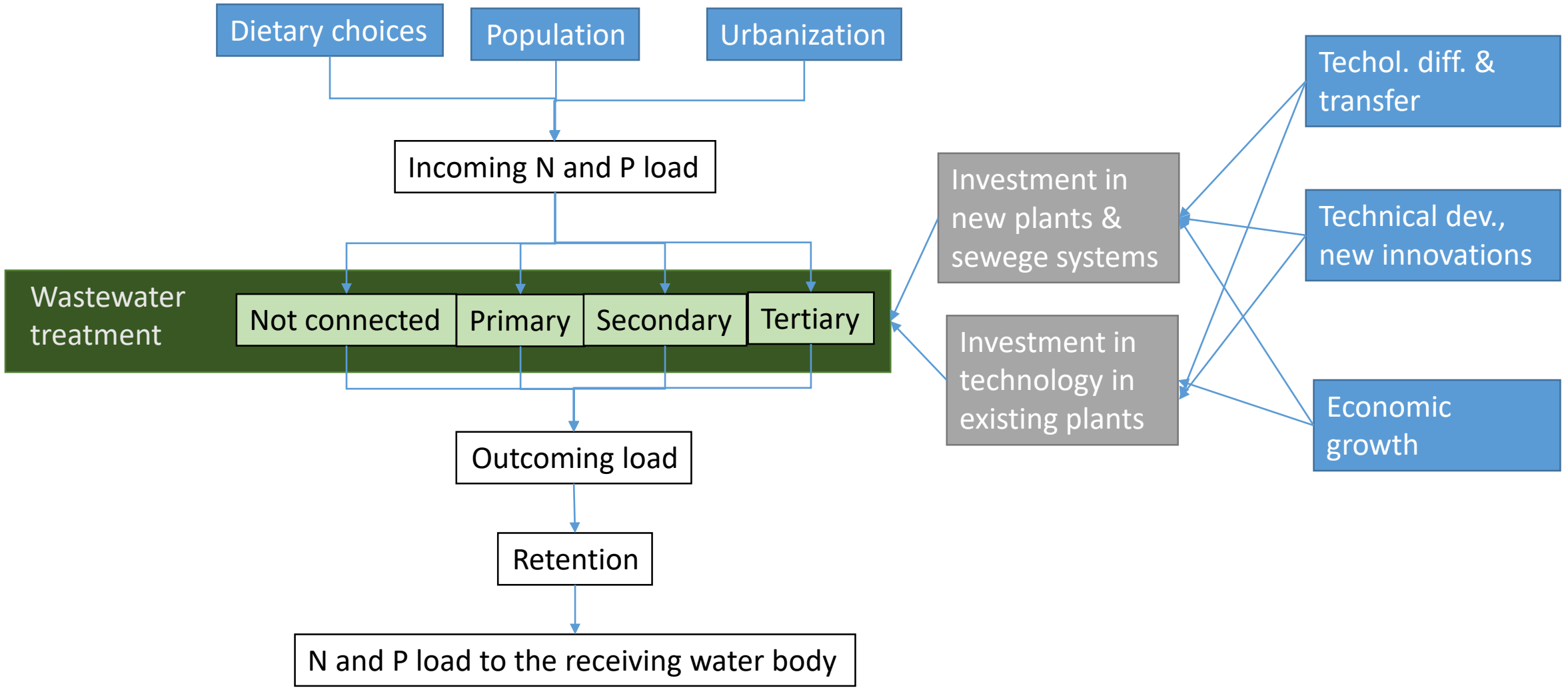
- Fast increase in shipping industry, both tourist shipping and in particular oil & bulk shipping
- The emissions to the water and air increase

- Large-scale fishing focusing on maximising profits
- Habitat destructive gear and bycatch allowed
- Industrial scale development of freshwater and marine aquaculture with no nutrient focus



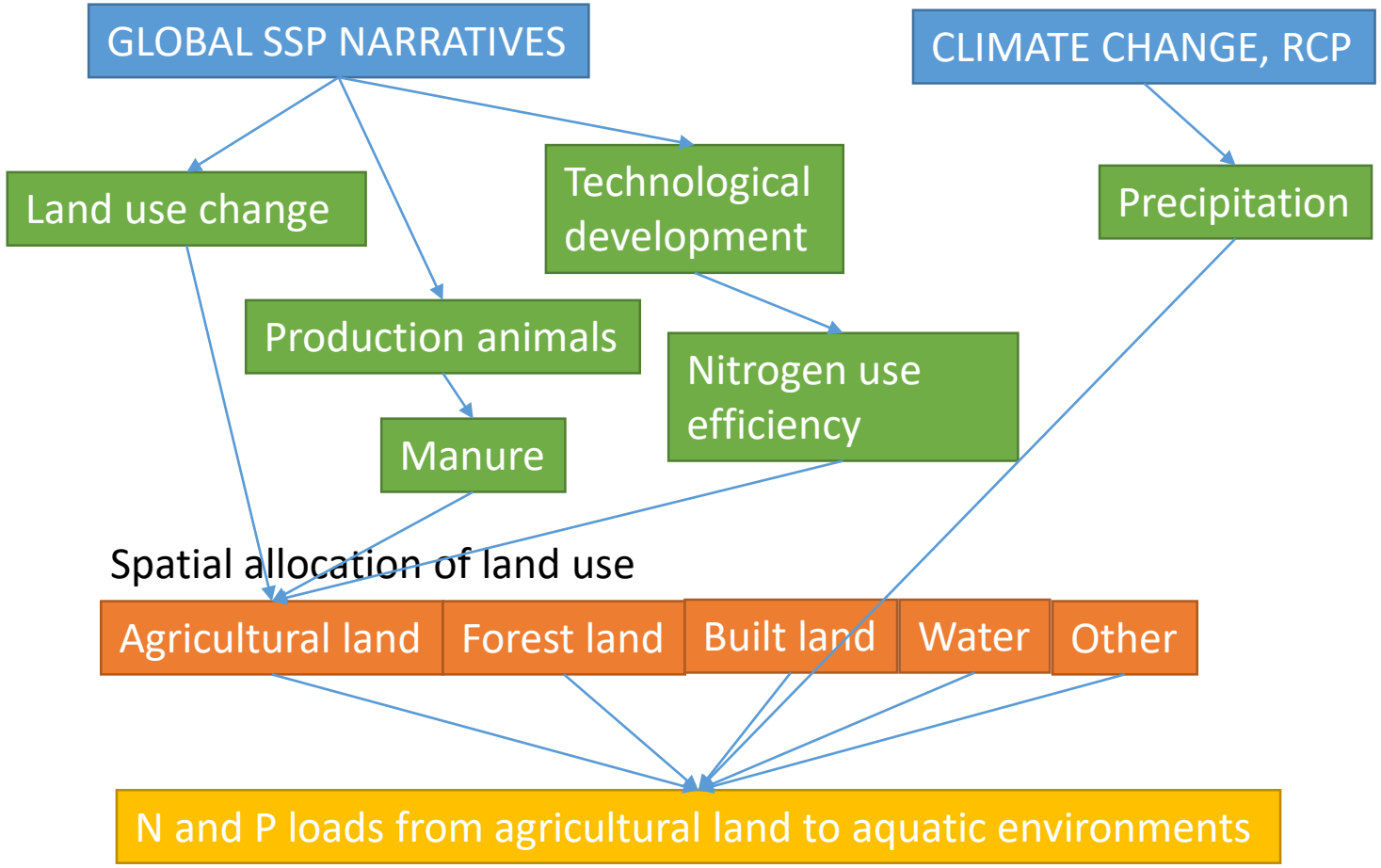
From qualitative to quantitative:

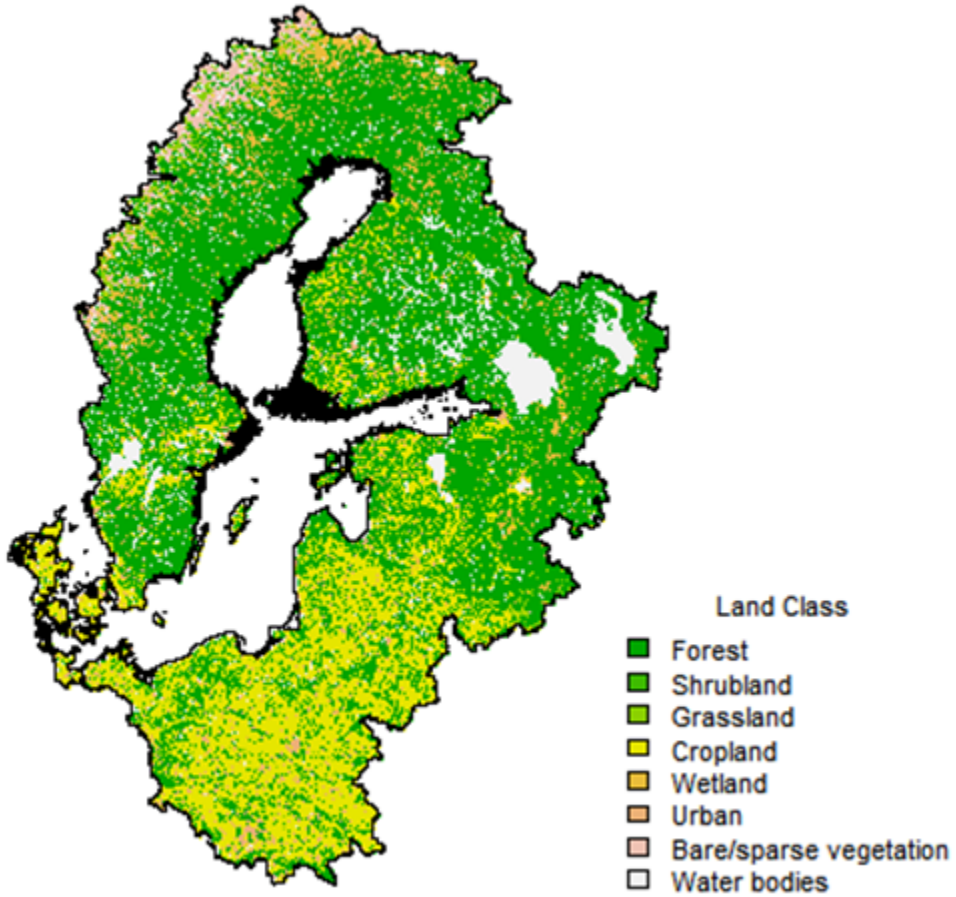
FROM QUALITATIVE TO QUANTITAVE:
NUTRIENT LOADS FROM THE MUNICIPAL WASTE WATERS



FROM QUALITATIVE TO QUANTITAVE:

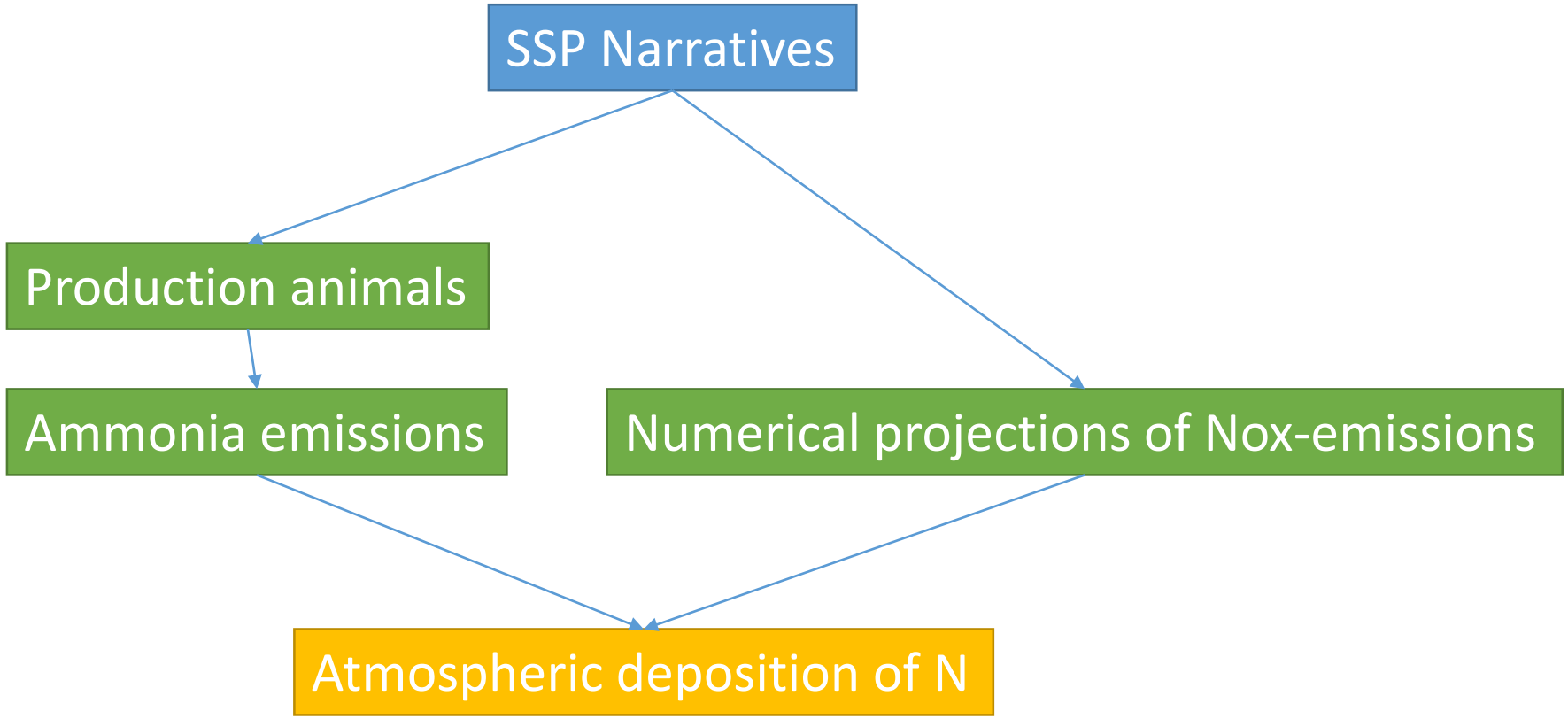
Nutrient loading from agriculture

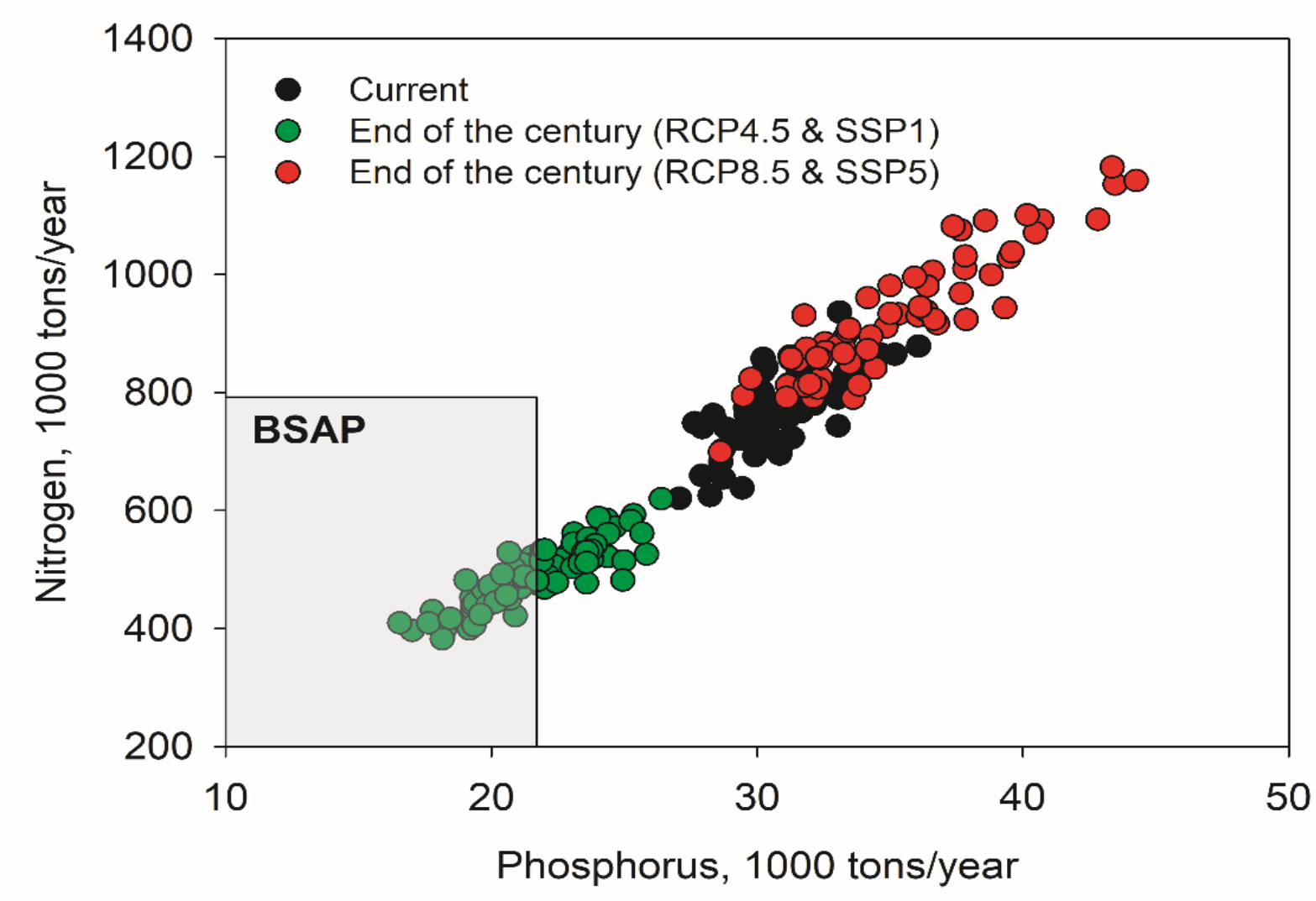




FROM QUALITATIVE TO QUANTITAVE:

Atmospheric deposition of nitrates





Annual variability in nutrient loads to the Baltic Sea currently (2010-2030) and at the end of the century (2078-2098)