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SIMULATING YIELD GAPS IN A GLOBAL COMPUTABLE GENERAL EQUILIBRIUM MODEL OF THE WORLD ECONOMY

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BACKGROUND AND OBJECTIVE

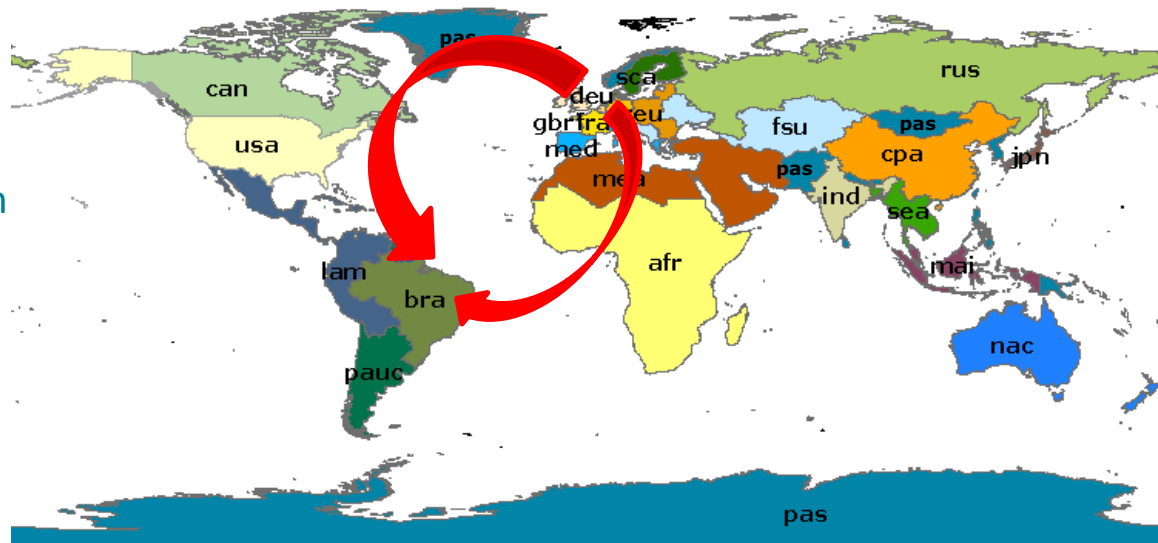
- How can linkages between global agricultural markets, climate change, and land productivity be modelled on a global scale?
- What is the impact of changes in land productivity on regional and global agricultural markets?
- Example: USA as big exporter

Interdisziplinary field of research; Use of:

- Information from linking the Dynamic Vegetation Model (PROMET) with a Computable General Equilibrium Model (DART)

DART (Dynamic Applied Regional Trade)

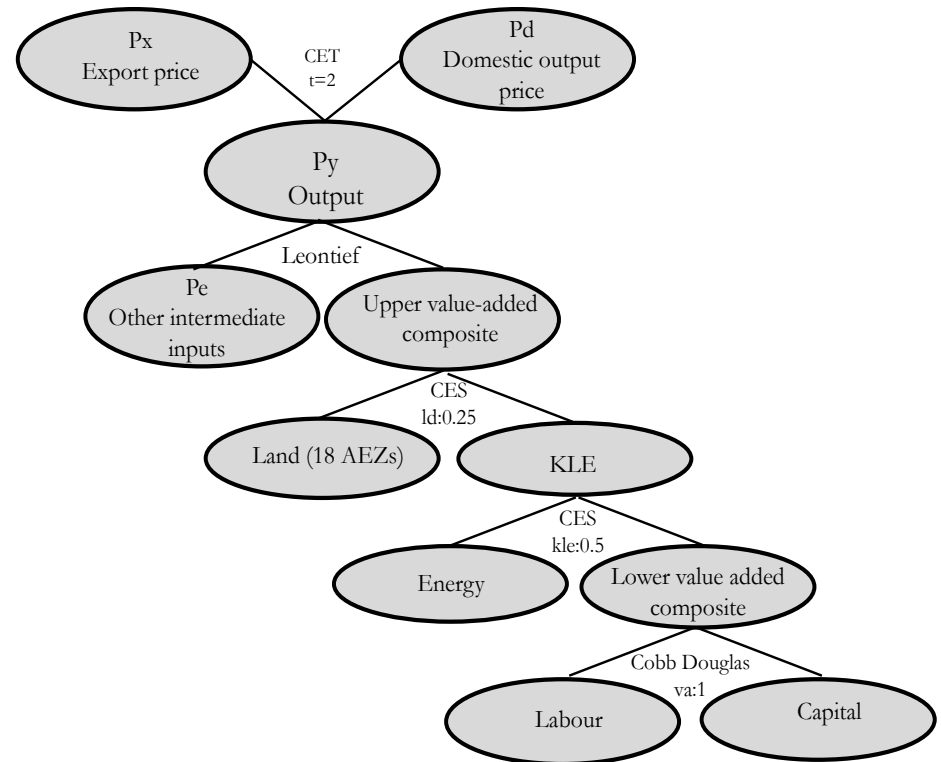
- Recursive-dynamic, multi-regional, multi-sectoral CGE model of the world economy
- 44 sectors, thereof 12 agricultural commodities
- Based on micro-economic theory
- Economy in each region competes with other economies under flexible prices and market clearing conditioned by policies
- Bilateral Trade
- Different qualities of land
- Land: input into agric. production
- Biofuels and by-products



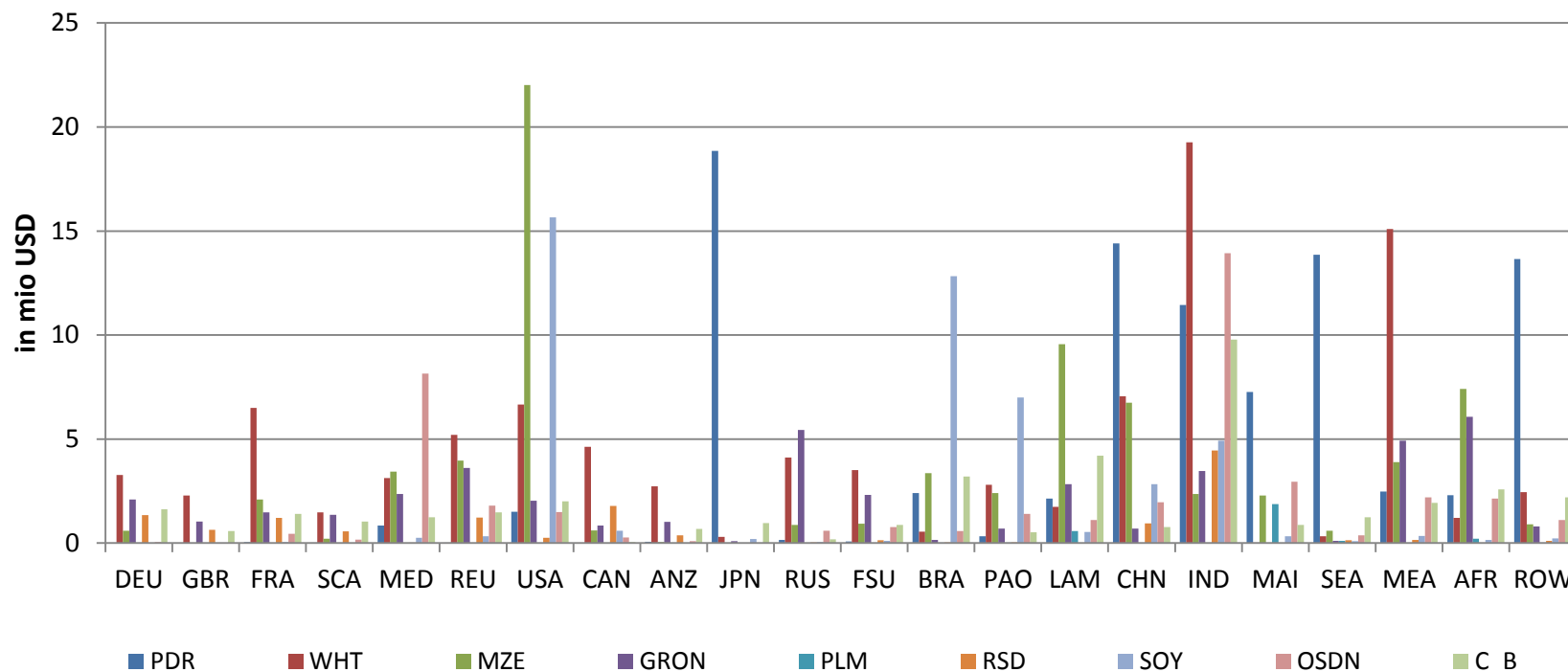
Closing yield gaps:

- Take agro-economic yields from PROMET/DART link
- Yield gap: difference between agro-economic potential yield and statistically observed yield
- Scenario setting: close yield gap by 10% in USA
- Static version

Production function of agricultural goods in DART

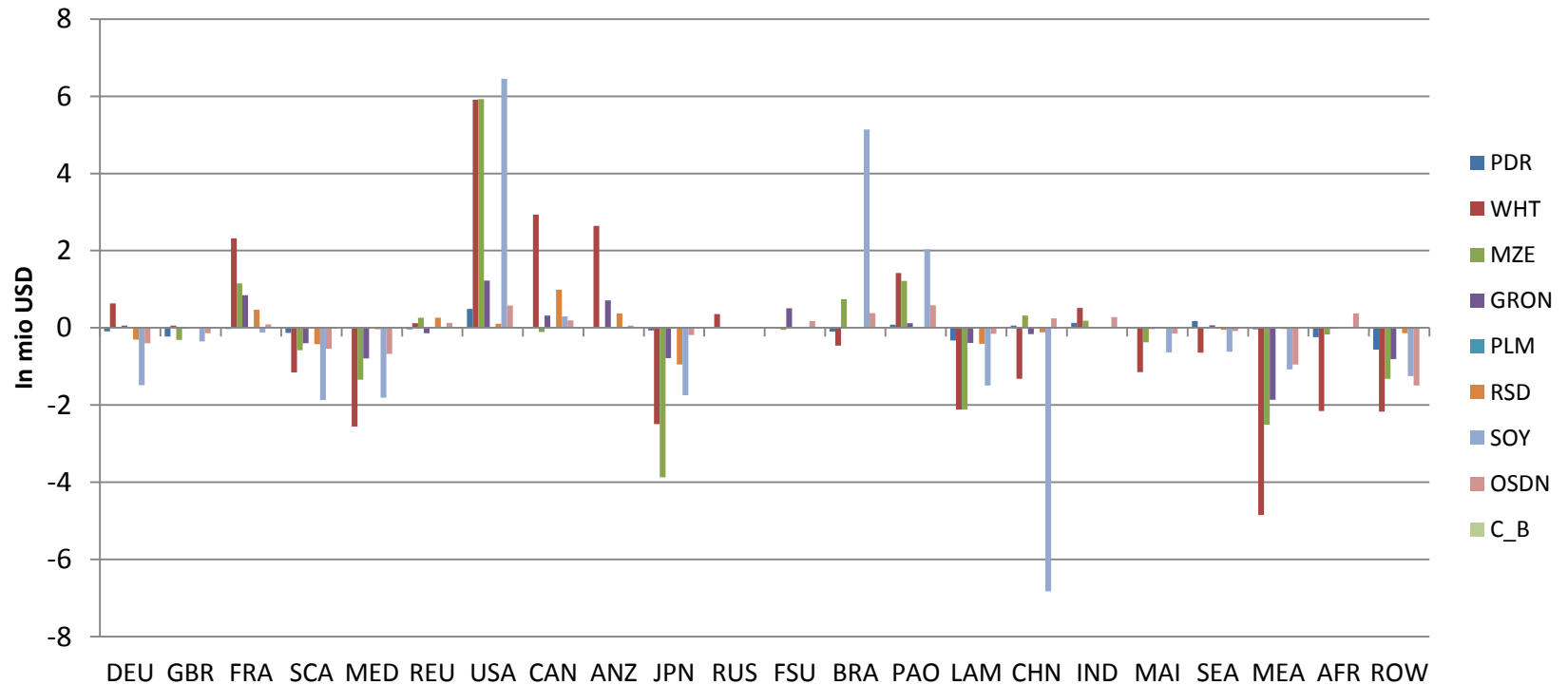


US AGRICULTURE: MAJOR PRODUCER....



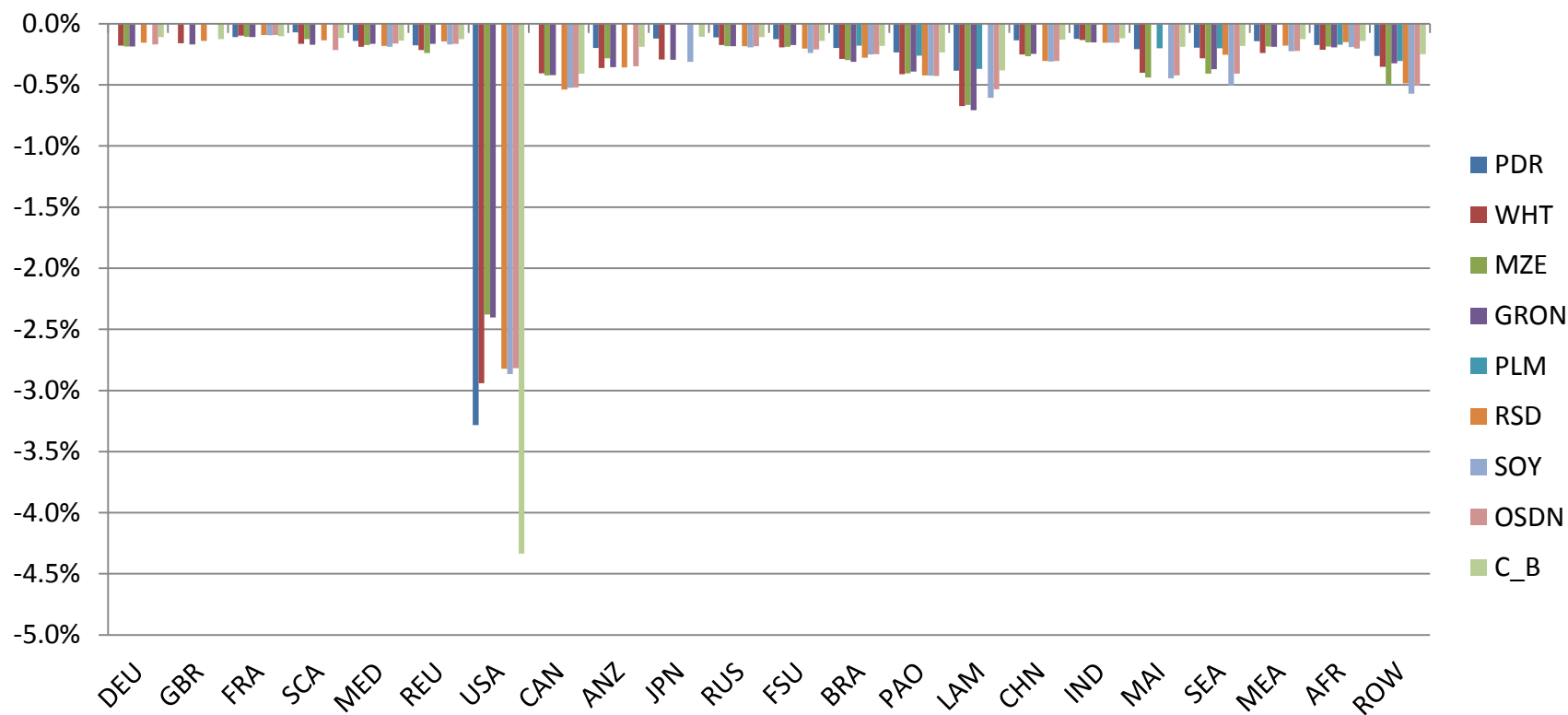
Source: DART baseline

... AND NET-EXPORTER



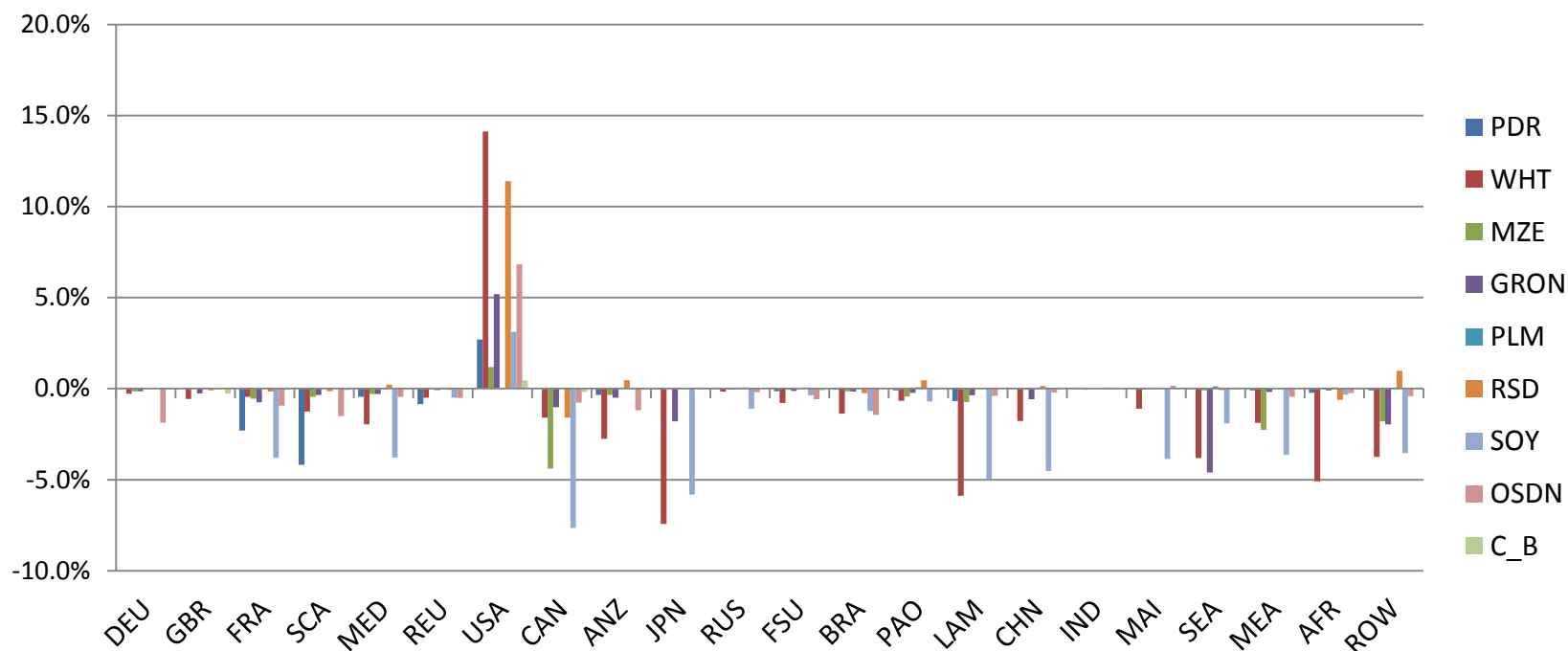
Source: DART baseline

Closing Yield Gaps in USA: Change in Crop Prices



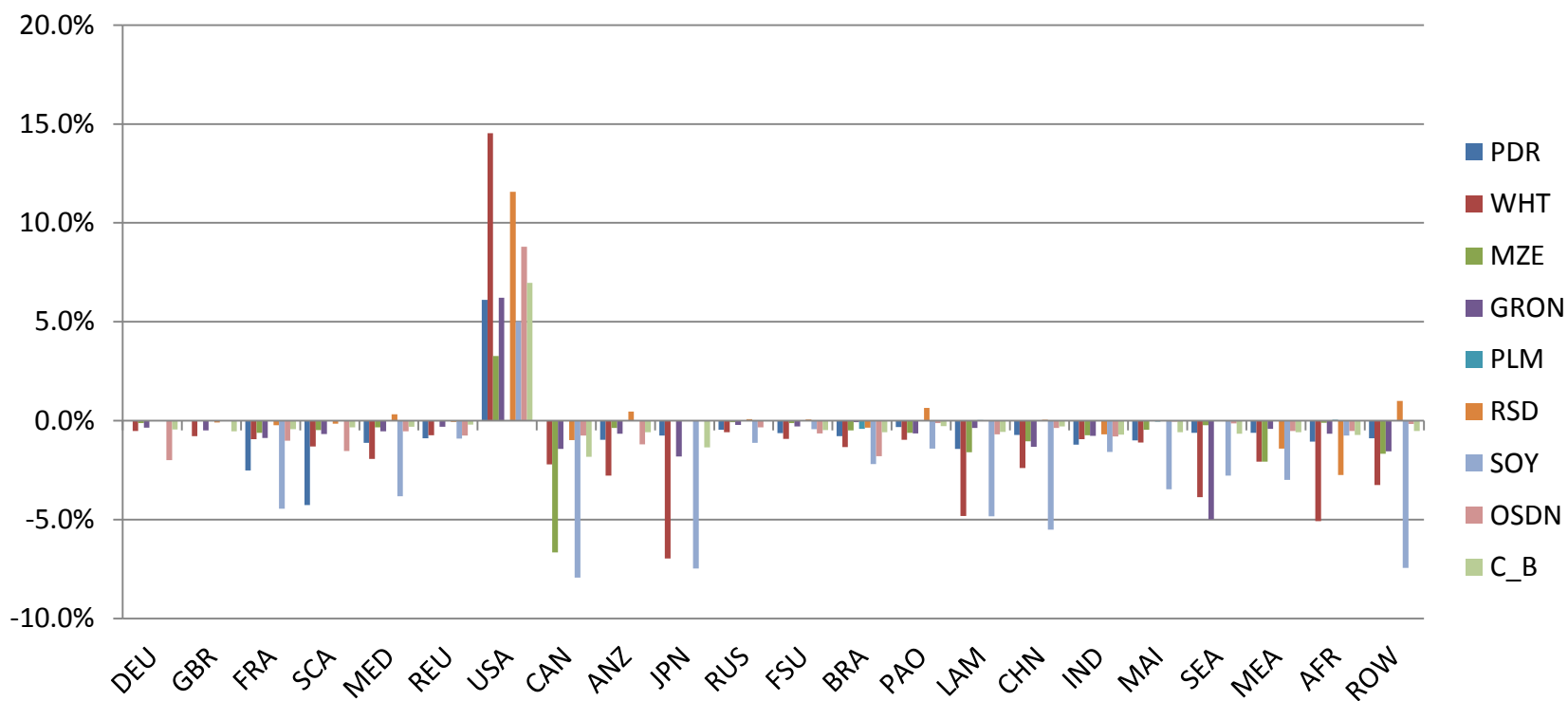
Source: DART yield gap scenario

Closing Yield Gaps in USA: Change in Output



Source: DART yield gap scenario

Closing Yield Gaps in USA: CHANGE IN EXPORTS



Source: DART yield gap scenario

Next Steps:

- Improve linking PROMET/DART
- Dynamic version
- Combination with other scenario settings:
 - Yield gaps under climate change
 - Closing yield gaps combined with higher demand for dairy/meat products
 - Closing yield gaps combined with scenarios on land expansion
- Joint publications with regional projects