

The environmental consequences of a weakening US-China crop trade relationship

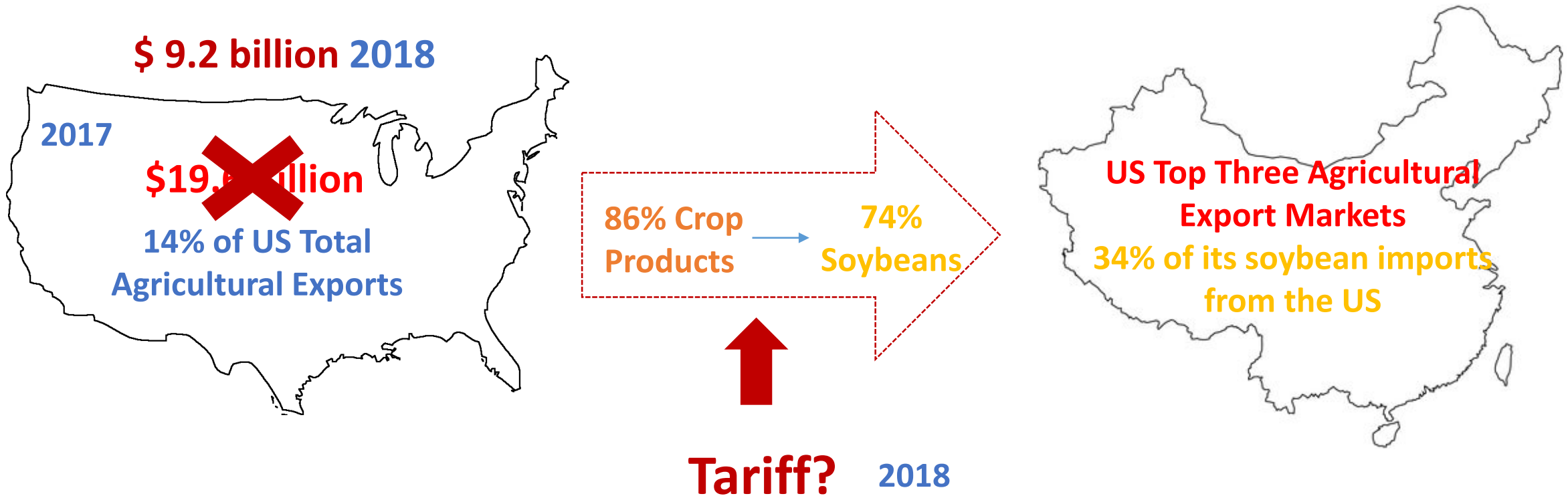
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Ongoing China's retaliation on the US Agriculture

- What about the environmental impacts driven by crop portfolio changes?
- How about spillover impacts on South America?



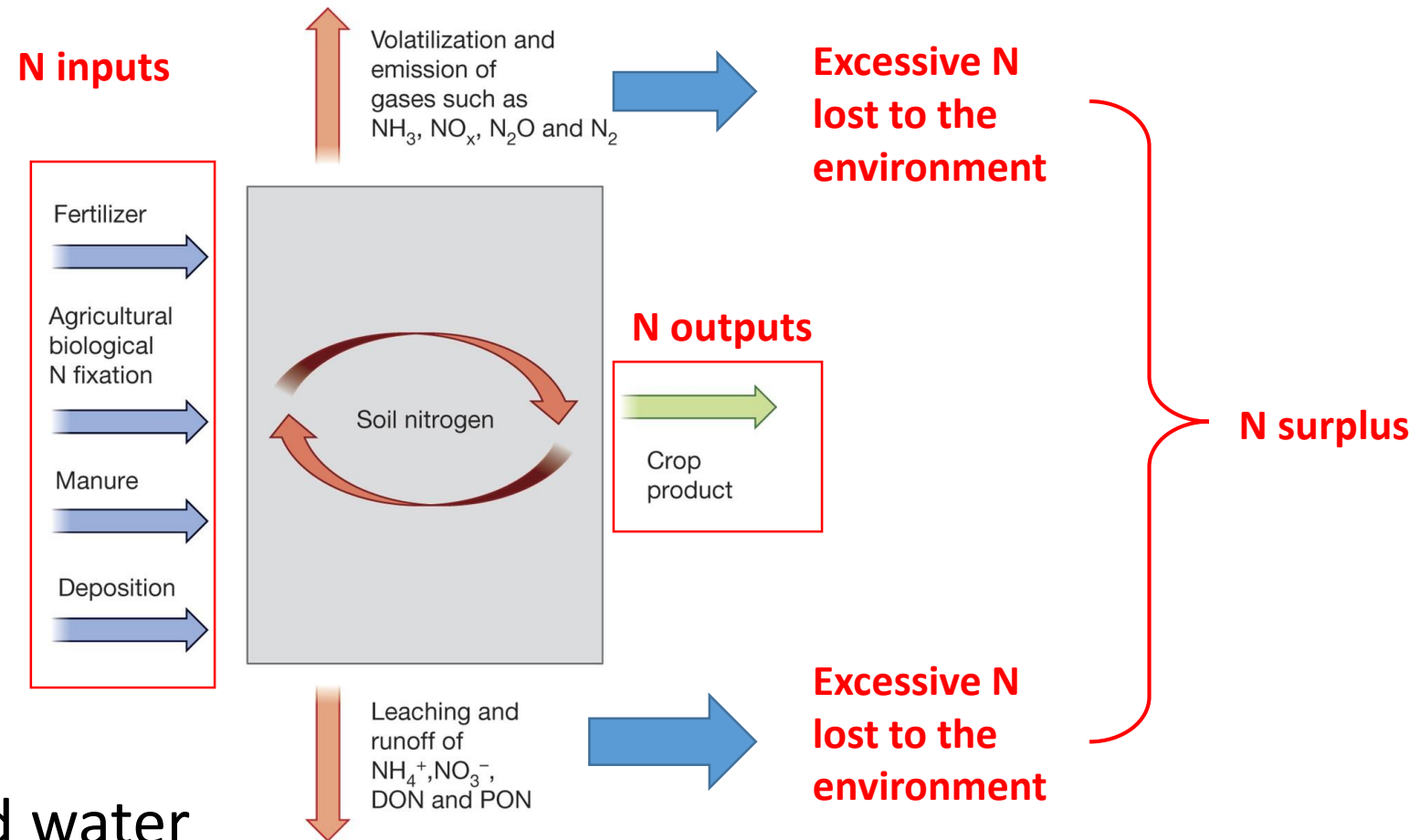
Three Types of Environmental Impacts

Nutrient Pollution

- **N surplus**
 - $N \text{ inputs} - N \text{ outputs}$
- **P surplus**
 - $P \text{ inputs} - P \text{ outputs}$

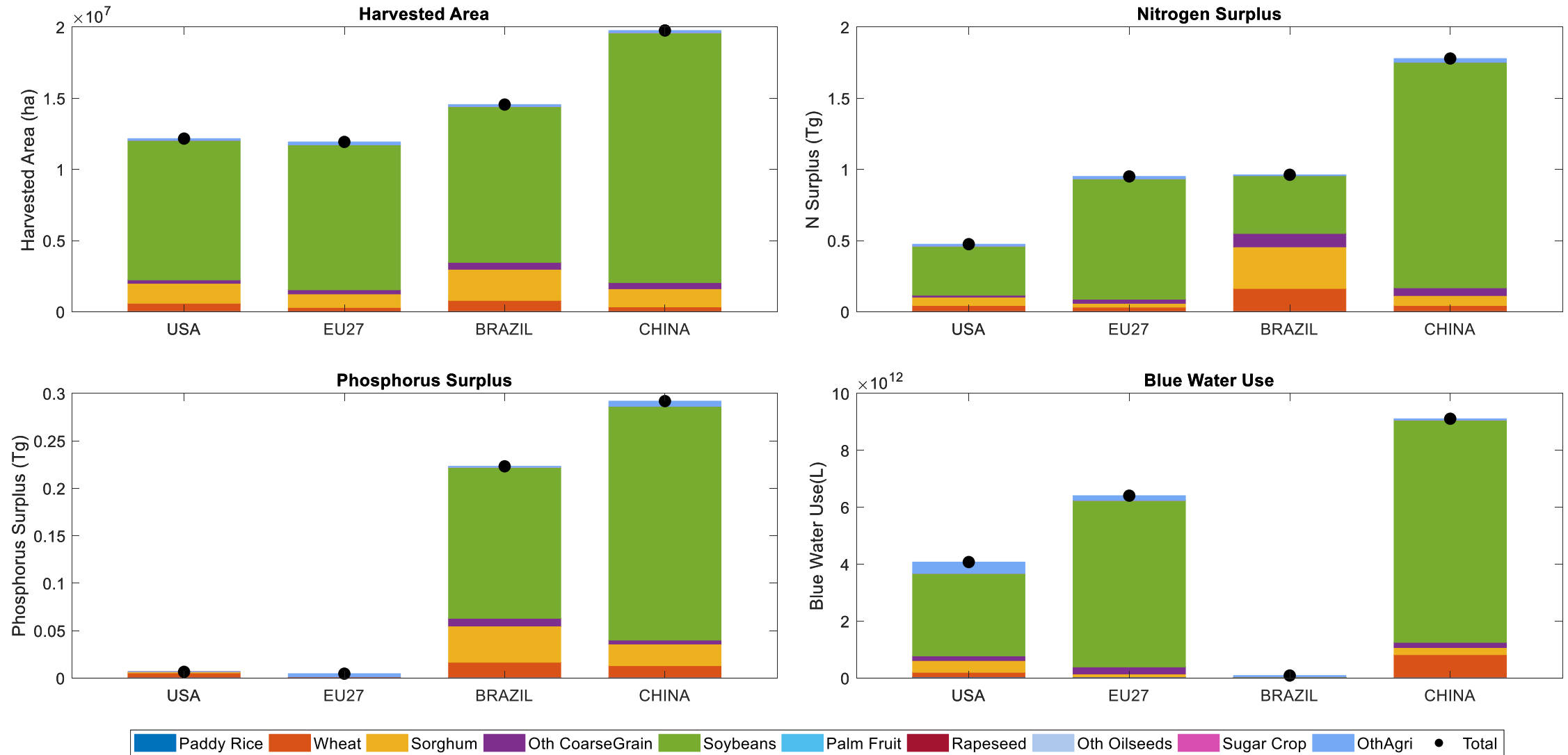
Water Use

- **Irrigation water use**
 - Blue water
(the surface and ground water used for irrigation)

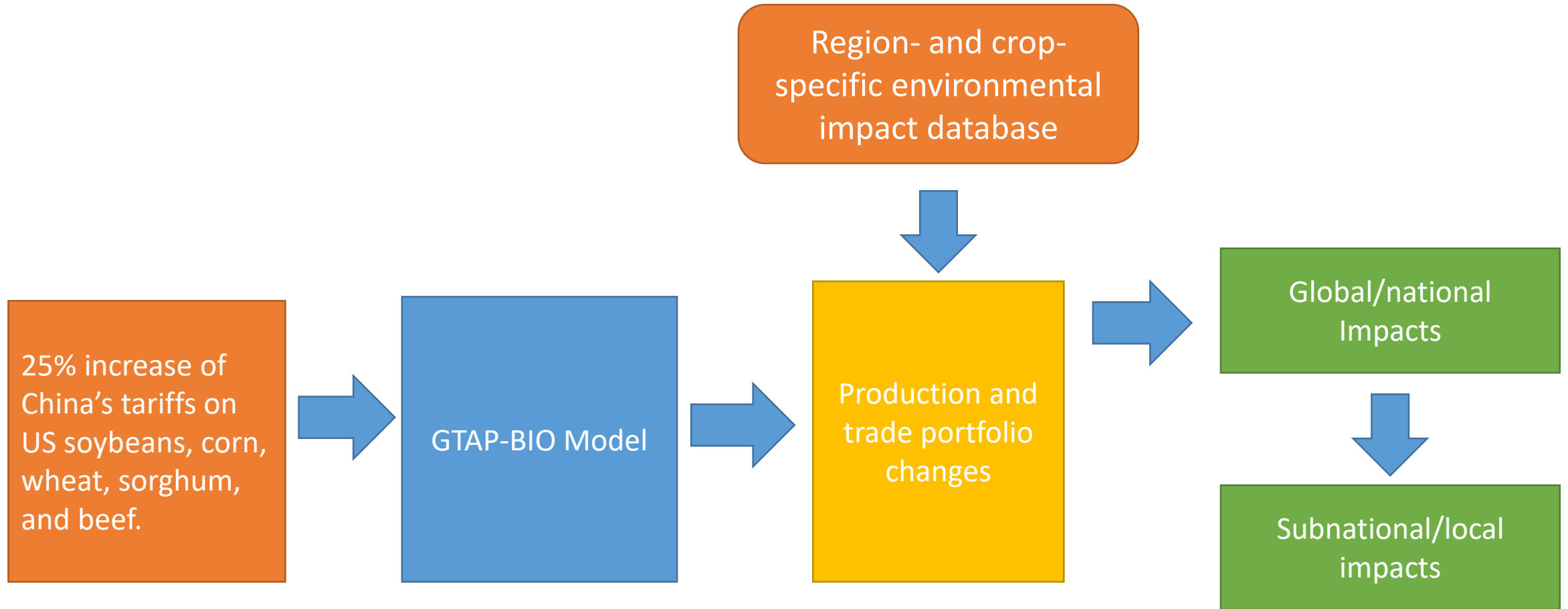


Source: Zhang et al. (2015)

The Environmental Impacts of US-China Crop Trade (2014)

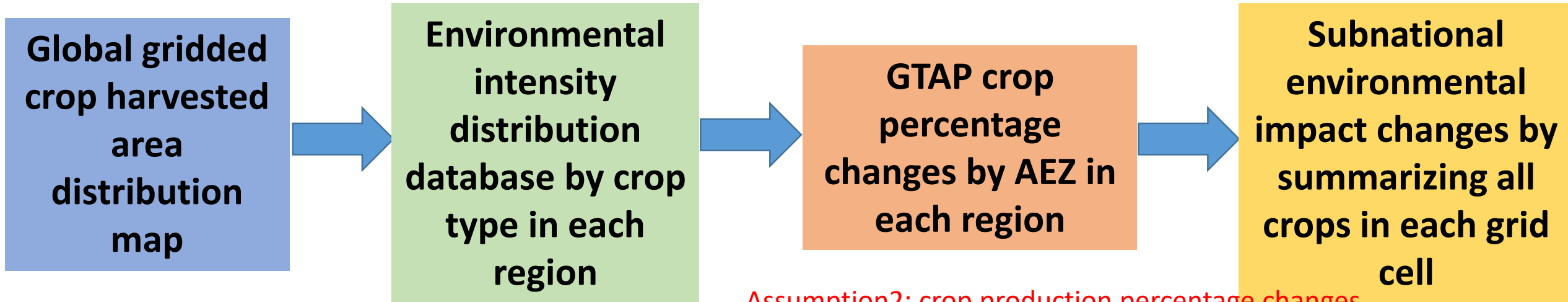


Environmental Impact Assessment Framework

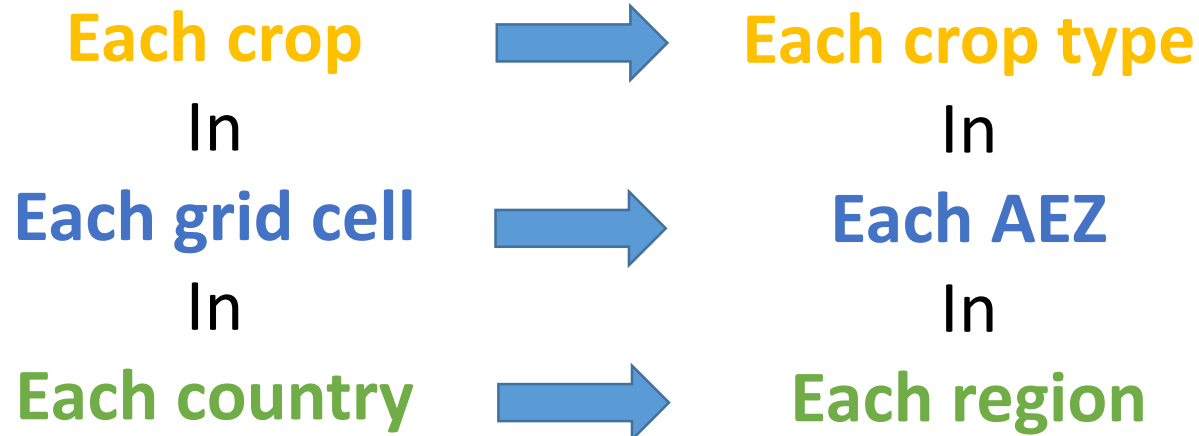


Subnational Analyses

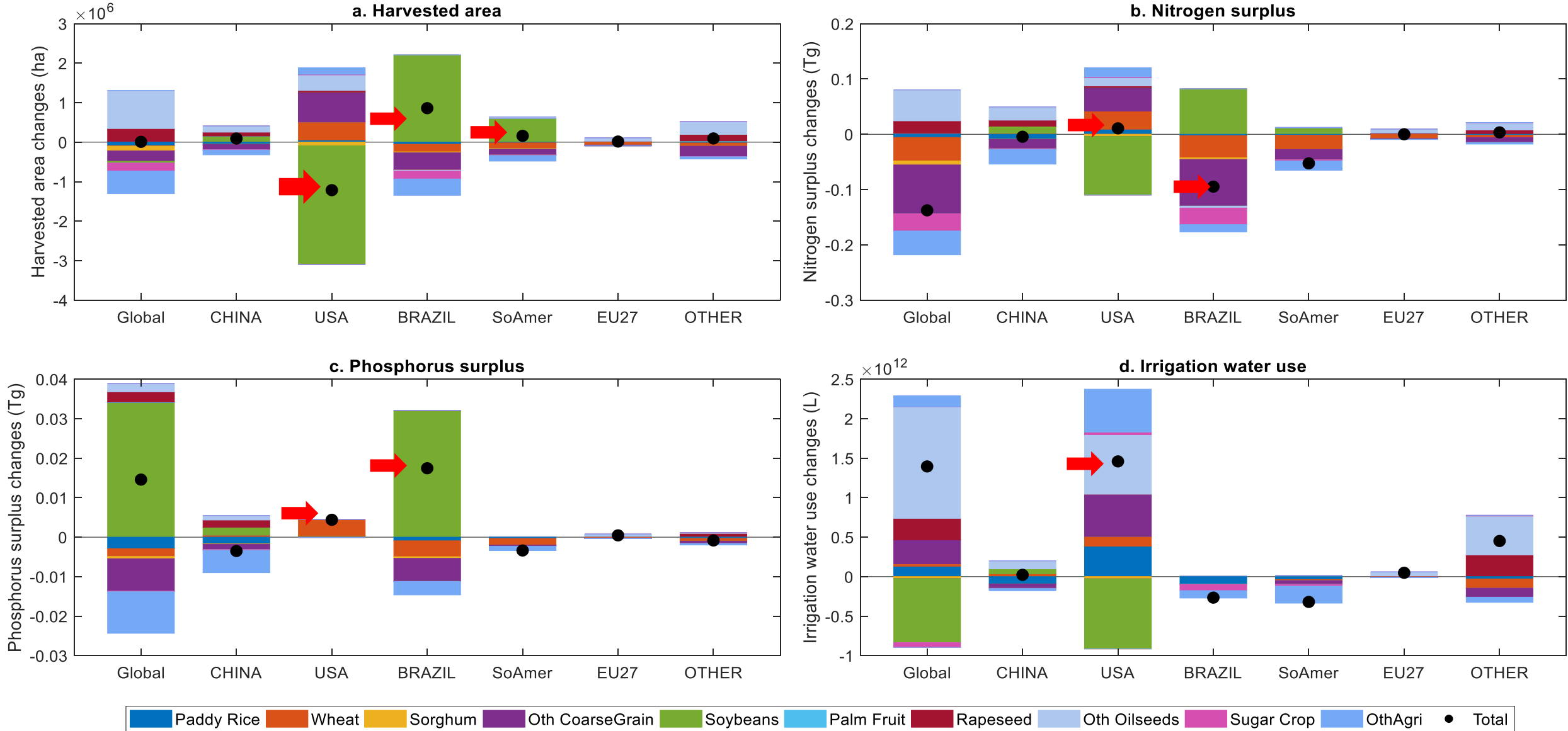
Assumption1: environmental intensity for each crop type is the same across all areas in each region.



Assumption2: crop production percentage changes for each grid cell in each country is the same as its crop type in its corresponding AEZ and region.

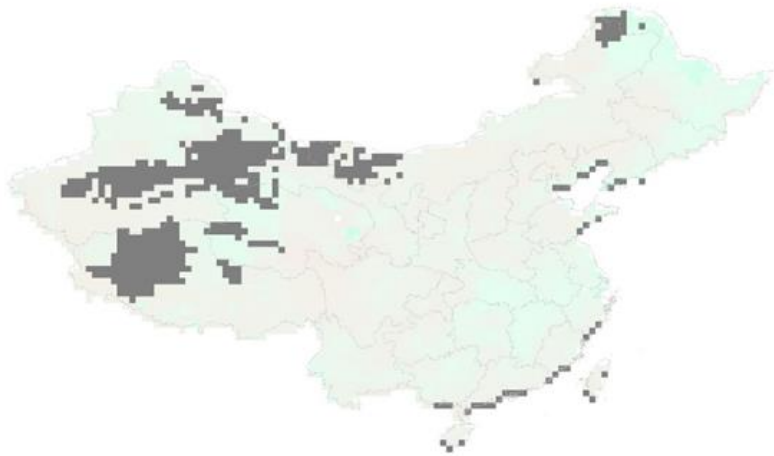


Trade Impact Evaluation: Total Impact Decomposition

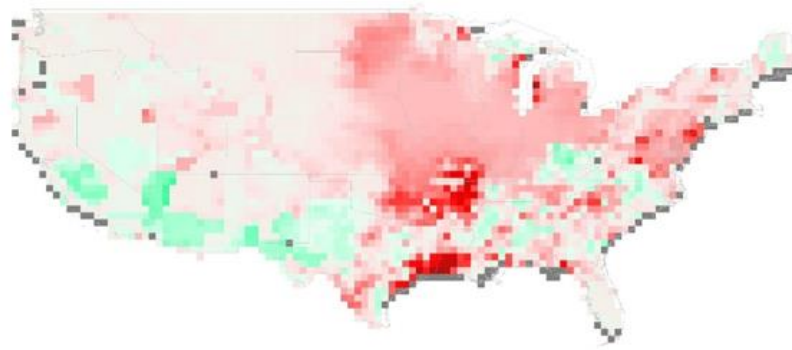


Subnational N Surplus Intensity Changes

China



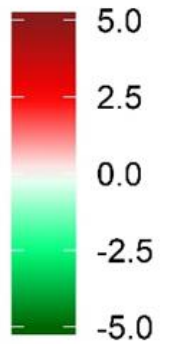
Contiguous US



South America

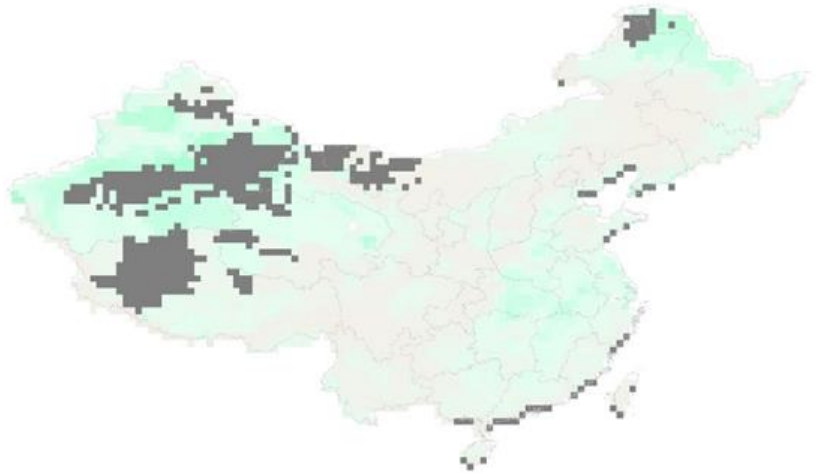


Kg N/ha

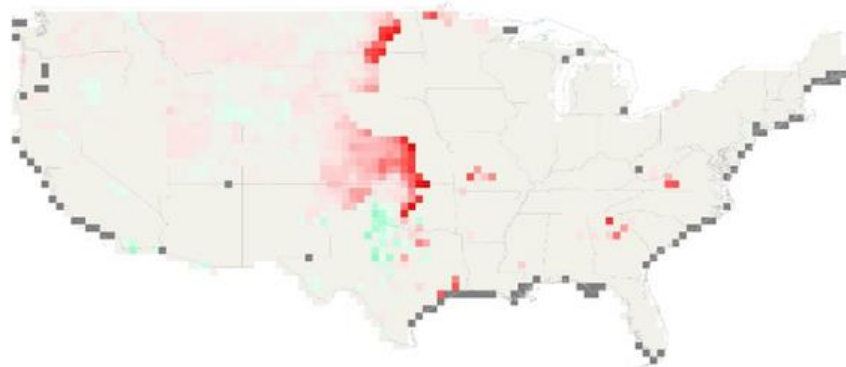


Subnational P Surplus Intensity Changes

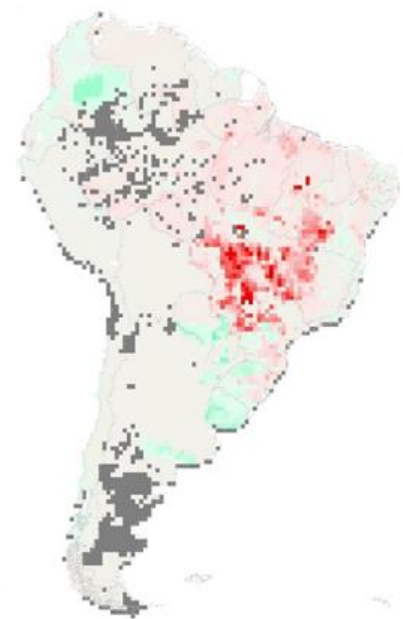
China



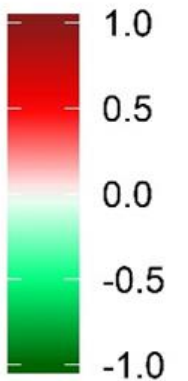
Contiguous US



South America

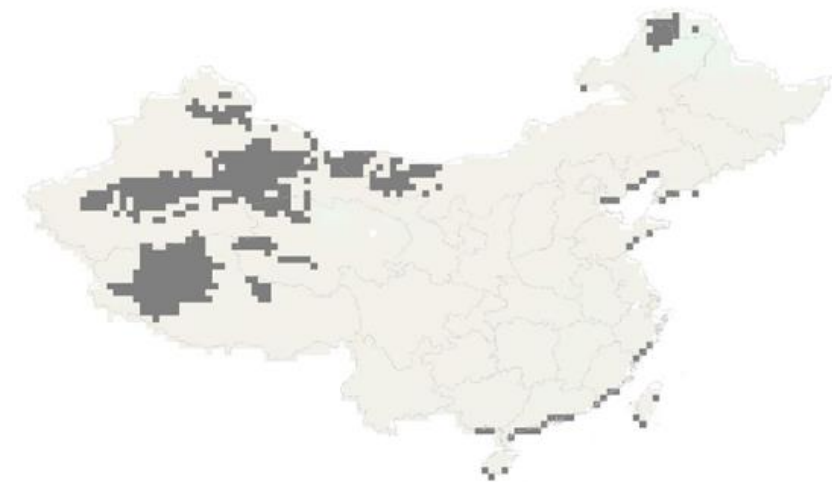


Kg P/ha

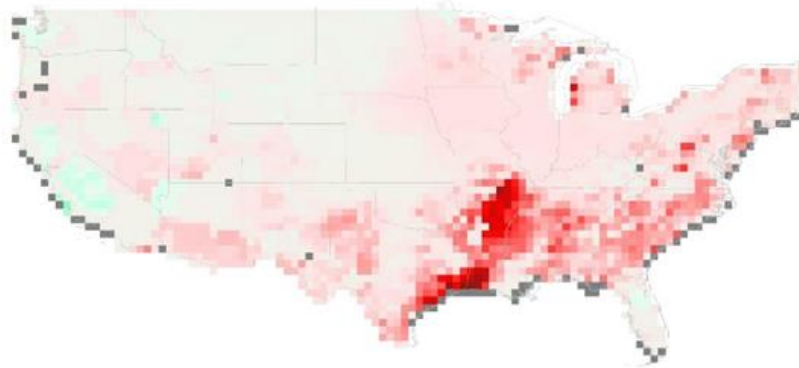


Subnational Irrigation Water Intensity Changes

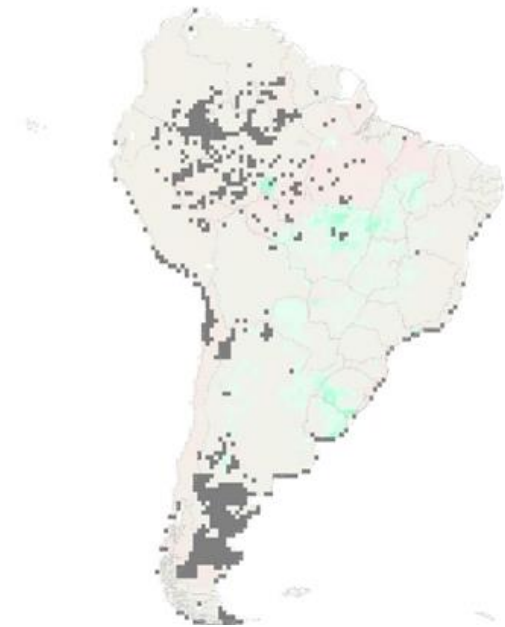
China



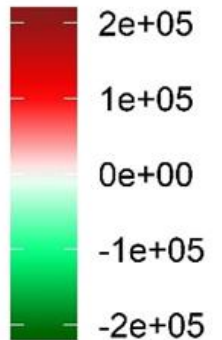
Contiguous US



South America

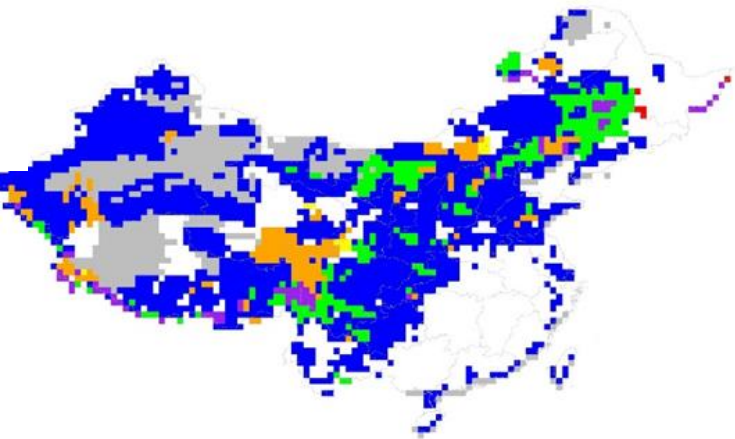


L/ha

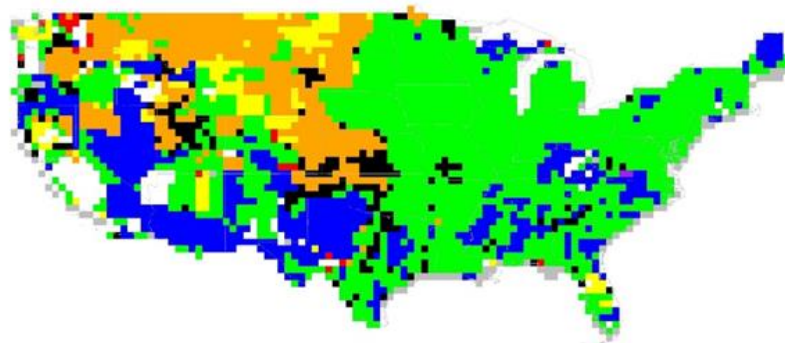


Overall Subnational Environmental Intensity Changes

China



Contiguous US



South America



Environmental degradation



Discussions and Conclusions

- Trade negotiations are ongoing and subject to changes
- Agricultural policy should factor in its environmental consequences.
- Environmental consequences driven by the US-China crop trade tension are considerable and could spillover to other countries.
- China would receive limited environmental impacts.
- US' environmental intensity could be worsened.
- The trade-offs between N surplus and P surplus in Brazil should be considered.
- Other South American countries could environmentally benefit from the US-China trade tension.
- Heterogeneous trade-offs do exist among different local regions within each country.