Scenarios of global land use change and its effect on ecosystem services

aka *Global Demise*

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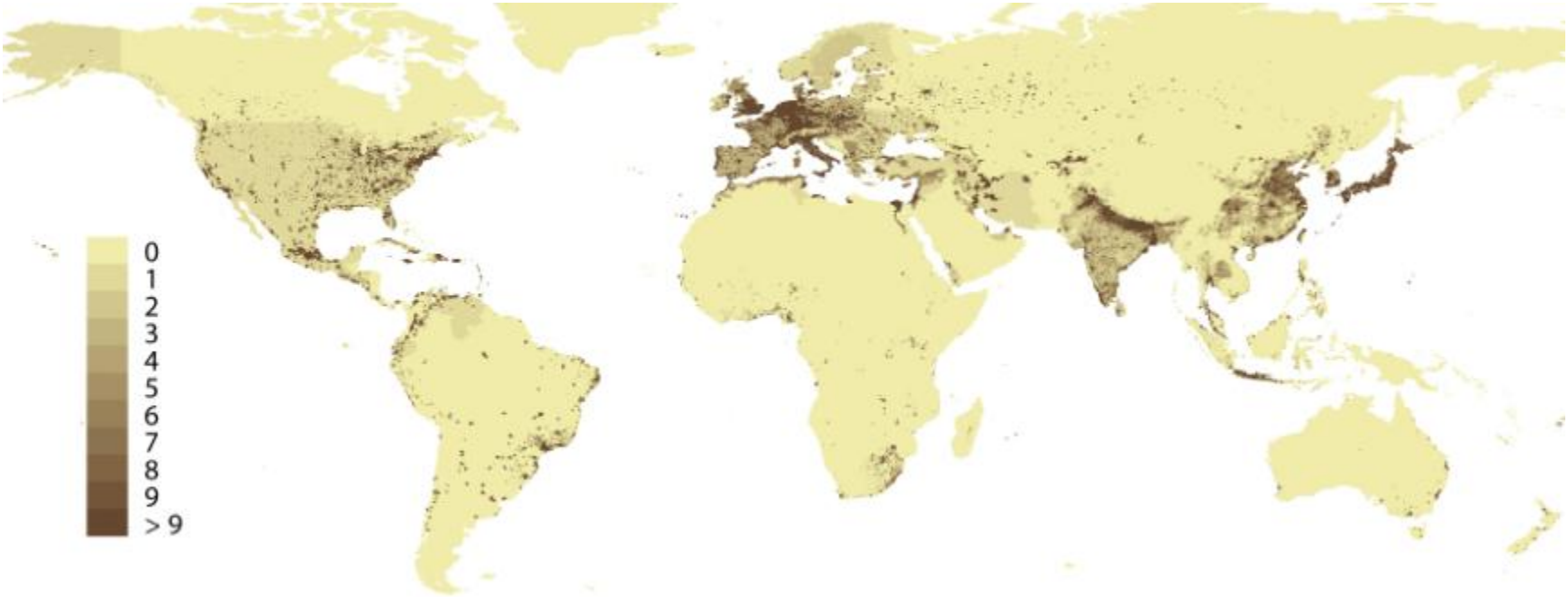
Summary

- The effect of global land use change on selected ecosystem services from 2000 to ~~2050~~ 2015.
- Change in: 1) urban area; 2) agricultural production; 3) biomass carbon stocks; and 4) species habitat.
- Spatially explicit.
- 2 scenarios considered.

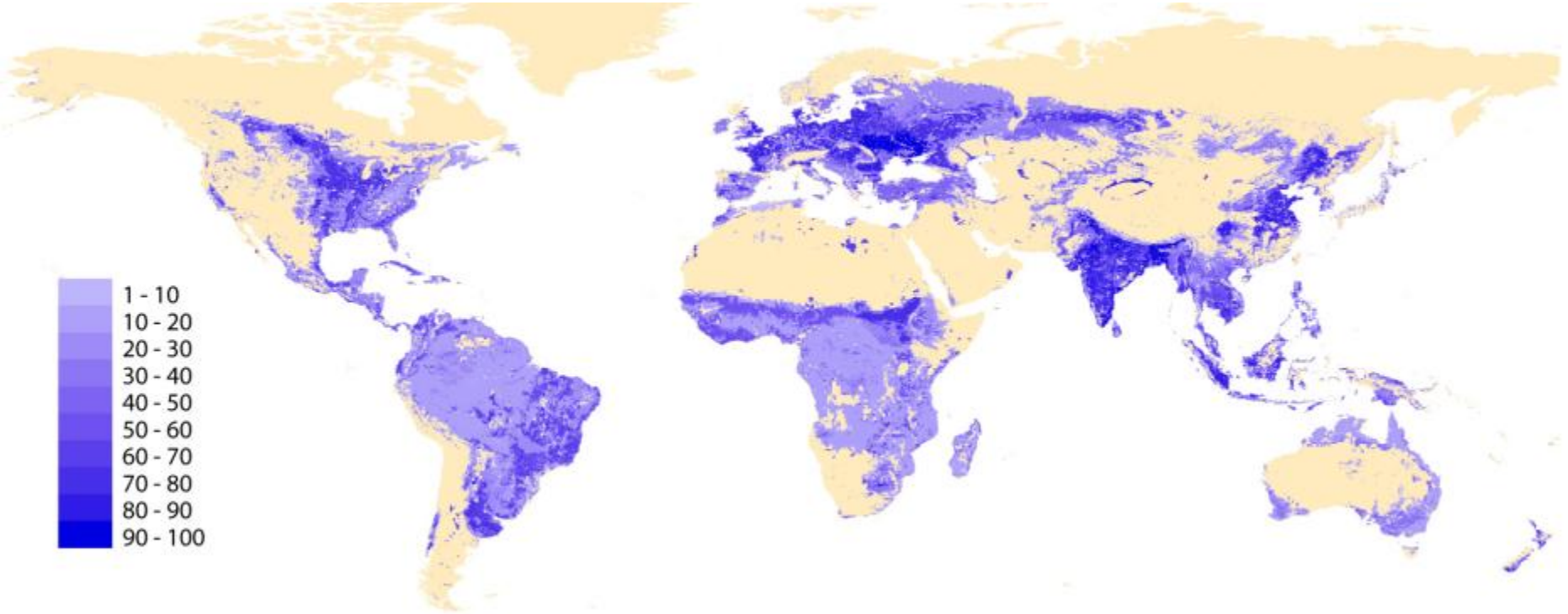
Urbanization suitability…



Urbanization…

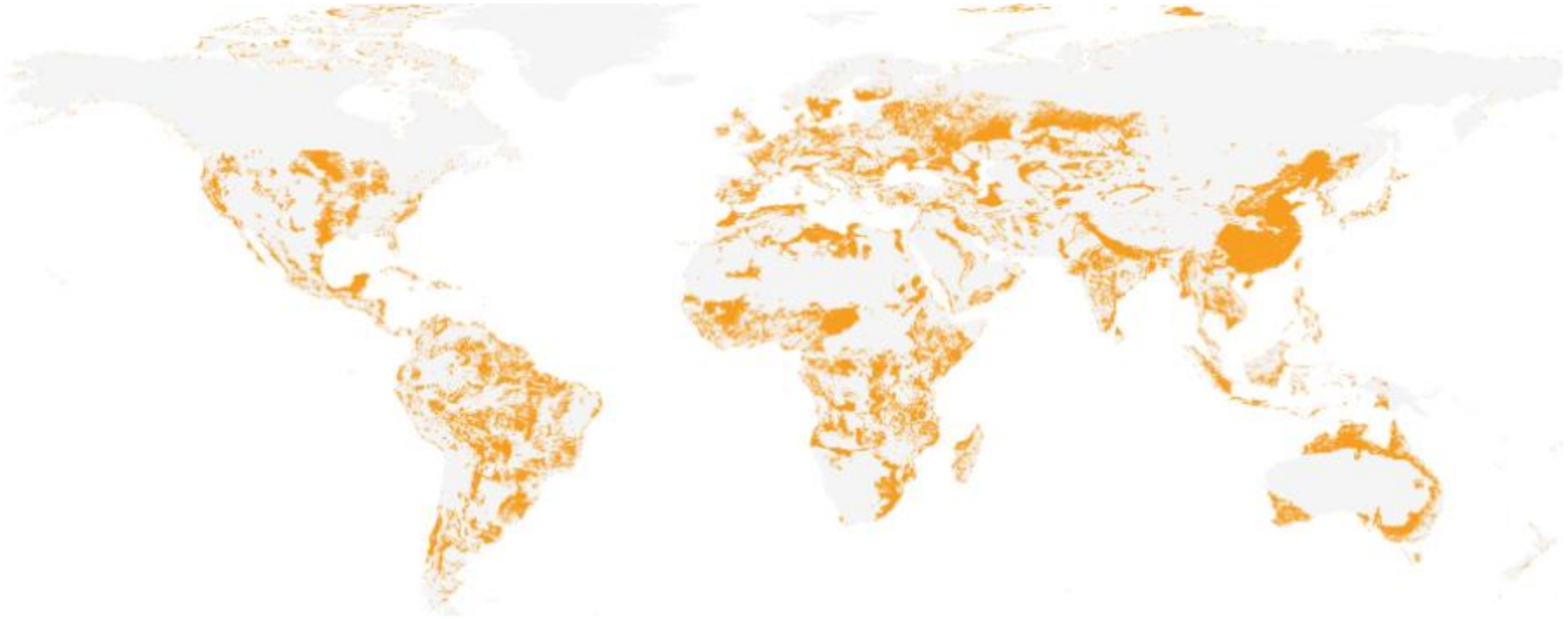
Urbanization…

Agriculture suitability…



country scenario

Irrigation mask…

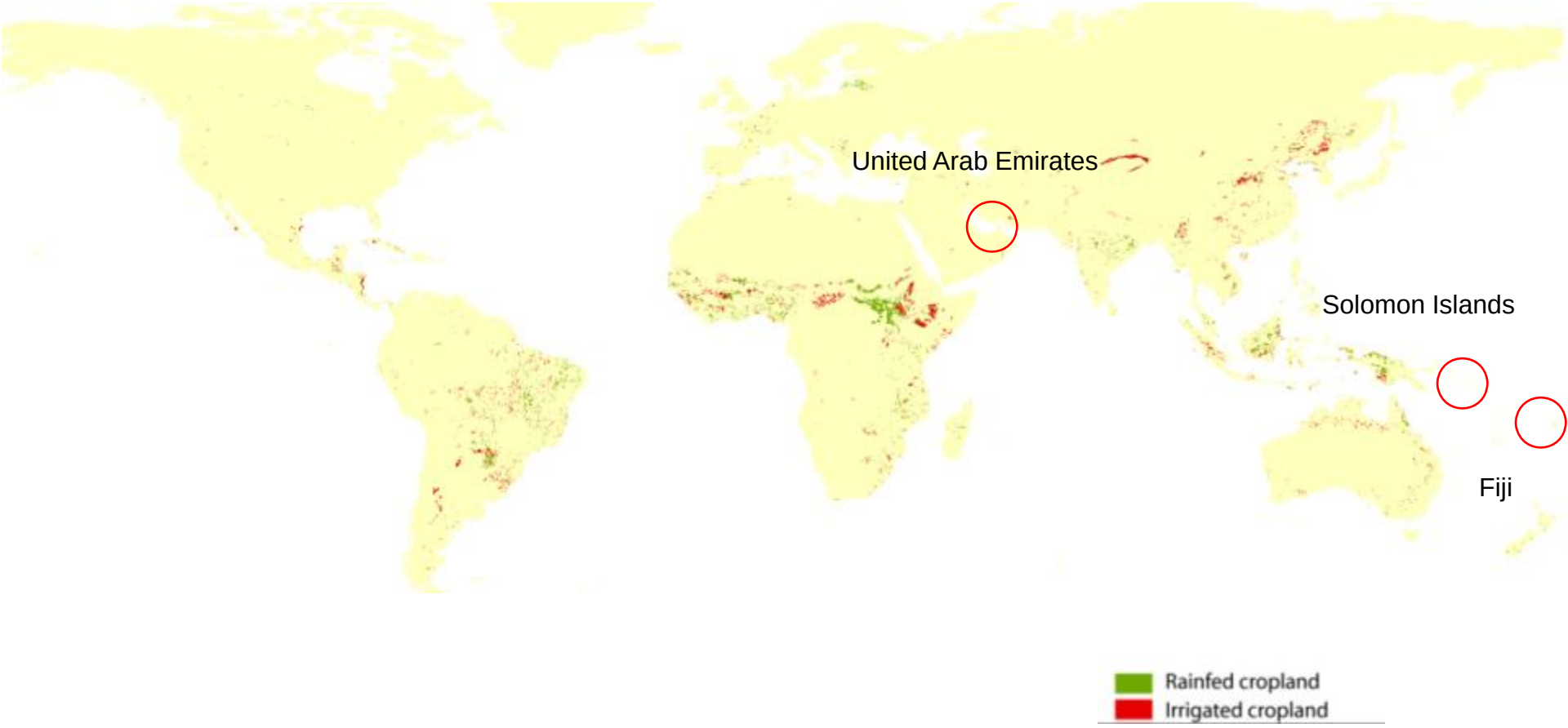


country scenario

Agricultural production

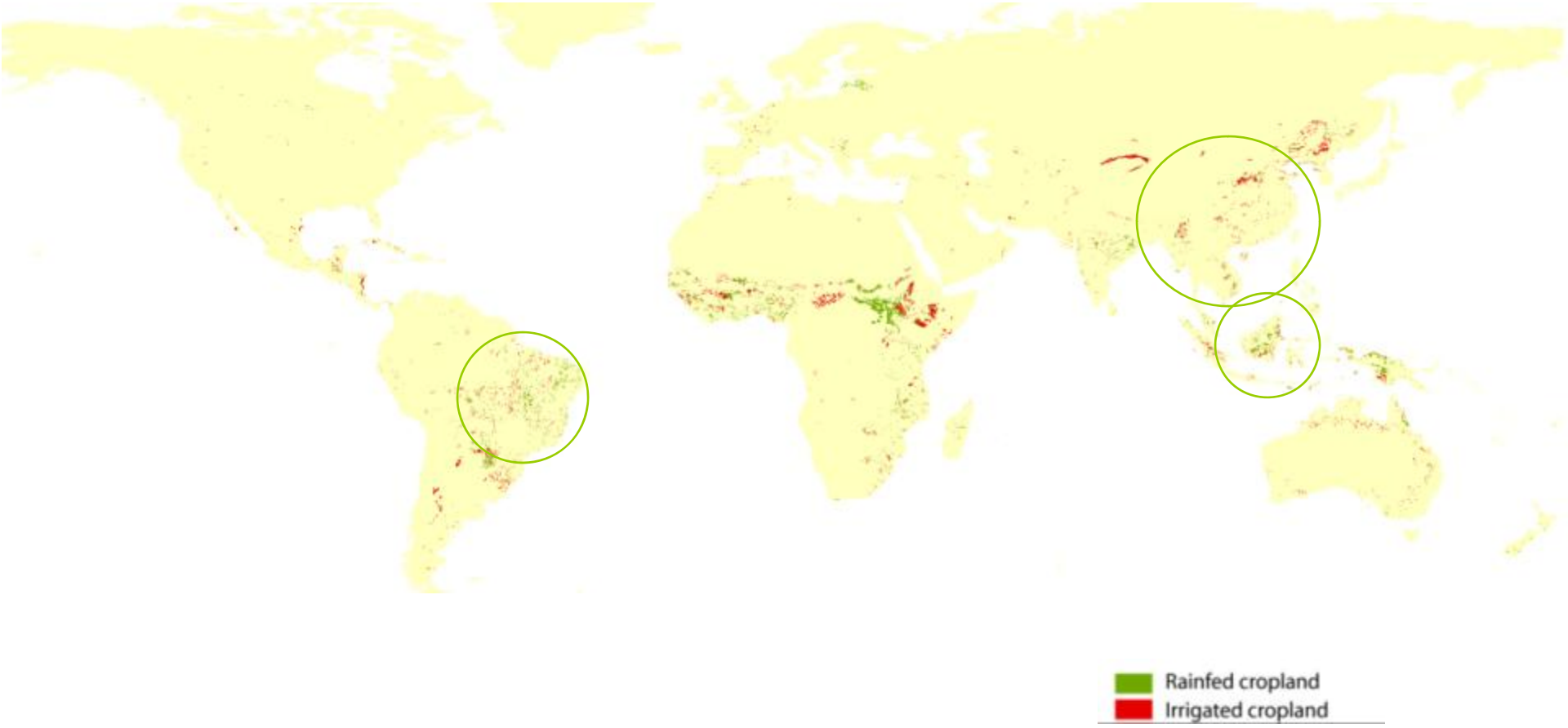
- 2015 production of 13 major crop types in each country is a function of:
  - 2015 harvested area in the country;
  - 2000 yield in the country;
  - Expected yield increase in crop types in the country;
  - Allocation of harvested area across cropping zones;
  - Allocation of harvested area across assumed irrigated areas;
  - Scenario-specific mix of crops in the country.

Cropland expansion…



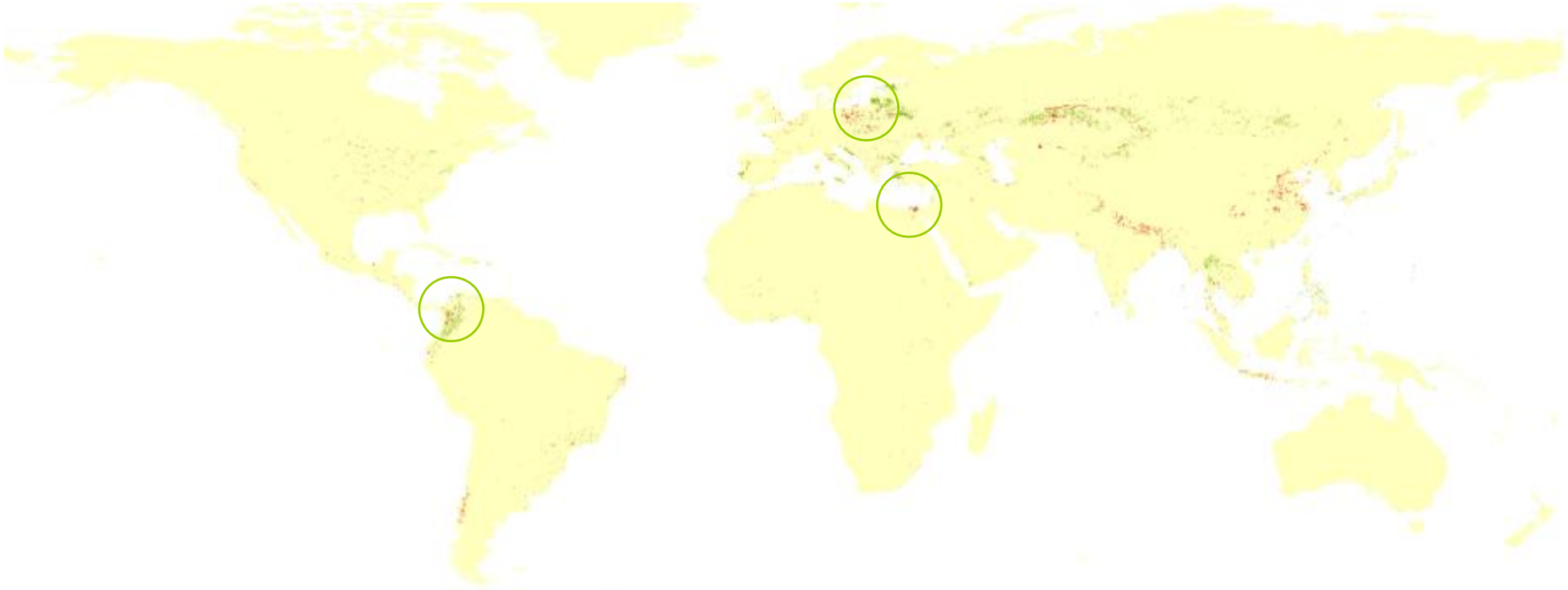
country scenario

Cropland expansion…



country scenario

Cropland loss…



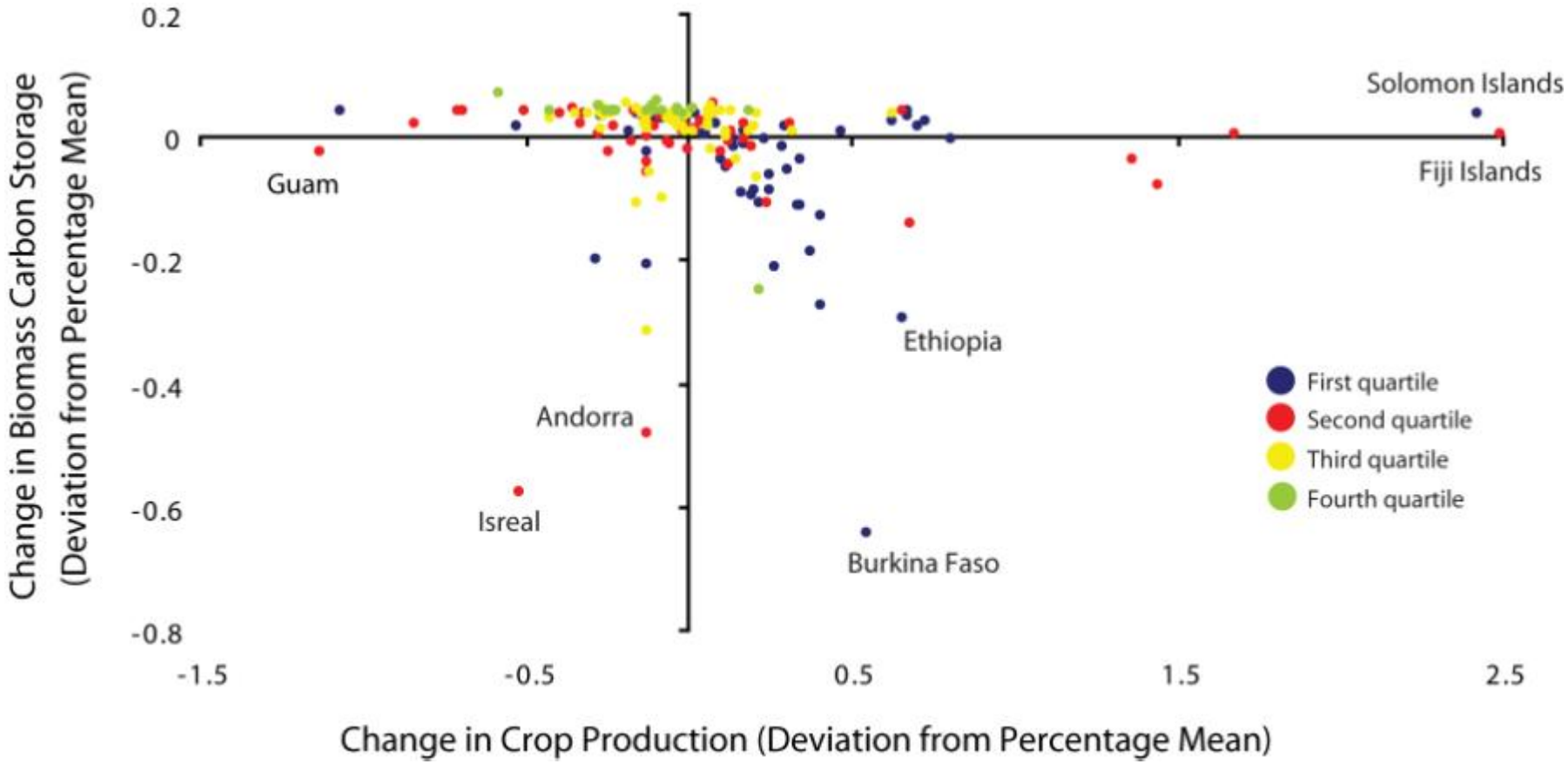
country scenario

Country scenario results…

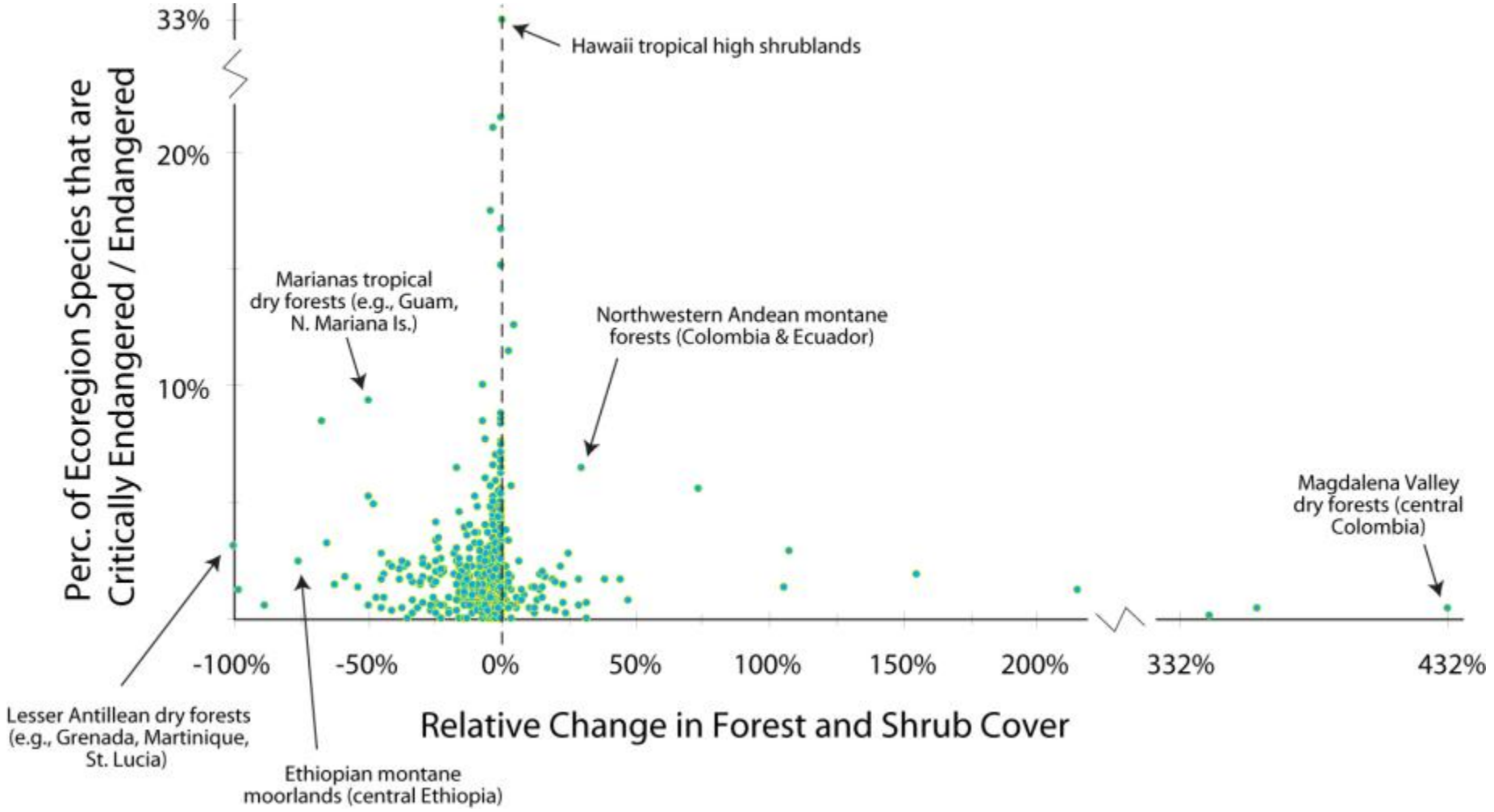
Country Scenario

	Agricultural Production (Mg per Capita)	Carbon Stored in Biomass (Million Mg)	Forest and Shrub Land Cover (Millions of Ha)	Urban land area (Millions of Ha)
2000	0.986	51,138,300	8,100	564.7
2015	0.940	51,120,748	7,883	641.2
Change	-0.046	-17,553	-217	76.4
Notes:	Biggest percentage gain in production is seen in rice and coarse grains. The biggest loss is in vegetables and melons	Does not account for biomass growth on undisturbed land. On an annual basis, the change is roughly equivalent to annual carbon emissions from tropical deforestation in the 1990s	Correlation between forest and shrub area gain and percentage of species endangered by ecoregion is -0.04	

Carbon emissions…



Biodiversity…



Next steps and caveats…

- Finish *regional* scenario.
- Compare projected forest loss by country to historic rates of deforestation to determine REDD potential.
- Determine if irrigation demand matches spatially with water supply under climate change.
- What about pasture / rangeland?
- No expansion of conserved network