



C7: Climate Change & International Trade - Channel for Damage Propagation or Chance for Adaptation?

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Summary of themes covered in workshop

This workshop was centred around the question of whether international trade has a buffering or amplifying effect on climate change impacts. Three speakers presented their work using contrasting methods, analyses and systems.

Thomas Hertel (Purdue University) examined the interactions between biophysical effects of climate change and economic geography for different types of agricultural crops at the country level. Using a statistical pattern scaling model they showed how trade and policy (e.g. subsidies) could act to alter the biophysical effects of climate change (countries exporting impacts) and how this approach could be used to examine the net effects of climate change. For example, Brazil reversed their climate change impacts from exporting or passing losses overseas. China on the other hand absorbed losses by importing soybeans from countries that had impacts as well as through inefficiencies due to subsidised crops. Their approach enables a matrix assessment of the sensitivity of each country on all other countries and vice versa that accounts for both biophysical and economic interactions, the latter of which are often ignored.

Hugo Valin (IIASA) presented research on climate change impacts on agricultural markets. Focussing on the USA the authors posed the question: How much does climate change in the rest of the world matter? They used a systems Integrated Assessment Model that combined a climate model ensemble with the EPIC crop model and GLOBIOM bioeconomic model that included links between crops, feed, livestock and forests for food supply with different assumptions about trade. The effects of trade could buffer the effects of climate change but price was affected in different ways depending on the commodity - different types of crops and

livestock varied substantially in their responses showing the complexities and context specific effects of trade and the need for global markets to be considered in regional analyses.

Matthias Kalkuhl (The Mercator Research Institute on Global Commons and Climate Change) presented research on the effects of climate variability and long-term change on GDP. They used panel regression versus cross-sectional statistical models to examine detailed sub-national income data covering 29500 observations and combined these with gridded weather and climate projection data to contrast effects of climate shocks versus long term change on regional GDP. They found temperature effects on GDP in terms of shocks and long-term changes were greater than previous published work had suggested. Although not explicitly incorporating trade, they suggested that trade would have more of an impact via consumption than GDP but rather their findings have implications for trade, that could be examined in more detail through future work.

Most controversial question that came up in this workshop?

Decision makers want to know how much GMO or investment in new technologies would be required to offset or buffer effects of climate change? How or can your models be used to help decision makers assess where to put their money to best withstand the effects of climate change?

Results of the discussion

Although the organisers posed a dichotomous question, it was clear from session that trade can act in a variety of ways depending on context. For example, impacts on food supply are more likely to be buffered by diversity in trade partners. In contrast very rigid supply chains with a lot of strong links and trade costs may amplify climate change impacts, depending on the commodity (e.g. manufacturing electronic products was discussed as an example). The nature of the trade network, geographical distribution of impacts clearly matters. Examining case studies on natural disasters (eg. India) could provide insight on climate change impacts. It was pointed out that a focus on past and present economic systems does not enable completely alternative economic systems to be examined under the wider lens of sustainability goals.

Research gaps identified

Variety of assumptions that need to be tested were discussed including the consideration of alternative economic systems. The need for improved communication of messages to policy makers was raised.

Next steps

NA

Other

NA

3-5 keywords that characterize the session

Trade; economic geography; agriculture; GDP; climate change; vulnerability