

Poorest countries may adapt better to climate change

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(Phys.org) -- The poorest societies may be more able to adapt to the threat that climate change poses to food supplies than their slightly richer peers.

A new study involving experts in the School of Geography at The University of Nottingham found that the very poor and the relatively wealthy countries are less vulnerable — it was the group in the middle that was most at risk. This unexpected result was found at several different scales and by different members of the research team. They've called on policy-makers and NGOs to take their findings into account.

Dr Simon Gosling, who specialises in the impacts of climate change, was one of the authors of the study. He said: "We're finding a real trade-off between adaptation and development, that's not to say we should discourage development, but you can't assume that by promoting it

you're also helping people adapt to climate change. It's not that traditional is always better, but as people move from traditional to modern they lose things; policy-makers need to think about how to help them make the transition.”

The study highlights areas that are at particular risk of climate-induced crop failures — these include south-eastern South America and the north-eastern Mediterranean.

Dr Gosling said: “You might assume getting richer would always make a country safer from drought and famine, but that turns out not to be the case. Instead, the very poorest countries seem to become more vulnerable in the early stages of development. There's a crucial period, before the benefits of modernisation start to kick in, when developing countries become more vulnerable to problems like drought than when they started.”

The study was funded by the Natural Environment Research Council (NERC) under the Quantifying and Understanding the Earth System (QUEST) research programme, the Rural Economic and Land Use Program, and The Economic and Social Research Council's (ESRC) Centre for Climate Change Economics and Policy and has been published in two parts. The first is in the journal Food Security and the second in Agricultural and Forest Meteorology.

Dr Gosling was part of an international research team from University of Leeds (UK), the University of Guelph (Canada), Aarhus University (Denmark) and the World Agroforestry Centre (Viet Nam).

The dangerous middle ground

Dr Gosling said: “Our study found that there seems to be a dangerous middle ground where the old ways no longer function, but the new ways

aren't up and running yet, and people are at their most vulnerable. Development has damaged traditional agriculture, but they can't yet use capital-based adaptation strategies — from fertilisers and bank loans to higher-yielding breeds of cow.”

The researchers suggest that the counterintuitive result may be partly because assistance from other nations and NGOs tends to dry up once a country is no longer classed among the very poorest. But it may also be because moving away from traditional farming practices has a cost, and it takes time for new methods to start paying dividends. For example, switching from pastoral farming to settled agriculture can bring benefits to local people in the long-term, once they can introduce new techniques like higher-yielding, drought-resistant crops and modern machinery. But these need investment to work, and it takes time for poor farmers to build up the necessary capital.

In the meantime, most land has been parcelled up into private plots and is now crisscrossed by fences, so people can no longer respond to drought, as their pastoralist ancestors would have — by simply moving their herds somewhere with more water.

Calculating areas at risk

The team devised a two-part process to identify areas that are at particular risk from drought-induced famines over the coming century. They used a climate model to predict where rainfall and soil moisture may fall sharply. Then they analysed a range of social and economic data to work out how well different countries could adapt to environmental change.

In part this involved looking at the effects of drought on different countries in the past, and trying to work out why some have coped well and others have been pitched into devastating famines. They ended up

with a map of how well different areas were likely to be able to cope with future climate change.

Putting the two results together allowed the scientists to calculate where the risk to [food supplies](#) is most serious — areas that will suffer severely from [climate change](#) and where societies will be least able to adapt.

They focused on wheat and maize production, both because these are two of the most vital crops and because better data is available on them. It turns out that for wheat, the vulnerable spots are the south-eastern USA, south-eastern South America, the north-eastern Mediterranean and parts of central Asia. For maize, the risks seem to be south-eastern South America, the north-eastern Mediterranean and parts of southern Africa.

Dr Gosling said: “There are events that we cannot predict. For example, some areas may appear very resilient to drought because in the past they’ve been able to use groundwater to keep crops alive. If aquifers start running dry, areas like the American Midwest could be much more vulnerable to future droughts than this study suggests.”

Provided by University of Nottingham

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