

ABSTRACT

Global studies of climate change impacts point to the possibility of more adverse implications on the developing countries in comparison to the developed countries. However there have been a very limited number of detailed studies on developing countries per se. Among various sectors that could potentially get affected due to changing climate, agriculture has special significance due to its direct dependence on climate. With its significant influence on the economy, agriculture still plays a vital role in India. Keeping these things in view, this dissertation has attempted to estimate the potential impacts of global climate change on Indian agriculture.

Climate change is expected to result in higher temperature and rainfall over the Indian sub-continent. The higher expected temperature could have adverse impacts on the crop yields. At the same time, higher rainfall could enhance growing period duration. In this thesis, the vulnerability of Indian agriculture is assessed through: (a) estimation of the impacts of climate change on various crops grown under different agro-climatic conditions and different management practices, (b) translation of the physical impacts into the associated economic impacts, and (c) analysis of the welfare implications on various income groups of the economy. The issues of adaptation possibilities and carbon fertilization effects are also addressed.

As it is not feasible to address all these objectives using anyone single approach, three different modeling approaches, namely crop-suitability, crop - modeling and Ricardian, are used in this thesis.

Overall results from various approaches suggest:

- Impacts estimated by the Ricardian approach are lower than those estimated by crop-modeling approach. This indicates that farm level adaptations could have significant influence.
- Consideration of carbon fertilization effects brought down the potential impacts substantially. This indicates that one might have to combine results from various approaches rather than relying on anyone single approach.
- The estimates from the Ricardian approach appear to be substantially higher than those predicted using similar approach for the US and Brazilian agriculture. This highlights the potential danger of extrapolating impact estimates from one country to another.