

Assessing agricultural vulnerability due to climate change using NDVI trends

Kaushalya Ramachandran
CRIDA, India

A study to evaluate agricultural vulnerability at district –level in rainfed agro-ecological regions in India, is being conducted at the Central Research Institute for Dryland Agriculture (CRIDA) at Hyderabad under the National Initiative on Climate Resilient Agriculture program of ICAR. Long-term NDVI time-series data is being used to assess agricultural vulnerability. As variations in NDVI would indicate impact of climate change on vegetation growth and vigour, it could be used as an indicator to study agricultural vulnerability. Based on coefficient of variation (CV) in NDVI, vulnerable districts were identified in order to develop climate resilient technologies for coping with climate change and adapting to it. NDVI data products based on NOAA-AVHRR (8km) data (1982-2006) and MODIS-TERRA (250m) NDVI data product (2001 – 2011) were used for the study. Study indicated that agriculture would be vulnerable in over 81.3 million ha in the arid, semi-arid and dry sub-humid regions in western parts of the country in Rajasthan and Gujarat and in central and peninsular India in large parts of Maharashtra, Karnataka and Andhra Pradesh where rainfed agriculture is widely practiced. These regions are already challenged and climate change would acerbate the situation. Over 12.1 million ha of Kharif cropland would be mildly affected while 1.81 million ha would be severally vulnerable. In case of Rabi agriculture, 6.86 million ha may be mildly affected while 0.5 m ha may be severally vulnerable to climate change. MODIS NDVI time-series data indicated a moderate drying trend in case of West Bengal, eastern Bihar and Jharkhand, parts of Vidharba and southern Madhya Pradesh, National Capital Region, southeastern Punjab, southern Himachal Pradesh and south-west Uttarakhand. These regions are densely populated and cultivate major food and cash crops like wheat, maize and sugarcane in the country. The information generated under this study must be used to develop regional strategies for coping and adapting to climate change.

kausalya@crida.in