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"Agricultural development within the rural-urban continuum"

Vulnerability Assessment and Impact of Climate Change on Agricultural Production in Krishna River Basin, India

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Abstract

The concept of vulnerability has emerged in the recent years as a cross-cutting theme in research on human dimensions of global environmental change. Vulnerability has been largely studied by scholars from various academic disciplines. The agricultural sector is highly vulnerable to climate change in many parts of the world. Vulnerability was used in relation to food security assessments, poverty mapping, natural hazard exposure, or climate impact studies. In the present paper, a vulnerability index is constructed by considering exposure, sensitivity and adaptive capacity. Multivariate statistical techniques, Ricardain and Principal Component analysis were used in assessing the impact of climate change in Krishna river basin of Andhra Pradesh in India. The impact of climate change on crop income and crop productivity analysis, using Ricardian models, indicated that temperature during North East monsoon has a significant impact on crop-net revenue. Whereas the net revenue increases initially with increase in temperature, it reaches a maximum, and then decreases, whereas the net revenue attains a maximum value at about 25.8°C. The climate variables have significant non-linear effects on the crop-gross margin per ha. South West monsoon temperature has a positive effect on the crop-gross margin across all districts.

More than 60 per cent of the area is vulnerable in the basin, where Ananthapur district is extremely vulnerable and Guntur district is less vulnerable. The adaptation strategies from such highly vulnerable areas can be studied and implemented in the less vulnerable areas to minimise the impacts of climate change over the coming years. Since climate change will result in yield and income loss, it is important to introduce different adaptation measures such as change in the cropping pattern, change of crop varieties, and investment in supplementary irrigation. It is also important that climate awareness and capacity building become an integral part of the development programs at all levels.

Keywords: Adaptive capacity, exposure, principal component analysis, Ricardian model, sensitivity, vulnerability index

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