

Climate Change, Agriculture, and Food Security in Pakistan: Adaptation Options and Strategies

Changing temperature, erratic precipitation, humidity concentrations and frequently occurring extreme weather pose serious threat to natural ecosystems adversely impacting agriculture, water, coasts, livelihoods, human health and food security in Pakistan. The Maplecroft ranked Pakistan 16th on the list of countries most vulnerable to the impacts of climate change and is witnessing severe pressure on natural resources and the environment, and climatic changes are likely to exacerbate this trend. Water supply, already a serious concern in many parts of the country, will decline dramatically, affecting food production.



The temperature increases in Pakistan are expected to be higher than the global average resulting in reduced national agricultural productivity. The increase in temperature is projected to be somewhat higher in the northern parts than that in the southern regions of the country. The yields of wheat, rice, other cereals and some important cash crops would decline in all the regions of the country except in the Northern Mountainous areas where wheat yield is likely to increase due to expected higher temperature during winter.



The studies have shown that the growing season length for major cereals will decline with increase in temperature in all agro-ecological zones of Pakistan resulting in 6-11 per cent decline in yield of wheat and 15-18 per cent reduction in yield of basmati rice by the year 2080. Livestock production could decline by 20-30 per cent due to rising temperature—creating crises in milk, meat and poultry supplies and pushing prices beyond reach of the common people. On average, the agriculture sector of Pakistan would lose up to 16 billion dollars per annum due to change in climate by the end of 21st century.



Neglect or failure on the part of the society to develop and adopt technologies for climate change mitigation and adaptation of agriculture to sustainable resource use and environment-friendly improved practices may lead to enhanced poverty and severe food insecurity in the country. The poor, children and women are likely to suffer the most due to climate change in this region as majority of them are engaged in agriculture, which is highly climate sensitive. In Pakistan women and children are already 'underpaid, overworked and exploited' and climate change will further increase this workload and accentuate their vulnerability.



With somewhat enhanced realization of the threats imposed by climate change among the policy circles and other stakeholders in the country, the issue is attracting higher priority in government's development agenda. The technical assistance and financial support of international organizations, institutions, and agencies has played a key role in enhancing awareness and sensitizing policymaking toward climate change and building institutional capacities in developing countries.

Quality research on the issues provides crucial information and guidelines for informed policy design and effective implementation. Unfortunately, research on issues related to climate change in Pakistan is scarce and narrow in scope. The work already done in Pakistan on looking at the impacts of climate change on agricultural production at country and/or regional level is crucial to appreciate the extent of the problem and designing appropriate mitigation strategies at the country and/or regional level. However, the results are not very useful in terms of developing effective adaptation strategies at micro or household level as the micro evidence on impact of climatic change and related adaptation measures on crop yield is very sparse and lack human dimension i.e. how people and especially the poor, the vulnerable, children, females will be affected by climate change. Understanding this impact is vital to come up with credible strategy and action. The poor and the vulnerable will not only be the most adversely affected but they must play an important part in facing up to the threat, and for this they need to be suitably empowered.



A better understanding of rural households' perceptions regarding climatic changes, current adaptation measures and their determinants will be important for informed policy decisions regarding future adaptation

strategies for agriculture and related sectors in the country. Understanding the determinants of household choice of adaptation options can provide policy insights for identifying target variables to enhance adaptation measures. Despite the complexities of climate change impacts to the agricultural sector, there are opportunities to find out right kind of technologies and policies that reduce the intensity of the negative impacts and contribute in improving the livelihoods and food security of the affected.

In order to generate such information and to build research capacity the Pakistan Institute of Development Economics (PIDE) and Canada's International Development Research Centre (IDRC), have recently agreed to undertake research titled "Climate Change, Agriculture, and Food Security in Pakistan: Adaptation Options and Strategies" under the IDRC's umbrella project on "Climate Change Adaptation, Water and Food Security in Pakistan". The main focus of the research is on looking at the differential impact of climate change and adaptation options for vulnerable groups and assessing practical alternatives and institutional partnerships that can ensure food and water security for poor women, men and children.

This study aims at filling the research gap by examining the impact of key climatic variables on food production in Pakistan using district level panel data as well as household survey data. The study will also investigate key factors affecting the farmers' decision to climate change adaptations, and the impact of this action on agriculture and various aspects of food security.

The overall objective of the research is to contribute to the formulation of policies, programmes, and action plans to adapt to and mitigate the adverse impact of climate change and ensure that government's overall objective of moving the Pakistan economy to a high, sustainable and inclusive growth is realized. The immediate objectives of the project will be concentrated in two areas: a) design of coping and mitigating strategies arising from extreme and untimely weather events that are resulting in floods and related natural disasters; b) analyze the impact of climate change on small and marginal farmers in relation to agricultural productivity, cropping pattern, livelihoods and food security in order to identify measures to supplement their indigenous/local adaptive strategies to cope with climate change. The more specific objectives of the study are to:

- 1) review and evaluate existing policies and support functions of various institutions/ organizations mandated to provide support for mitigating adverse impacts of climate change, improving food security, and disaster management.
- 2) analyze economic impacts of climate change on agriculture in different agro-ecologies using district level panel data—also incorporating the extreme events like floods and droughts;
- 3) explore the determinants of farmers' decisions to adapt in response to long-run changes in key climatic variables and how adaptation/non-adaption affects agricultural productivity and food security; and
- 4) identify indigenously developed best-practices and adopted by the communities and assess their potential to be scaled up with special emphasis on water and land conservation practices.
- 5) build analytical capacity of the staff and post graduate student undertaking research on issues related to climate change, agriculture, and food security.

Expected Outcomes

- Policies and institutional capacities reviewed relevant to mitigating climate change impacts;
- Panel data gathered and analyzed for measuring climate change impacts across regions;
- Package of interventions ready to be offered for adaptation as mitigation strategy;
- Adaptation/non-adaption effects on agricultural productivity and food security assessed at household and regional levels;
- An enhanced analytical capacity at the national level on issues related to climate change, agriculture, and food security.

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