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Climate change impacts on community resilience-A review

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Abstract
Climate change acts as a major hindrance factor and is considered to be the mother of all factors that affects the agriculture, livestock and other sectors of the world. Agriculture in a climate change context requires a multi-sectoral and multi-agency approach. The majority of farmers are small and marginal landowners who are resource-poor. Adaptation is always a local phenomenon. Hence, there is a need to integrate traditional knowledge with the scientific to develop locally suited adaptive strategies for agriculture. Climate-Smart Adaptive Sustainable Agriculture is the way forward to come out of this situation.

Keywords: agriculture; climate change; livestock; production system; resilience

Introduction
Climate change is already happening and its effects, especially on rural communities in India, are particularly adverse. The need is to highlight the key issues and understand the practical challenges that must be addressed if India is to build the capacities of rural communities to robustly adapt to climate change and realise the National and State Action Plans on Climate Change (NAPCC and SAPCC). It is predicted that for every two-degree rise in temperature, the agriculture GDP of India will reduce by five percent. In this context the worst hit are small-holder producers, as their ability to cope with the speed and intensity of climate events as they are happening, is an issue of concern. The need for a climate resilient approach to agriculture is critical for India with 60 percent of Indian agriculture being rain fed and more than 80 percent agriculturists are small-holder farmers.

Climate change associated with Indian agriculture
Indian agriculture today faces a multipronged set of challenges pressured simultaneously by several sectoral and non-sectoral demands. All this is further aggravated by the extreme weather variations that are being experienced. The majority of farmers are small and marginal landowners who are resource-poor. They are most affected due to their low adaptive capacity and risk-taking ability. By incorporating various adaptation measures in the agriculture system one can increase the resilience and adaptive capacity of the small land holders. Government policies, and the various departments and development agencies need to synchronise their efforts towards achieving sustainable agriculture productivity and food and nutrition security, particularly for the small and marginal farmer.
Assessing vulnerabilities of villages for climate variations is essential for building resilience of the people and their livelihoods. For building the response capacity of farmers, especially the small land holders, the model advocated promotes agriculture for the market while it simultaneously ensures food and nutrition security and ecosystem resilience. Hand-holding is urgently required to build the confidence of farmers in improved farming practices. Capacity building for application of a crop-specific 'package of practices' will enhance the ability of farmers to respond to the challenges facing them. Preparedness for weather variations is critical. To better equip farmers to respond appropriately to climate variations and minimise risks, local automated weather stations at appropriate distances will help generate locale-specific crop-weather advisories; together with Contingent Crop Plans specific to the sub-agri-climatic zone, they will increase the response capacity of farmers and will minimise losses.

There is an urgent need to promote/revive indigenous crop varieties and reverse the loss of agro-biodiversity caused due to market drivers.

Indigenous crops are more resilient to climate variations, farmers have better knowledge of handling them, and traditional crops generally meet the food preferences of communities, making it all the more important to create measures to promote and revive them. Reduction of waste of agriculture produce at all stages-from farm to plate-is essential, especially during the post-harvest stage. Decentralising the storage facilities and improving storage possibilities along with localised value addition to perishable goods is essential and will reduce the carbon footprint simultaneously.

Livestock, an integral part of the agriculture production system

The dying link in the harsh and unproductive environments of the arid and semi-arid rain-fed systems, livestock rearing goes beyond the purpose of mere milk and meat production and supporting rural livelihoods. It plays a critical role in providing draught power for agriculture and transportation, biodiversity regeneration and maintenance, and most importantly, manure for agriculture. This is a low-carbon system. At the national level, key drivers of change are the animal husbandry policies that promote adoption of high-input output production systems and animal breeding programmes focussed on increasing productivity (of a single productive trait-milk). The driver on another level that forces a decline in rearing of indigenous cattle is the conversion of common property resources (grazing lands in particular) into agricultural lands. The ban on grazing in forest areas, and the restrictions to grazing in natural resource conservation and management programmes, have caused reduction in rearing indigenous cattle and non-dairy livestock.

The simultaneous promotion of dairy cooperatives and related infrastructure, subsidies, poverty alleviation programmes, and animal husbandry schemes/programmes that promote crossbred cattle for improving economic returns through increased milk production have accelerated a shift towards rearing crossbred cows. The same is seen in sheep where fast-growing meat breeds are promoted rather than local breeds that are more suited to the agro-ecological zone (e.g. the 'Nellore Red' is promoted in Andhra Pradesh rather than the local Deccani sheep). Besides these, fluctuations in market prices, the demand for agricultural products, and repeated crop losses due to the vagaries of climate, are pressures that greatly influence decisions the rural poor make. The need for regular cash flow to meet their daily needs is a key pressure for the small-holder farmers. It influences cropping patterns, seed selection, and the type of livestock they rear.

The drivers and pressures have induced a clear shift from low-input farming to cash-oriented high-input-output, water-intensive, dairy-based farming. This change has deep impacts, affecting agriculture and livestock production, the ecosystem, and the communities. There is a significant reduction in indigenous cattle and non-dairy livestock in villages over time. In the ecosystem, the main impacts observed are rapid ground water depletion, decreasing soil quality and fertility, and loss of biodiversity. For the communities, agriculture input costs are on the rise, while crop yields are decreasing, lowering incomes, with a significant drop in animal protein in their diets.

A lack of understanding of the role of livestock in dryland farming systems has resulted in serious unintended consequences in the name of better economic development and environment conservation.

The promotion of alternate non-farm livelihoods for small-holder producers reduces the burden on agriculture and the natural resource base of being the only sources of income. Linkages and Partnerships: Collaboration with experts is essential to address the complex issue of building resilience to climate change. Partnerships with local, national, and international institutes. Farmer Field Schools: This outreach strategy fills the gap of inadequate extension services, currently experienced by small-holder producers. It provides on-site guidance and participatory documentation, engaging farmers in discussions and studies of their own and neighbours' plots, applying indigenous knowledge and scientific data. Weather-based locale-specific agro-advisories: With the support of data from Automated Weather Stations (AWS) located in villages,12 three days' weather forecasts provided by the Indian Meteorological Department help generate locale- and crop-specific agro-advisories that are sent through SMS to farmers13 every three days.

Contingent Crop Planning: Monsoons are critical for India's dry land agriculture. The amount of precipitation received during the main cropping season influences the annual crop production plan of the area. This in turn affects farmers' incomes, triggers ground water utilisation and ultimately impacts the national economy. Promotion of low external input technology: Besides the extensive application of organic compost (amrutkhad, vermicompost, amrutpani) and integrated nutrient and integrated pest management). This low-input crop production methodology enhances productivity and uses inputs more efficiently, while maintaining the resource base. It appears to withstand some shocks due to climate variability.

Diversification for livelihood security: When dependence of farmers for their sustenance is solely on agriculture, they will use any and all means to earn for their survival, even if it means extracting every drop of water, or increasing the application of chemicals, cultivating cash-pulling monocrops, and taking huge loans for agriculture. Therefore, diversification of crops, 17 agri allied activities, and alternate livelihoods are imperative for increasing resilience, ensuring economic security, and protecting the natural resource base. It thus reduces the burden of productivity from agriculture, particularly in a climate change context. Conservation and promotion of indigenous varieties: Document the knowledge and promote production of indigenous crop varieties, before we lose our heritage. However, research to assess the drought-resilient characteristics of indigenous varieties is necessary. Crop insurance: the design of insurance products should be such that they contribute to adaptation. They should necessarily incentivise success, risk reduction (payment of premium is not the same as overall risk reduction), adaptive behaviour and application of methods geared towards sustainability, and reward ecosystem-based (low-input low-risk) agriculture.

The way forward

Climate-Smart Adaptive Sustainable Agriculture is the way forward. Stabilisation and management of the natural resource base (land, water, and biodiversity) is important for all, particularly the semi-arid and rain-fed, regions. An ecosystems-based approach to Participatory Watershed Management as a central point of activity is essential for building the adaptive capacities to climate change. Assessing Vulnerability of a cluster of villages/sub-region to climate

change is essential for developing a road map for building locale-specific resilience of the people and their land to varying weather extremes. It is imperative that we integrate a package of climate-smart agriculture practices into ongoing programmes which includes weather-based locale specific agro-advisories, contingent crop planning, promotion of low-external input technology, water budgeting, livelihood diversification, and promotion of local agro-biodiversity. These, together, would build the resilience of the farming community, while simultaneously improving the quality of the resource base.

Reduction of wastage of agriculture produce from farm to plate, especially during the post-harvest phase, will greatly contribute to conservation of precious resources (water, energy, soil health, etc.), while decreasing the carbon footprint of agriculture. Decentralised good quality storage facilities would greatly reduce losses. Simultaneously, the promotion of village/household level storage facilities and value-addition would protect the income of small-holder producers. Capacity Building of the farming community right through, is essential at all stages and for all aspects. This is essential for sustainability of agriculture.

Conclusions

India being a hotspot for climate change and having 15 broad agro-climatic zones and 127 sub-zones, the presentation of climate change and its effects will vary from region to region. Hence a 'one size fits all' approach will be detrimental to the agriculture and food security of the country. Given the multiplicity and interconnectedness of possible solutions, these will necessarily have to be selected and tailored to fit the geographic and socio-economic characteristics and needs of the local community. Solutions should address the twin challenges: adaptation to climate variations and sustainability of the resource base with increase in productivity, to meet future food security demands.

References

1. Bernabucci U. Climate change: impact on livestock and how can we adapt. Animal Frontiers. 2019; 9(1):3-5.
2. Biswal J, Kennady V, Rahman H. Impact of methane emission and associated environmental stress on livestock production systems in India. Journal of entomology and zoology studies. 2020; 8(3):113-116.
3. GoI. Basic Animal Husbandry Statistics-2019. Department of animal husbandry dairying and fisheries, government of India, New Delhi, 2019a, 132.
4. Kennady V, Biswal J, Rahman H. Amelioration of methane production from livestock production systems through effective management strategies. Journal of entomology and zoology studies. 2020; 8(3):148-152.
5. National account statistics. Central statistical organization, GOI: Share of agriculture & allied and livestock sector in GVA, 2019.
6. NDDB. National dairy development board, Government of India, 2020. https://www.nddb.coop/information/stats/milkprodindia.