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Climate resilient agriculture for food security

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Global warming and climate change have already set in and even the semi-literate farmers are being able to realise that the weather conditions are becoming abnormal. Last year, there was a delay in monsoon and several states in the country particularly Maharashtra, had to encounter severe drought. Subsequently, unexpected hail storms and heavy rains during spring season caused extensive damage to standing crops. This year again, the rainfall is expected to be below normal. Apart from the volume, timely distribution of rainfall will also affect agricultural production. This phenomenon is likely to continue. As the food security of 1.2 billion people is threatened by erratic monsoon, there is an urgency to prepare a climate resilient cropping system on priority. Supply of safe drinking water is another serious problem related to climate change.

In India, 70% of the farmers are small landholders with an average holding of one ha, mostly dependent on rainfall. With low land productivity, lack of irrigation and sub-optimal use of inputs, their crop yields are low, forcing over 30 - 40% families to live in poverty. In the absence of alternative source of income, they cannot even afford to purchase food grains from the market. Thus, while addressing food security, the focus should be on two aspects namely, engaging small farmers in sustainable agriculture to build their purchasing power and increasing food production to meet the growing demand.

Enhancing the Productivity of Small Farms

Efficient management of soil and water, multiple cropping with drought-resistant varieties and mixed farming with livestock as a major activity can be helpful for increasing the productivity on small farms. In the absence of assured irrigation, maintaining dairy cows and buffaloes and cultivation of food-cum-fodder crops such as sorghum, maize, wheat, bajra and groundnut can boost the income. These hardy crops yield food grains as well as nutritious fodder through crop residues. Likewise, livestock consuming fodder provide milk and nutritious dung for agricultural production. Thus, mixed farming provides income from two sources with least risk, while facilitating efficient nutrient recycling.

Small farmers can also grow other cash crops if backward and forward linkages are provided, with regular guidance. Consolidation of small holdings to take up mechanised farming is another option. Corporates can take up contract farming with huge investment on irrigation and infrastructure to cultivate high value crops, generating year round employment for local population. This calls for a suitable policy support to safeguard the ownership of the land.

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Boosting Agricultural Production

For increasing agricultural production in the country, the major technologies to be adopted are efficient use of water resources, balanced fertiliser application, selection of crops adapted to changing climatic conditions and development of a strong value chain.

Efficient Management of Resources

Water supply is worst affected by climate change, suppressing crop yields. Hence, conservation of water resources should be given priority. The annual water availability in India is 4000 billion cubic metre (BM^3), which comes from rainfall, snowfall and melting of glaciers. However, the usable water is only 1123 BM^3 because of huge water losses caused by heavy deforestation, poor water storage facilities and inefficient water management. Hence, the priority should be to conserve rain water through watershed development. India has over 182 million ha of cultivated area of which only 140 million ha are under cultivation. During the last 10 years, over 85 million ha were covered under watershed development but hardly 15 - 20% area could be covered effectively. Hence, efficient programme implementation can significantly boost crop production while recharging the ground water table.

Only 44% area is covered under irrigation although there is potential to cover 80% cropping area. With adoption of micro-irrigation, additional 50% agricultural lands can be covered under irrigation due to saving in water, while reducing the consumption of fertilisers and pesticides as well. Hence, a strong policy is needed for a complete shift from flood irrigation to micro-irrigation.

Balanced application of fertilisers such as N, P, K and micro-nutrients is essential to boost crop production. Presently, farmers are using excessive doses of nitrogen while ignoring other nutrients, which often leads to vegetative growth and heavy infestation of pests and diseases. Hence, balanced application of nutrients based on the soil fertility and crop requirement will increase crop yields, while saving on inputs and preventing soil and water pollution. Selection of suitable crops and varieties can further enhance the income. Farm mechanisation needs a fresh look, as efficient farm equipment can facilitate timely operations, while reducing hardship.

Value Chain Development

Disorganized farm services for crop production and absence of infrastructure for post-production activities make our farmers victims of severe exploitation. The problem is so serious that even the progressive farmers of Punjab and Haryana have to depend on Government support for selling their commodities. Discontinuation of procurement by the Government and allowing the farmers sell the produce on their own might jeopardise the economy. On the contrary, an efficient value chain can improve the fortune of these farmers by permitting them to select high value cash crops instead of paddy and wheat which fetch lower price.

This calls for a paradigm shift by involving public and private institutions at the village level for value chain development. It is necessary to invest in research for evolving better varieties of crops and efficient agricultural implements to cope up with the changing climate. Research on efficient weather forecasting is also necessary. An information technology network should be created to disseminate information on the weather and market. There is a need to create a band of self-employed para-technicians who can work as service providers. Active women farmers can be identified as champion farmers to adopt new technologies and motivate others to follow. Grading, packing and processing facilities need to be created at the village or block level through farmers' organisations or producer companies to ensure transparency and value addition.

It can be concluded that with a multi-pronged strategy to boost agricultural production involving small farmers and suitable policy support, India can become a food exporting country while ensuring food security and better quality of life for the growing population.

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