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## Smart Farming in a Warm World

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(The editorial is based on the article “Smart farming in a warm world” which appeared in The Hindu for 27th February 2019. In this article, we will discuss the effects of climate change on agriculture and a way forward.)

**Climate change has the potential to hurt everyone, but one particularly vulnerable group is farmers.** Agriculture, especially in India, depends on favorable weather conditions; so climate change-induced temperature rises can significantly hurt farm productivity. Consequently, a farmer’s ability to adapt to temperature changes becomes crucial.

Global demand for food is on the rise due to population growth. Moreover, developing world is adding more protein to their diets. **The Food and Agriculture Organization (FAO) and other projects that global agricultural production must double by 2050 to close the gap between food supply and demand.**

**No industry is more dependent on predictable weather and climate patterns than agriculture.** Volatile climate changes create enormous challenges in meeting the needs of the world’s growing population. Yet farmers are acutely divided over climate change.

### Concerns

- **With patchy rains, crop failures become common.** There is hardly any greenery in many villages, making it difficult for farmers to even maintain cattle.
- **Quick adaptation for new changes is hard,** with farmers varying and mixing crops across seasons, along with heavy investments in borewells, tractors, and threshers.
- **Because of continuous crop failures, farmers are increasingly abandoning their lands** and heading to nearby towns to find work as laborers.
- Though India is fortunate to have the monsoon, it is also uniquely vulnerable to rising temperatures, **with the country ranked 14th on the Global Climate Risk Index 2019.**
- India has over 120 million hectares of land suffering from some form of degradation. This has consequences, especially for marginal farmers.

- **According to one estimate, they may face a 24-58% decline in household income and 12-33% rise** in household poverty through exacerbated droughts.
- With rain-fed agriculture practiced in over 67% of our total crop area, weather variability can lead to heavy costs, especially for coarse grains (which are mostly grown in rain-fed areas).
- **A predicted 70% decline in summer rains by 2050 would devastate Indian agriculture.**
- Within 80 years, our Kharif season could face a significant rise in average temperatures (0.7-3.3°C) with rainfall concomitantly impacted, and potentially leading to a 22% decline in wheat yield in the rabi season, while rice yield could decline by 15%.

## Solutions

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- **Promotion of conservation farming and dryland agriculture**, with each village provided with timely rainfall forecasts, along with weather-based forewarning regarding crop pests and epidemics in various seasons, is necessary.
- **Agricultural research programmes need to refocus on dryland research**, with the adoption of drought-tolerant breeds that could reduce production risks by up to 50%.
- **A mandate to change planting dates, particularly for wheat, should be considered**, which could reduce climate change-induced damage by 60-75%, by one estimate.
- **There needs to be an increase in insurance coverage and the supply of credit.** Insurance coverage should be expanded to cover all crops, while interest rates need to be subsidized, through government support and an expanded Rural Insurance Development Fund. The recently announced basic income policy by the government is a welcome step as well.
- **A push for actual on-ground implementation** of compensatory afforestation is required.
- To check the effects of climate change there is a need to preserve our forest resources.
  - For this, **restructuring of Indian Forest Services**, in order to make it equivalent to the police and the army, albeit in the environmental domain can be done.
  - **State-of-the-art training to its personnel must be provided**, and specialization should be encouraged in wildlife, tourism, and protection for new recruits.
  - **Deputations from other services will no longer do**; this needs to remain a specialized service. Wildlife heritage towns should be given more attention — cities like Sawai Madhopur, Bharatpur, Chikmagalur, and Jabalpur, which are adjacent to national parks and sanctuaries, need to be converted into green smart cities with upgraded waste recycling processes.
  - **The Van Dhan Yojana, as adopted by the State government in Rajasthan,**

- can be scaled up** towards building a green mission to save our non-protected forests (outside the existing national parks and sanctuaries).
- **Wildlife tourism must also be encouraged**, particularly through public-private partnerships, to help increase conserved areas while making a difference to backward districts.
  - **The impact of climate change will affect India's food security while reducing fodder supplies for our livestock.** Prudent investments and policy reform can help make India resilient to climate change.

## Conclusion

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**Any adaptation to ongoing climate change will require climate justice, which involves policy reforms that can help make India resilient to climate change.**

This can be induced by expansion of joint research and development partnerships (like the U.S.-China Clean Energy Research Center), pairing India's emerging smart cities with green cities in the West.

### Climate Smart Agriculture

Climate-smart agriculture (CSA) is an integrated approach to managing landscapes—cropland, livestock, forests, and fisheries--that address the interlinked challenges of food security and climate change.

#### CSA aims to simultaneously achieve three outcomes:

- **Increased productivity:** Produce more food to improve food and nutrition security and boost the incomes of 75 percent of the world's poor who live in rural areas and mainly rely on agriculture for their livelihoods.
- **Enhanced resilience:** Reduce vulnerability to drought, pests, disease, and other shocks; and improve capacity to adapt and grow in the face of longer-term stresses like shortened seasons and erratic weather patterns.
- **Reduced emissions:** Pursue lower emissions for each calorie or kilo of food produced, avoid deforestation from agriculture and identify ways to suck carbon out of the atmosphere.

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