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## Tropical and sub-tropical fruit crops in the arena of climate change

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#### Abstract

Climate change is a looming threat to mankind. No one can escape from its destructive consequences and out of its impact on plant kingdom can never be overlooked as human being depends on them to assure food security as well as maintenance of ecological balance. Perennial crops though robust in nature cannot nullify adverse climatic impacts. Among them fruit trees of warm climate that provides a great role in nutritional security worldwide and enriched of most of the tropical continents with its wide species diversity. So for this, climate change adversities on tropical and sub-tropical fruit crops needs way outs and seek urgent expert's attention.

**Keywords:** Climate change, fruit trees

#### 1. Introduction

Changing climate is a dynamic factor from creation of earth to formation of living being and during continuous evolutionary processes climate has always changed. The facts that make the mankind concerned are the rate at which climate is changing and mostly due to human interference.

It is impacting ecosystem in many ways like shifted growing season in many parts of the globe, altered lifecycles of pollinators, like bees, that may cause out of synchronicity with flowering time of plants and trees. This mismatch can limit the ability of both pollinators and plants to survive and reproduce, which would reduce food availability throughout the food chain. Pollinators play a key role in fruit production system from tropical to temperate region. For most of the temperate crops pollinators are externally introduced into orchards for maintaining proper pollination and consequently the crop yield.

Accordingly changes in precipitation pattern, increasing temperature and uncertainty in climatic prediction leave huge impact on tree crops (Olesen and Bindi, 2002) [2]. Generally in most fruit crops like mango, papaya, guava and others, flower drop occurs when extreme low temperature conditions prevail during flowering and ultimately hamper fruit yield (Dinesh and Reddy, 2012) [1]. Rising temperature prevents desirable fruit coloration in coloured guava and reduces quality grape productions that ultimately reduce the area of cultivation market demands as well (Rajan, 2008; Zemni *et al.*, 2005) [3-4]. Similarly temperature also determines the quantity and quality of flowers, thus directly influences the fruiting potential for the season. Fruit crops like mandarin, coloured variety of guava and grapes require low night temperature to develop attractive fruit peel colour. Sweetness of warm climate fruits also increases with increase in diurnal temperature difference which surely affected by adverse climatic situations. These are some examples but the actual scenario is much larger and if proper measures are not taken situation may get worsen.

Another horrible impact of climate change is pest and disease infestation that may become severe in hot and humid conditions which is favourable for promulgation of many pathogens like, fruit fly is gradually becoming an alarming threat to guava and black leaf streak of banana may become more aggressive with increase in global temperature. The thing is like that new diseases or pest that were latent before global warming can become a major threat.

However many fruit trees have developed adaptive mechanisms throughout their evolution process to resist adverse situations. Where in other agricultural crops cannot be grown due to extremity of weather, fruit crops like date palm, aonla, pomegranate change hot dry desserts into greenery so as in case of extreme temperate regions cherry, walnut produce delicious fruits. Changes in phenological cycle probably are the first step to adapt weather alteration situation. Even to cope up with global warming perennial crops, palm trees can constantly maintain more year round carbon in their biomass and soil compared to annual crops.

Mitigations for annual crops are comparatively easier as they complete their life cycle in one growing season. In adverse situation timing of crop sowing may be altered or varieties with short life cycle can be incorporated that save the grower from total crop failure which is not possible in fruit crops. Even breeding for stress resistance is also less time taking for annual crops. Whereas for fruit trees, breeding procedure is complex in nature and requires long time to get desired outcome. However some crop models suitable for this perturbed environmental condition are present, in most cases these do not include any horticultural crop.

## **2. Conclusion**

Fruit crops though considered hardy in nature and especially tropical and sub-tropical fruits that can migrate to higher elevations due to temperature rise. The process is slow and it is not easy for crops to adapt their biological cycle or ecological niche at the same rate with changing weather. In this way many valuable species may get extinct. Role of these crops in nutritional security is inevitable so the question remains whether we should neglect adverse climatic impacts on these crops or pay certain attention at least for the sake of mankind?

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