Impact of changes in climatic conditions on temperate fruit production of Himachal Pradesh

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ABSTRACT. The study examined the impacts of changing climate on productivity of temperate fruit crops viz., plum, pear, peach and apricot in Himachal Pradesh based on climate information and farmers’ perception. Three study sites representing different elevations viz., Shimla, Kullu and Palampur were selected to relate the chill units with temperate fruit productivity. The climate element distribution over the period in each study site revealed an increase in the mean temperature to the tune of 0.050, 0.019 and 0.046 °C per year in Shimla, Kullu and Palampur respectively in the past 3 to 4 decade. The rate of decrease of rainfall per year during winter season was -9.86 mm in Shimla, -11.1 mm in Kullu and -8.6 mm in Palampur leading to a decrease in chill accrual. The chill units calculated using the UTAH model showed a decline of more than 4.97 chill units per year during December month, 0.64 units per year in January and 3.75 units per year in February month in past 26 year period in Shimla district. The decrease of 1.73, 1.84 and 1.65 chill units per year during January, February months were observed at Kullu. The decrease of chill units during December to February ranged from -2.8 to -12.8 per year in Palampur were also observed. The significance of the slope of chill units was worked out using Mann-Kendall test trend which indicated no significant trend for the December month for Kullu region and January and February months at Shimla. Significant decreasing trends in chill units for January to February months for Kullu, December month for Shimla and December to February months were observed at Palampur. The indications of changes in climate have also been supported by the farmers’ perception in Kullu, Kangra and Shimla districts accounting a
reduction in snowfall with an increase in temperature in past 20 to 30 years affecting the chill accumulation. The temperate fruits pear, peach, plum and apricot showed significant increase in the production at the rate of 0.172, 0.064, 0.018 and 0.018 t/ha per year during the past two and half decade respectively. Thus, the decreasing trends in cumulative chill units due to increase in temperature and reduction in rainfall in all locations varied from sub temperate climate in mid hills to temperate in high hills did not affect the productivity of temperate fruits in Himachal Pradesh and a promising replacement for apple shifting region in the face of climate change.

Key words – Temperate fruits, Chill unit requirement, Snowfall, Farmers’ perception, Climate change.