

Assessing length of growing period as an indicator of climate change

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Abstract: Climate change is one of the hot topics in recent decades, which has direct impact on the agriculture production and productivity. Although there exists few debates on the actual existence of climate change, many scientists have taken up studies to quantify the impact of climate change and projections, especially rainfall and temperature on the crop growth and productivity using indicators viz., rainfall distribution, temperature deviation, cropping pattern etc., over the historical normal. Length of growing period (LGP) is an estimate of days available for crop production which is based on the rainfall distribution and Potential Evapo-Transpiration (PET). The deviation of LGP over historical normal can be used as an indication of climate change, as it affects the rainfed crop production directly. The parameters required for estimating LGP were derived from freely available remote sensing and modeled data for the years from 2001 to 2017. TRMM was used for rainfall parameter and GLDAS NOAH modeled data with ancillary data were used to derive PET using Jiang and Islam 1999 procedure from remote sensing variables. LGP deviation from normal, start of seasons and classification of growing period were computed to study the impact of climate change. Results revealed that there was a decrease in the LGP from 2001 to 2017 in 100-150 days category where it was more than 76 percent area in 2001 and has decreased gradually to 35 percent during 2017. Major seasons were derived based on the LGP which has at least 75 days for growing of crops. Single and double season areas were generated for each year which showed a considerable area under double season during 2001 to 2010 and no area under No prominent season class during these years, while the area under no prominent season class were visible from 2011 to 2017. The area was very high during 2016 under no prominent season class. LGP deviation from normal indicated an increase in LGP from the year 2001 to 2010 while there was a decrease of 25 to 50 days in major areas during 2011 to 2017. The change in the Start of the Season (SOS) is an important criterion which affects the cropping pattern of an area. Major area was found to have No change in the start of the season, while considerable area were found under Forward shift of more than 2 weeks and in north western parts of Tamilnadu the shift was backward for more than 2 weeks. The results clearly expressed the severe drought situations occurred during 2014 and 2016 and need for reorienting the growing periods in certain areas to overcome the loss of crop.

Keywords: Climate change, Length of growing period, Remote Sensing, PET.