Journal of Agrometeorology 9(2) : 279 - 281 (Dec. 2007)

Short communication

Study on the effective growing period (EGP) using FAO model for the selected districts of Andhra Pradesh and Rajasthan

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Assessing effective growing period (EGP) on practical basis is very important, especially for dry lands, since this period provides the required optimum soil moisture to the growing crops. It is evidently proved from the past research that the potential yield of a crop was directly proportional to the crop's evapo-transpiration to the Potential Evapo-Transpiration (PET).

Sanbagavalli *et al.*, (2001) made a study to determine the Length of Growing Period (LGP) or otherwise called as EGP for Coimbatore, Tamil Nadu, India, using FAO model. Rainfall data from India Meteorological Department (IMD) were collected for 80 years (1905-85) and mean striked out. Thirty and fifty percent initial probable rainfall was also computed. LGP was drawn between PET and mean rainfall, 30 percent and 50 percent initial rainfall respectively. The LGP was from 38th standard week to 50th standard week, if weekly mean rainfall were taken and the same period was noticed for 30 per cent probable rainfall also, while it was 40th week to 46th standard week for 50 per cent probable rainfall, which was unrealistic. The result suggested that computed LGP for 30 per cent probable rainfall was similar to the result obtained from mean rainfall. Crops like sorghum (cultivar, Co 25 and Co 26), maize (cultivar, CoH 1 and CoH 2) and sunflower (cultivar, Co 1 and Co 2) were suggested.

Climatic water balance for three agro climatic zones in Indian Punjab was assessed using weather parameters. Statistical analyses indicated that annual, as well as seasonal water deficit was maximum at Bathinda, while it was minimum at Ballowal Saunkhari. Such analysis was helpful in working out the length of crop growing period, which can be used for contingent crop planning and crop diversification for judicial use of limiting water resources (Kingra *et al.*, 2004).

Considering the usefulness of these studies for planning purposes, an attempt was made in the present study to fix the EGP especially for planning dry land cropping programme in the two study districts.

Mehabubnagar district for Andhra Pradesh and Udaipur district for Rajasthan were selected for the study. Monthly rainfall data from 1960 to 2000 (41 years) for

Mehabubnagar district of Andhra Pradesh and monthly rainfall data for 44 years (1960 – 2003) for Udaipur district of Rajasthan were obtained from IMD, Pune along with monthly PET data. For finding out the EGP, FAO water balance model as prescribed by Higgins and Kassam, (1981) was used. In this method mean monthly rainfall and 50 per cent PET values were plotted for twelve months. Whenever, the monthly rainfall did cross the 50 per cent value of PET in a concerned month, that month was taken as starting period of the EGP. Similarly, when the mean monthly rainfall got down from the monthly 50 per cent PET value, that month was taken as termination of the EGP. In addition, the stored soil moisture after the termination of the EGP was also taken into account to compute total EGP. Effective rainfall was computed based on the Gupta *et al.* (1972) model and used for arriving cropping system design for the monsoon season of the two districts of study and the data are presented in Table1.

From the data presented in Table 1, in respect of Mehabubnagar district there was deficit of rainfall to PET up to 60 per cent during June, which may affect the initial stand of the crop if sown and hence June month was eliminated from EGP. The deficit was 12, 9, 10 and 58 per cent respectively for July, August, September and October. Though the deficit was 58 per cent during October, since the crop would be under maturity stage after reaching physiological maturity, this deficit may not affect productivity. Thus, the study pointed out the EGP falls from July to October and hence one intercropping system, by integrating one-long duration crop of 120 days and one short duration crop could be recommended to this district. First week of July can be safely considered for sowing. Sanbagavalli *et al*, (2001) also recommended crops based on LGP analysis for Coimbatore, Tamil Nadu, India.

With respect to Udaipur, it is interpreted that a three-month LGP from July to September could be considered for cropping. This conclusion is drawn, based on the data furnished in Table 1, wherein, there was deficit of rainfall to PET up to 13 per cent during July, while the deficit was 11 and 44 per cent respectively for August and September. Inclusion of October month within the EGP would be a problem for this location, since the deficit was up to 92 per cent. Similarly for June there was greater deficit, since the monsoon onset occurs during early part of July only.

On contrary to the recommendation given under cropping system for Mehabubnagar for Andhra Pradesh, at Udaipur a crop with a duration not exceeding 90 days could be recommended with the sowing week to be fixed on the first week of July. Jain *et al* (2003) suggested crops for Gujarat agro ecological zones based on the LGP study.

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Table 1: Effective rainfall, PET and water deficit

Udaipur					
	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTAL
Mean Rain fall (mm)	172.9	189.2	107.1	15.5	484.8
Effective Rain fall (mm)	103.7	113.5	64.3	9.3	290.9
PET 100 Per cent	119.5	102.3	115.3	112.3	449.4
Effective rainfall received to satisfy PET (%)	86.8	111.0	55.77	8.3	64.7
Deficit (%)	13.2	11.0	44.2	91.7	35.2

Mehabubnagar							
	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	TOTAL
Mean Rain fall (mm)	104.3	181.4	181.5	175.9	83.7	17.8	744.7
Effective Rain fall (mm)	62.5	108.8	108.9	105.6	50.2	10.7	446.9
PET 100 per cent	157.5	123.9	119.1	116.7	120.5	116.8	754.5
Effective rainfall received to satisfy PET (%)	39.7	87.8	91.4	90.4	41.7	9.1	59.2
Deficit (%)	60.3	12.1	8.5	9.5	58.3	90.8	40.8

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