551.579.5 : 551.577.38 (548.2)

Agricultural droughts at Peddapuram, East Godavari district, Andhra Pradesh

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सार — वर्षा होने की स्थितियों में रागी की उपज के सन्दर्भ में कृषि सूखे के अन्वेषण का कार्य किया गया है । फसल पैदावार के पूर्वानुमान के लिए रागी की पैदावार और ऋतु सम्बन्धी I_{ma} के मध्य समाश्रयण ज्ञात किया गया है । फसल की बढ़वार के दिनों में नमी पर्याप्तता सूचकांक और मिट्टी में उपलब्ध नमी के प्रतिशत की आवश्यकता ज्ञात करने के लिए उपरोक्त प्राचलों के निम्नत्तम औसत एवं उच्चत्तम उपज के वर्षों में फसल बढ़वार सप्ताहों के रूप में लेकर ग्राफ खींचे गए हैं । इन्हीं वर्षों के लिए साप्ताहिक जल संतुलन प्रारूप भी प्रस्तुत किए गए हैं ।

ABSTRACT. This investigation is undertaken to study agricultural drought in relation to ragi (*Finger Millet*) grown under rainfed conditions. Regression relationship is worked out between the yields of ragi and seasonal I_{ma} for forecasting of crop yield. To know the requirements of index of moisture adequacy and percentage of available soil moisture during crop growing phase, graphs are presented by taking above parameters as crop growing weeks for the years of lowest, average and highest yields. For these years weekly water balance patterns are also presented.

1. Introduction

Studies on characterisation of an agricultural drought, which occurs when soil moisture and rainfall are inadequate during the growing season to support healthy crop growth and cause extreme crop stress and wilt, with special reference to a particular crop are scarce in India. Therefore, this investigation is undertaken to study agricultural drought in relation to ragi crop (*Finger Millet*) grown under rainfed conditions at Millet Research Station, Peddapuram (17°05′ N, 82°08′E) which is the headquarters of one of the upland taluqs of East Godavari District, Andhra Pradesh.

Ragi is grown in an area of nearly 8,000 acres in the upland taluqs of East Godavari District under rainfed conditions in the Kharif growing season. It is usually grown by raising nurseries in the week of onset of monsoon and transplanting the seedlings in plough furrows after 3 or 4 weeks in the mainfield and harvested in the months of October and November (generally from 41st week to 44th week).

2. Data and methodology

Meteorological data is collected from the Agric-Met. Station, Samalkot, which is about 3 km away from the Millet Research Station, Peddapuram. The weekly meteorological data is analysed for the period 1960 to 1976 (17 years), since the yield data at Peddapuram is available only for the same period. Weekly water budgets have been computed for all the years following Thornthwaite's scheme (1955). Further, the index of moisture adequacy (I_{ma}) and soil moisture as a percentage of available moisture capacity are computed during phenological stages of crop growth for the years of highest, normal and lowest yields.

3. Results and discussion

Regression relationship is worked out between the yields of ragi and seasonal I_{ma} (Table 1) and the equation is as follows :

$$Y = 9.9X + 1.2$$

and correlation coefficient $r = 0.64$

where, Y = Yield in kg/acre and $X = I_{ma}$ (%).

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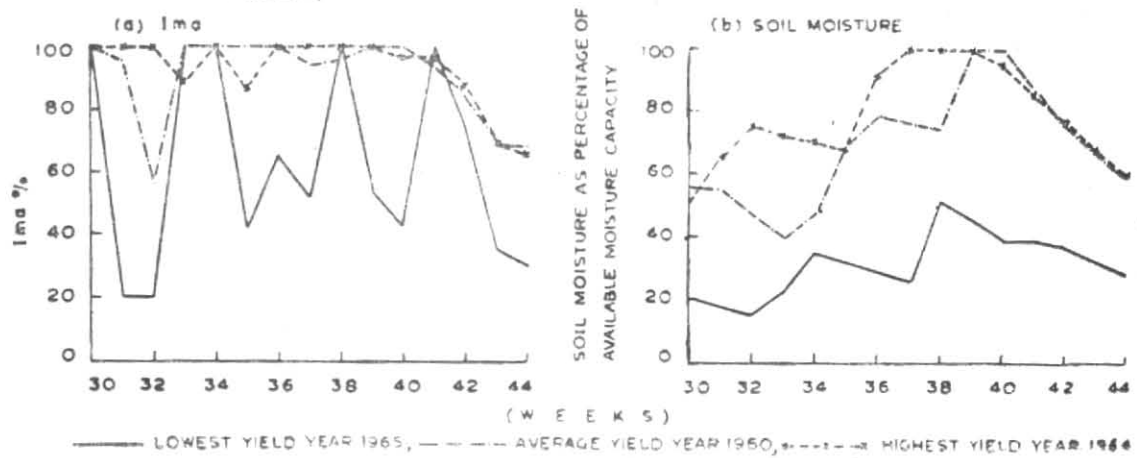
Fig. 1. Moisture and *finger millet* (ragi) growing period : (a) I_{ma} vs *finger millet* (ragi) growing period and (b) soil moisture vs *finger millet* (ragi) growing period

TABLE 1

Year, ragi yield and moisture adequacy at Peddapuram

Year	Yield (kg/acre)	Moisture adequacy (I_{ma}%) (Crop growing season, 30-44 week)
1960	797	81
1961	1196	85
1962	865	94
1963	410	77
1964	1367	84
1965	0 (*Nil*)	60
1966	514	82
1967	382	75
1968	382	67
1969	610	70
1970	730	69
1971	1231	76
1972	1183	79
1973	700	77
1974	877	78
1975	984	95
1976	982	81