

RAINFALL VARIABILITY AND RICE PRODUCTIVITY OVER KERALA

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Abstract: An attempt was made to study the trend in rice area under cultivation, production and productivity in Kerala to find out relationship between rainfall variability and rice yield. The average rainfall during the *kharif* is 2061.8mm while 563.3mm during *rabi*. Rainfall trend in *kharif* seasons showed a declining trend while *rabi* season indicated an increasing trend during the study period. The area under rice and rice production were in decline. It revealed that high rainfall during September and October are not conducive as it intervenes with harvest during *kharif* and transplanting during *rabi*.

Key words: *Kharif*, *Rabi*, Standard deviation, Productivity, Decadal analysis.

INTRODUCTION

Kerala, the southernmost State of India, lies between 8°18' and 12°48' North latitude and between 74°52' and 77°24' East longitude with an altitude range of 3 meters below MSL level as in Kuttanadu to an altitude of 1400 m as in the high ranges. The area and production of paddy have declined drastically over recent years due to shortage of labourers, increase in wages, less profitability than plantation and cash crops and lack of interest among the new generation in cultivation.

Pre-monsoon showers, delay in onset of monsoon, break in the monsoon, early cessation of monsoon, excess rainfall during crop season, rainfall shortage during north-east monsoon also adversely affect the crop yield. Krishnakumar *et al.* (2007, 2009) have observed that monthly rainfall in Kerala during June and July was decreasing while increasing in August and September, indicating that there was a shift in monthly rainfall as August and September rainfall was increasing.

MATERIALS AND METHODS

The long-term monthly rainfall data of Kerala State published by the Indian Institute of Tropical Meteorology (www.tropmet.res.in), Pune from 1974 to 2011

The area, production and productivity of rice during *kharif* (may-September), *rabi* (October-February) for the State of Kerala published by

the Directorate of Rice, Government of India, from 1974-75 to 2010-2011 formed the material for the study.

The decadal analysis was carried out by statistical tools by finding out mean, standard deviation and coefficient of variation. Time series analysis was carried out for rainfall and yield of rice. Crop weather relationships were worked out using the statistical package.

RESULTS AND DISCUSSION

The average rainfall from May to February during 1974 to 2011 over Kerala is 2606.0mm, which contributes about 94.6 % of the annual rainfall and the standard deviation of rainfall is 378.4 mm. June is the rainiest month (638.12 mm) followed by July (581.28 mm).

The coefficient of variation of total rainfall during May to February is 14.5 per cent, the monthly variation is more in January (132.37 per cent) followed by February (116.29 per cent).

Rainfall is showing a significant decreasing trend during South-West monsoon season (Fig. 1). During the study period, four excess (1975, 1981, 2006 and 2007) and three deficit (1976, 1986 and 2000) rainfall years were noticed in the *kharif* season.

The correlation studies indicate that rainfall of August was highly positively correlated with rice production while September rainfall was

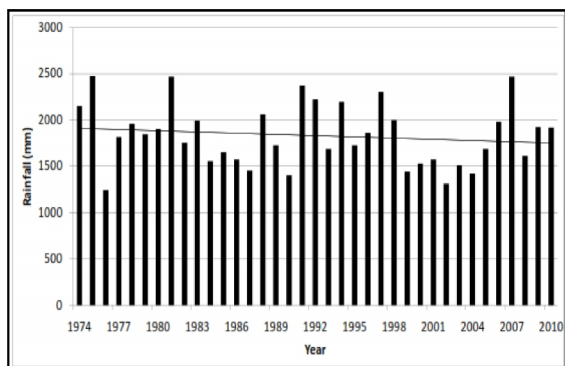


Fig. 1. Trend in Southwest monsoon rainfall (mm) during 1974-2010

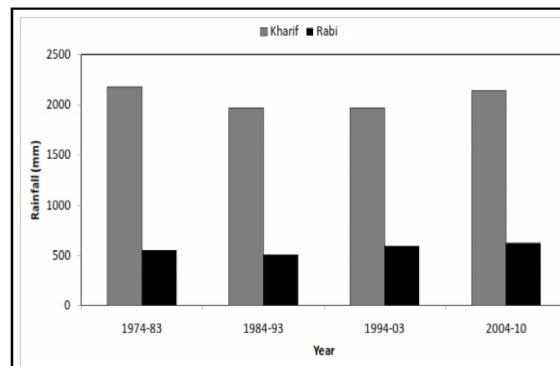


Fig. 2. Decadal rainfall of both the *kharif* and *rabi* season

negatively influencing the production of *kharif* season because the reproductive phases like flowering, maturity, grain filling and harvesting coincide with rainfall depending upon the region and broadcasting practices.

November rainfall was highly positively correlated with rice production while October rainfall was negatively correlated with *rabi* yield as heavy rainfall adversely affects the transplanting stage and increases the incidents of pest and diseases.

Decadal analysis indicated that the lowest and highest rainfall during *kharif* season was 1971.5mm (1994-03) and 2183.5 mm (1974-83) respectively and the rainfall during *rabi* season was 508.0mm (1984-93) and 623.5 mm (2004-10) respectively (Fig. 2).

In the case of *kharif* season rainfall showed a decreasing trend while rice productivity showed an increasing trend (Fig. 3).

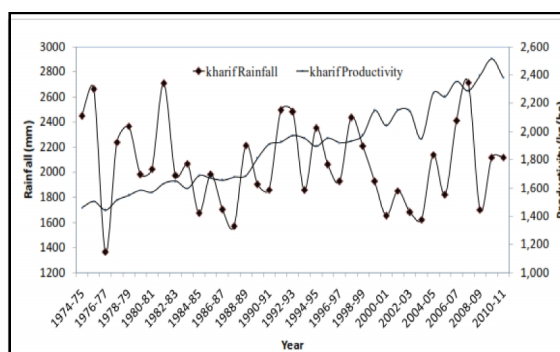


Fig. 3. Rainfall and productivity of *kharif* season

Production during *rabi* season is very much less than *kharif* season, as the area under *rabi* cultivation is less. In the case of *rabi* productivity rainfall and rice productivity showed an increasing trend. (Fig. 4).

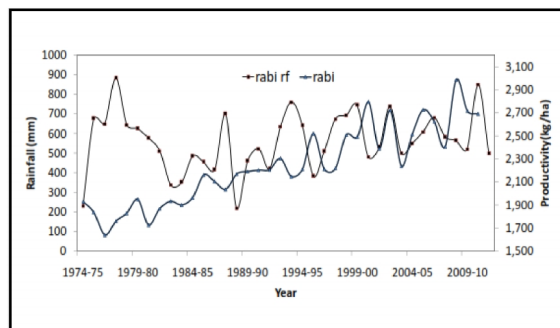


Fig. 4. Rainfall and productivity of *Rabi* season

Both the area and production under rice were observed to have a decreasing trend whereas the productivity was increasing trend (Fig. 5).

The percentage decrease in area and production was 75.8 and 60.8 respectively while the increase in yield was 62.06. Between 2007-08 and 2009-10, the area under rice cultivation in Kerala increased by 5,200 ha and the production of rice in the State increased by 69,800 tones.

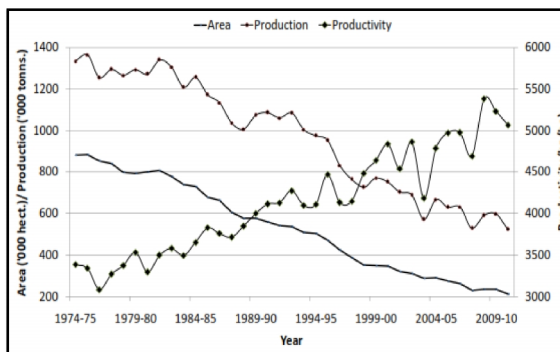


Fig. 5. Area ('000 hect.), Production ('000 tons.) and Productivity (kg/ha) of both the season *kharif* and *rabi* together.

The study reveals that rainfall was in decreasing trend during *kharif* while increasing in *rabi*. In both the seasons, floods are not uncommon due to wet spells or single day high rainfall events. High rainfall during September and October are not conducive as it intervenes with harvest during *kharif* and transplanting during *rabi*.

Overall, the study indicated that high rainfall across the State is not conducive for obtaining better yields.

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