



CLIMATE CHANGE ADAPTIVE CROP PRODUCTION STRATEGIES IN HIGH ALTITUDE AND TRIBAL AREAS OF VISAKHAPATNAM DISTRICT, A.P

K. SASIKALA* and P. ASHOK

Regional Agricultural Research Station, Chintapalli, Visakhapatnam Dt. A.P

e-mail: *sasiagron @ yahoo.in

ABSTRACT

Agriculture in many regions remains sensitive to climate variability and the capacity to manage this risk is variable. Hence, it has become critical to identify and evaluate options for adapting to climate change in agriculture. The dominant weather and climate events that risk agriculture are monsoon onset/with drawl, rainfall distribution, dry and wet spells, droughts, cyclones and floods. The resource poor tribal farmers experiencing difficulty in their farming with these hazardous unpredictable weather conditions. Keeping this in view, a study was conducted at RARS, Chintapalli to know the behavioural changes of climate and to formulate climate change adaptive crop production strategies in agency areas of Visakhapatnam district of Andhra Pradesh.

Average of decennial monthly weather data reported that maximum temperature (33.7 °C) and minimum temperature (7.9 °C) were noticed during the month of May and December respectively. Similarly, maximum relative humidity (88.5 %) and minimum relative humidity (46.2 %) were noticed during the month of October and March respectively. Rainfall is highly variable and maximum amount of rainfall was received during the months of July and September with more number of rainy days during the month of August. Based on these data, cultivation of crops like paddy, maize, vegetables and banana were recommended during *kharif* season and crops like wheat, chick pea, niger and pulses were recommended during *rabi* season. The other crops like coffee, pepper, cardamom, strawberry, orange and pine apple can also be successfully cultivated in these areas. Abnormal weather conditions during the crop growth period can also be mitigated timely by the contingent crop management strategies issued through Agromet Advisory Services by integration of Medium Range Weather Forecast with location specific crop and seasonal conditions.

Key words: High altitude, Tribal area, agriculture, climate change, crop production strategies



Introduction:

Climate change finds its own impact on Agriculture through rise in temperature (1.4-5.8⁰C), change in precipitation and storm activity, widespread runoff, reduction in first water availability, droughts and permanent changes in pest distributions (Adger *et al.*, 2004). Agriculture, irrigated or rainfed, particularly the latter, is inherently vulnerable to climatic hazards. All agricultural practices starting from land preparation to harvest, storage and transport are weather dependent. High altitude and tribal area zone is the seven Agro-climatic zones of Andhra Pradesh. It covers Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and Khammam districts comprising 40 agency mandals. The altitude may range from 260 MSL - 1400 MSL with variable landscape ranging from wide plains to rolling, hill ranges covered with dense vegetation and valleys. Tribal farmers are having very small land holding, resource and economically poor, not aware of modern agricultural practices and utility of weather information in day to day agricultural operations. The changing distributions of rainfall and temperature are the most important climatic factors affecting agriculture (Jones, 2000). The magnitude and direction of these may vary in different regions. It needs region-wise critical analysis for enhancing agriculture production. Climate of a place is going to decide the suitability of a crop.

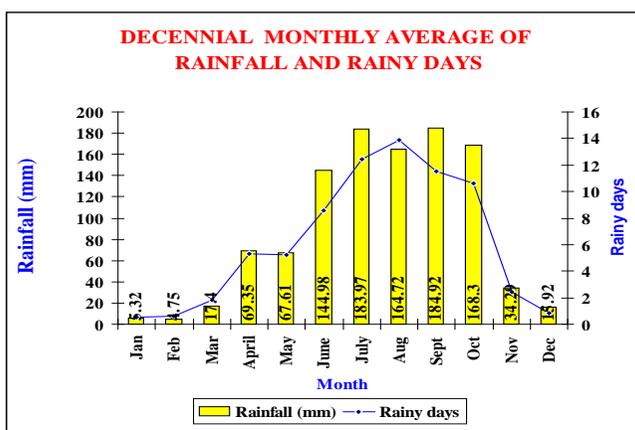
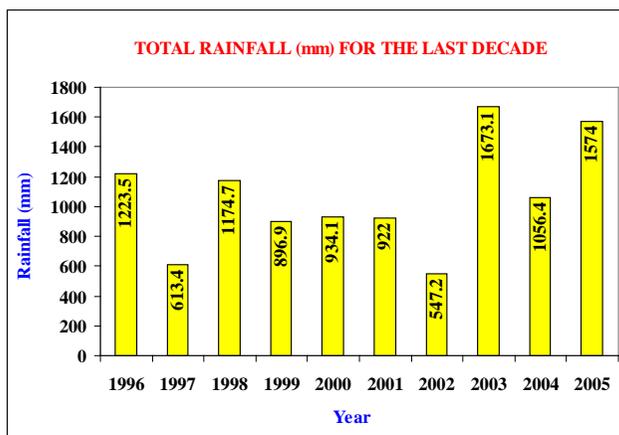
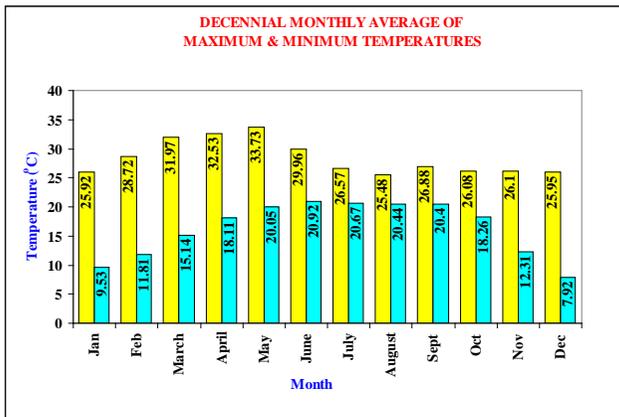
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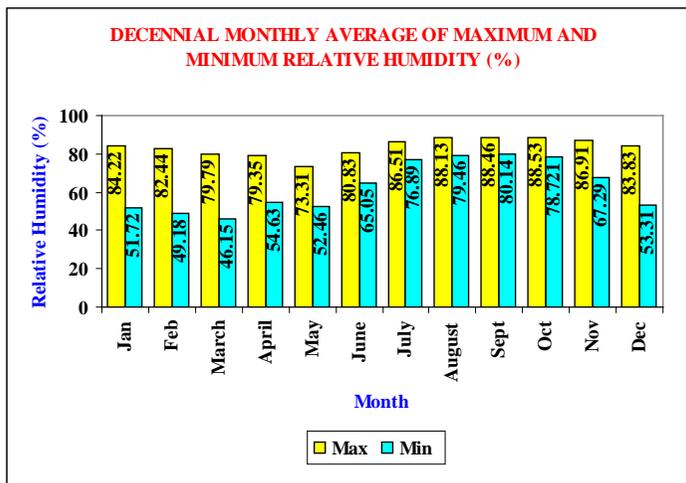
A study was conducted at RARS, Chintapalli, to recommend suitable crops for HAT zone based on the behavioural changes of climate and to formulate weather risk management strategies for enhanced agricultural productivity and profitability with efficient use of natural resources. The weather data for a consecutive period of ten years is subjected to critical analysis to find out the decennial monthly average of maximum and minimum temperatures, rainfall, rainy days, relative humidity and total rainfall for the decade. Suitable crops for HAT zone are recommended based on the result of critical analysis of weather data. Risk management strategies were formulated against different weather aberrations to improve the agricultural productivity.

Results and Discussion:

1. Recommendation of suitable crops based on climatic data

The weather data for the past decade was analyzed to find out the decennial monthly averages for different weather parameters and results were given in the following figures.





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2. Management strategies against major weather aberrations:

After recommending suitable crops for HAT zone based on prevailing climatic conditions, still the success or failure of crops is majorly decided by the weather. The major weather aberrations like late onset and early withdrawal of monsoon, intermittent dry spells, prolonged drought, floods and cyclones may reduce the agricultural productivity (Swanson, *et al.*, 2009). So, suitable management practices were formulated against these aberrant weather conditions to



a) Under delayed monsoon

Rice:

Adopt closer spacing with more number of seedlings per hill.

Two-thirds nitrogen (40 to 60 kg/ha) may be applied as basal application and 1/3rd at panicle initiation stage

Proflactic sprayings should be given against diseases like Sheath blight or blast and pests like leaf folder, green leaf hopper, stem borer and gall midge

Pulses:

Grow short duration pulse crops

Grow oil seeds like sunflower, soybean and millets like Bajra

b) Under break monsoon

Pulses:

Use recommended dose of basal fertilizers for better root development

Adopt frequent inter-cultivation

Remove 1/3rd plant population under prolonged dry spells

Spray urea solution (2%) at times of drought

Oil seeds:

Thin the plant population to the minimum to adjust with the available soil moisture

Conserve soil moisture through frequent inter-cultivation

Spray 1% urea solution twice at 15 days interval

c) Under excess moisture conditions due to extended monsoon

Rainfed heavy soils:

Drain up excess water

Open up the soil by inter-cultivation as soon as it is possible

Helicoverpa incidence may flare up, adopt Integrated Pest Management practices

Nipping of tops in case of excess growth in cotton

Appropriate measures to be taken to check boll / fruit rot



3. Agromet Advisories:

Agromet advisories are farmers bulletins prepared taking into account prevailing weather, soil and crop condition and weather prediction suggestions on measures/practices are provided in the bulletins to minimize the losses and optimize inputs in the form of irrigation, fertilizer or pesticides (Jones, 2001).

Conclusions

As climate plays an important role in deciding vegetation of a place, suitable agricultural and horticultural crops were recommended for tribal areas based on climate analysis. For the economic up-liftment of tribal farmers and for their sustainability, timely need based agromet advisories containing climate risk management strategies were disseminated to the tribal farmers to reduce losses due to aberrant weather conditions

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