



Weather Based Management Practices in *Kharif* Season for Different Crops

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The *Kharif* season (June – October), driven by the southwest monsoon, plays a crucial role in India's agricultural production. However, it is highly vulnerable to weather variability, including erratic rainfall, extreme temperatures, high humidity, and wind disturbances. This review outlines weather-based management strategies for major *Kharif* crops such as rice, maize, soybean, pulses, cotton, groundnut, and millets. Key interventions include appropriate sowing time, variety selection, seed treatment, water and nutrient management, and integrated pest management (IPM). By aligning crop practices with real-time weather conditions and forecasts, farmers can enhance productivity, reduce crop losses, and increase resilience against climatic risks.

Introduction

Kharif crops are primarily sown with the onset of the southwest monsoon (June – July) and harvested by October. Nearly 60% of Indian agriculture is rain-fed, making it particularly susceptible to monsoon variability. Fluctuations in rainfall, heat waves, and elevated humidity levels can severely impact crop yields. To address these vulnerabilities, weather-responsive crop management practices are essential. This paper reviews such practices tailored to prevailing and forecasted weather conditions to support sustainable and climate-resilient farming.

Weather Conditions and their Impact on *Kharif* Crops

Rainfall

Rainfall is the most critical weather element influencing *Kharif* crops.

- **Deficient rainfall** leads to drought, poor germination, and stunted crop growth.
- **Excess rainfall** results in waterlogging, root diseases, and nutrient leaching.

Temperature and Humidity

Most *Kharif* crops require warm temperatures (25 - 35°C). However:

- **High temperatures** during flowering stages can lead to flower or pod drop, especially in pulses and cotton.
- **High humidity** fosters fungal diseases such as mildew, blight, and leaf spot.

Wind and Cloudiness

- **Strong winds** can lodge tall crops like maize and sorghum.
- **Extended cloudiness** lowers sunlight availability, reducing photosynthetic efficiency and affecting grain filling.

Weather-Based Management Practices

Delayed Monsoon

- Select early-maturing, drought-tolerant varieties.

- Practice dry sowing and apply mulch to conserve soil moisture.
- Consider short-duration crops such as millets or pulses.

Erratic Rainfall / Dry Spells

- Use hydro-primed seeds to improve germination during dry spells.
- Employ gap-filling and mulching to retain moisture.
- Apply light, life-saving irrigation where necessary.

Heavy Rain / Waterlogging

- Construct surface drainage channels and adopt raised bed planting.
- Use split applications of fertilizers to prevent nutrient leaching.
- Treat seeds with fungicides to protect against root and seedling diseases.

High Temperature

- Adjust sowing dates to avoid flowering during heat stress periods.
- Apply foliar sprays of potassium and boron during reproductive stages.

High Humidity

- Apply preventive fungicides and adopt IPM strategies.
- Maintain proper crop spacing to enhance air circulation and reduce fungal infection risk.

Wind and Storms

- Use dwarf or lodging-resistant crop varieties.
- Support susceptible crops through staking.
- Apply contour farming on slopes to reduce soil erosion and runoff.

Crop-Specific Weather Management

Crop	Key Weather Risks	Recommended Practices
Rice	Flooding, drought, cloudiness	Alternate wetting-drying, drainage, flood/drought-tolerant varieties
Maize	Waterlogging, tasseling heat	Ridge planting, fungicide sprays, timely irrigation
Soybean	Excess rain, low light, root diseases	Drainage, boron spray, seed treatment, fungicide application
Pulses	Drought, mosaic virus	Mulching, resistant varieties, vector control with insecticides
Cotton	Excess rain, bollworm, high temperatures	Raised bed planting, IPM, optimal plant spacing
Groundnut	Waterlogging, collar rot, dry spells	Raised beds, fungicide seed treatment, pegging-stage irrigation
Millets	Drought, lodging, mildew	Deep tillage, Metalaxyl seed treatment, line sowing

General Recommendations

- **Seed Treatment:** Use *Thiram*, *Carbendazim*, or *Trichoderma* to prevent early-stage diseases.
- **Split Fertilizer Application:** Divide nitrogen doses to reduce leaching during heavy rains.
- **Use of Forecasts:** Promote weather apps like **Meghdoot**, **Mausam**, and **Agri-DSS** for agro-advisories and decision-making.
- **Crop Insurance and Diversification:** Encourage participation in **PMFBY** and promote mixed/intercropping to reduce weather-related losses.

Conclusion

Climate variability during the *Kharif* season necessitates the adoption of weather-based management strategies to ensure yield stability and sustainability. Integrating weather forecasts with scientifically validated agronomic practices empowers farmers to make informed decisions. These adaptive measures not only mitigate climate risks but also enhance productivity, resource use efficiency, and farm profitability.

Summary of Benefits

This review serves as a valuable resource for:

- **Farmers:** Provides actionable insights linked to local weather conditions.
- **Extension Workers:** Offers crop-wise guidance and timely interventions.
- **Researchers and Policymakers:** Presents a structured reference for climate-resilient agriculture strategies.

References

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