

DROUGHT: AN INEVITABLE CONCERN

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Drought is an insidious hazard of nature. It is a temporary condition that occurs for a short period due to deficient precipitation for vegetation. It is the result of imbalance between soil moisture and evapotranspiration needs of an area over a fairly long period as to cause damage to standing crops resulting in loss of yield. Climatic factors such as high temperature, high wind velocity, and low relative humidity are often associated with drought and can significantly aggravate its severity.

Causes for agricultural drought:

- Late onset of monsoon
- Inadequate rainfall
- Erratic distribution of rainfall
- Prevalence of long dry spells in the monsoon
- Early withdrawal of monsoon

- Improper soil and crop management practices

Effect of drought on crop production:

Water relations: Drought alters the water status of plants through its influence on the physiological processes viz., absorption, translocation and transpiration. The increase in transpiration due to atmospheric dryness results in the loss of turgor,

which leads to poor crop growth and development.

Photosynthesis: Moisture stress reduces the rate of photosynthesis, chlorophyll content and leaf area. Increase in assimilate saturation in leaves results due to lack of translocation.

Respiration: Respiration increases during mild drought but severe drought lowers the water content and respiration.

Anatomical changes: Drought affects growth and development of crops through its influence on decrease in size of the cells and intercellular spaces, thicker cell wall due to greater development of mechanical tissue and

increase in the number of stomata per unit leaf.

Metabolic reaction: Almost all metabolic reactions are affected by water deficits.

Hormonal relationships: Under drought conditions, the activity of growth promoting hormones like cytokinin, gibberlic acid (GA) and indole acetic acid (IAA) decreases and growth retarding hormones like abscissic acid (ABA), ethylene, etc. increases. This alteration of hormones in plants affects growth and development.

Nutrition: The fixation, uptake and assimilation of nitrogen are affected by drought. The uptake of nitrogen, phosphorus and potassium (NPK) is reduced due to less accumulation of dry matter production of crops.

Growth and Development:

Decrease in growth of leaves, stems and fruits. Maturity is delayed if drought occurs before flowering while it advances if drought occurs after flowering.

Reproduction and grain growth: Drought at flowering and grain development determines the number of fruits and individual grain weight, respectively.

Yield: The yield depends on the influence of drought on growth, flowering, and fruit set etc. Moisture stress at

critical stages of the crop reduce the yield drastically.

Strategies to overcome the ill effects of drought:

- Remove unhealthy seedlings
- Conserve soil moisture through weed control
- Mulching with organic residues to minimize evaporation loss
- Provide protective irrigation at critical stages if the rainfall is not adequate
- Top dress with N fertilizer during rainy days
- Provide effective plant protection measures.

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Fig 1 : Drought management adopted blackgram field

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