

# Critical Stages of Irrigation of Crops in Arid Zones

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## Perspective

The critical stage of water requirement refers to the point at which water stress produces substantial yield decrease. It's also referred to as the moisture-sensitive phase. Moisture stress caused by a lack of water during the moisture sensitive period or crucial stage will diminish the yield irreversibly. Even providing appropriate water and fertiliser at other stages of growth would not help in recouping yield losses owing to stress during vital periods. The best soil moisture for plant growth varies depending on the stage of crop development. When it comes to crop growth and development, certain seasons are more vulnerable to soil moisture stress than others. Moisture sensitive phases are what they're called. The term "critical period" refers to the stage of growth when plants are most vulnerable to water shortages. Inadequate water supply during moisture sensitive periods will diminish production irreversibly, and adequate water and other management methods during other growth stages will not assist to make up for the lost output. Because of the very weak root system that is sparsely distributed and positioned in the upper 15 to 20 cm layer of soil that quickly dries, vegetables require a stress-free hydration condition while they are young, even if they transpire less water. In the later phases of growth, when moisture stress has a significant impact on production, vegetable crops use and transpire more water. For crops with economically important vegetative portions, soil moisture stress affects all stages of growth equally. Perennial plants' total growth and yield are the sum of the effects of stress at each growth stage. However, sufficient water is required for flower bud initiation, flowering, and fruit set. Flower bud production, on the other hand, increases in citrus and mango due to a lack of water prior to flower bud commencement.

In general, the mid-season stage is the most vulnerable to water shortages, as any shortfall during this time will have a substantial impact on yield. Ripening and harvesting are the least sensitive stages for most crops, with the exception of vegetables such as lettuce and cabbage, which require water until harvesting. If monocropping is followed by staggered sowing or planting in an irrigation project or on a farm, it is better to arrange irrigation to a crop that has reached the mid-season stage, as this is the most critical stage.

## The sensitive stages differ by crop, as seen below

**Rice:** Critical steps for panicle initiation, Blossoming and head

**Sorghum:** Flowering and grain development

**Maize:** Before tasseling and grain filling

**Ragi:** Blossoming and primordial initiation

**Wheat:** Tillering, booting, and crown root initiation

**Groundnut:** Initiation and penetration of flowering pegs, as well as pod formation.

**Sesame:** From sprout to harvest

**Sunflower:** Two weeks before and after flowering of the

**Soybean:** Blooming and seed development in the

**Castor:** Complete maturation

**Cotton:** Boll development and flowering of

**Sugarcane:** Maximum vegetative stage of

Legumes

**Alfalfa:** Immediately after cutting for hay crop and flowering for seed crop

**Beans:** Flowering and pod setting

**Peas:** Flowering and pod formation

Others

**Coconut:** Nursery stage root enlargement

**Potato:** Tuber initiation and maturity

**Banana:** Throughout the growth

**Citrus:** Flowering, fruit setting and enlargement

**Mango:** Flowering

**Coffee:** Flowering and fruit development

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