Cotton variety chosen to plant in Karmana distract Navoi is **SULTON**. The **‘Sulton’ cotton variety** is one of the improved cotton cultivars developed and cultivated in **Uzbekistan**, known for its **high fiber quality, good yield potential**, and **adaptability to saline-prone soils and agro-climatic conditions of Uzbekistan**.

The vegetation period of this variety is 115-120 days, the length of the stem is 100-130 cm, the weight of cotton in one pod is 5.2-5.5 grams, and the weight of 1000 seeds is 130-135 grams. Currently, fiber output is 34-35%, fiber length is 34-35 millimeters and 4.4-4.8 microns. **Seed cotton yield:** Up to **4.0–4.5 t/ha** under optimal conditions.

The **dynamics of cotton root depth during the growing season** generally follow a predictable pattern that correlates with the plant's growth stages and environmental conditions:

**1. Early Vegetative Stage (0–30 days after planting)**

* **Root depth:** ~15–30 cm
* Shallow, fine roots begin to establish.
* The focus is on lateral root development near the surface for initial nutrient and moisture uptake.
* Sensitive to soil moisture and temperature.

**2. Rapid Vegetative Growth (30–60 days)**

* **Root depth:** Expands to ~60–90 cm
* Root growth accelerates vertically and laterally.
* The plant begins forming a deeper root system to access subsoil moisture.
* Root biomass increases significantly.

**3. Flowering to Early Boll Development (60–90 days)**

* **Root depth:** Reaches ~90–120 cm
* This is the **peak period of root depth extension**.
* The taproot may penetrate deeper depending on soil type and compaction.
* Nutrient and water demand is high; roots exploit deeper layers.

**4. Boll Maturation (90+ days)**

* **Root depth:** Maxes out at ~120–150 cm, though active uptake may reduce
* Root growth slows down or stops.
* Energy is redirected to reproductive development (bolls).
* Older roots begin to senesce.
* **Management Allowed Deficit (MAD)**: The percentage of MAD applicable to cotton.

**Management Allowed Deficit (MAD)** refers to the percentage of **available soil water** that a crop can use (or deplete) before irrigation is required to avoid yield loss.

The commonly recommended **MAD for cotton** is:

🔹 **50%** – This means that cotton can typically tolerate up to **50% depletion of available soil moisture** before needing irrigation.

**Why 50%?**

Cotton is a moderately deep-rooted and relatively drought-tolerant crop. Allowing 50% depletion balances efficient water use without significantly impacting yield or quality. However, the actual MAD may vary slightly depending on:

* Growth stage (lower MAD during flowering and boll development)
* Soil texture
* Climate and evapotranspiration rate

**MAD for Cotton by Growth Stage**

| **Growth Stage** | **Typical MAD (%)** | **Reason/Note** |
| --- | --- | --- |
| Emergence to Early Vegetative | 40% | Young plants are more sensitive to water stress |
| Vegetative to First Flower | 50% | Plants can tolerate moderate deficit |
| Flowering to Boll Formation | 40% | Critical stage – water stress can reduce yield |
| Boll Maturity to Harvest | 60% | Less sensitive to water deficit |

**Example Calculation – Uzbekistan Loam Soil**

Let’s assume:

* **Soil texture:** Loam
* **Root zone depth:** 90 cm (0.9 m)
* **Available Water Capacity (AWC):** 150 mm/m
* **MAD:** 50%

**Total available water in the root zone** =  
150 mm/m × 0.9 m = **135 mm**

**MAD of 50%** =  
135 mm × 50% = **67.5 mm**

**So, irrigation should be scheduled when 67.5 mm of water is depleted from the soil.**