**Agro (8103) Dry Land Agriculture**

**Dry Land Agriculture**

**Arid 250 mm/ anm**

**Semi-Arid 250 -500 mm/ anm**

**Sub humid 500 -750 mm/ anm**

**Humid less than 1000mm /anm**

**Diff b/w Drought and Aridity**

**Definition**:

 Growing of crops entirely under rainfed conditions is known as dry land agriculture. Depending on the amount of rainfall received, dry land agriculture can be grouped into three categories.

1. **Dry farming,** 2. **Dry land farming**, and 3**. Rainfed farming**.

**1.Dry farming:**

Dry farming is cultivation of crops in regions with annual rainfall of less than 750 mm. Crop failure is most common due to prolonged dry spells during the crop period. These are arid regions with a growing season (period of adequate soil moisture) of less than 75 days. Moisture conservation practices are necessary for crop production. Emphasis is on soil and water conservation, sustainable crop yields and limited fertilizer use according to soil moisture availability.

**2.** **Dry land farming:**

Dry land farming is cultivation of crops in regions with annual rainfall of more than 750 mm. In spite of prolonged dry spells, crop failure is relatively less frequent. These are semiarid tracts with a growing period between 75 and 120 days. Moisture conservation practices are necessary for crop production. However, adequate drainage is required especially for vertisols. Main emphasis is on soil and water conservation, sustainable crop yields and limited fertilizer use according to soil moisture availability.

**3.Rainfed farming**

is crop production in regions with annual rainfall of more than 1150 mm. Crops are not subjected to soil moisture stress during the crop period. These are humid regions with growing.

 **Factors Affecting Dry Farming**

Most of the cropping in the arid and semi-arid regions continues to be under rained conditions. A majority of the farmers are small farmers with meager resources. The poor resources base permits only low input subsistence farming with low and unstable crop yields. The low productivity of agriculture in dry farming regions is due to the cumulative effect of many constraints for crop production. The constraints can be broadly grouped into:

• Climatic constraints,

 • Soil related constraints,

• Cultivation practices,

 • Socio economic and political constraints

1.**Climatic constraints**

• High atmospheric temperature

 • Low relative humidity

 • Hot dry winds

 • High atmospheric water demand (**potential evapotranspiration defination**) exceeding precipitation during most part of the year

• **Vagaries of monsoon (uneven rainfall defination)**

1. **Variable rainfall** - Annual rainfall varies greatly from year to year and naturally its coefficient of variation. Generally, higher the rainfall less is the coefficient of variation. In other words, crop failures due to uncertain rains are more frequent in regions with lesser rainfall.
2. **Intensity and distribution** - In general, more than 50 per cent of total rainfall is usually received in 3–5 rainy days. Such intensive rainfall results in substantial loss of water due to surface runoff. This process also accelerates soil erosion. Distribution of rainfall during the crop-growing season is more important than total rainfall in dry land agriculture.
3. **Late onset of monsoon** - If the onset of monsoon is delayed, crops/varieties recommended to the region cannot be sown in time. Delayed sowing lead to uneconomical crop yields.
4. **Early withdrawal of monsoon** - This situation is equally or more dangerous than late onset of monsoon. Rainy season crops will be subjected to terminal stress leading to poor yields. Similarly, post-rainy season crops fail due to inadequate available soil moisture, especially during reproductive and maturity phases.

**(v) Prolonged dry spells** - Breaks of monsoon for 7–10 days may not be a serious concern. Breaks of more than 15 days’ duration especially at critical stages for soil moisture stress leads to reduction in yield. Drought due to break in monsoon may adversely affect the crops in shallow soils than in deep soils.

**II. Soil constraints** The soil constraints are:

1. Inadequate soil moisture availability

 2. Poor organic matter content

3. Poor soil fertility

 4. Soil deterioration due to erosion (wind, water).

**III. Cultivation practices**

The existing management practices adopted by the farmers are evolved based on long-term experience by the farmers. The analysis of traditional system revealed that on one hand, the traditional system suffers due to the fact that yield levels are low and unstable, while on the other hand, it has strong points due to which it has stood the test of time. The traditional management practices are listed below:

 • Ploughing with country plough which is replaced by tractor, ploughing just prior to sowing • Ploughing along the slope

• Broadcasting seeds/gorru sowing/sowing behind the country plough leading to poor as well as uneven plants stand

• Selection of traditional varieties

 • Monsoon sowing

• Choice of crop based on rainfall

 • Application FYM in limited quantity

 • Hand weeding

 • Mixed cropping

 • Use of conventional system of harvesting, and

 • Traditional storage system.

Among the traditional management practices, the fallowing practices are technically sound and can be practiced (strength).

**• Monsoon sowing**:

This still holds good for crops like maize, red gram, bajra and karunganni cotton.

**• Choice of crop based on rainfall**: Farmers take up coriander for late onset of monsoon. This traditional practice has been experimentally proved to be correct.

 **• Hand weeding**: It has proved to be as effective as herbicide application in terms of weed control and yield.

 **• Mixed cropping**: Farmers adopt many mixed cropping systems based on their experience. Groundnut and red gram are sown in 6:1 ratio. Sorghum black gram, green gram and Lab-Lab (mochai) crops are broadcasted. Cotton + black gram is sown in 6:1 ratio or black gram is sown in border. Even though the yield is less, there is some stability in yield due to mixed cropping and it is an insurance against risk of complete failure.

 • Traditional system of harvesting processing consumes more labourers, but it can be followed because of no loss in grain during the process of harvest.

• Traditional storage is based on sound practical knowledge as well as it involves low cost technology

• In certain pockets, pre monsoon sowing or early sowing of crops are taken.

 • Inter cultivation with plough in between crop rows is one of the best insitu soil moisture conservation techniques.

**Weakness in traditional system**

- Most management practices are not aimed at soil moisture conservation. Traditional system does not build up nutrient status in the soil; on the contrary it depletes the fertility status. Genotypes/varieties used are poor yielders. Spatial and temporal variations are not effectively utilized in the mixed cropping adopted by the farmers. This results in no yield advantage. One of the most serious limitations due to traditional management practices is low plant population per unit area, which ultimately reduces yield. Run off is neither collected nor used efficiently.