



Vegetable production in dry land area

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The terms rainfed, unirrigated and dryland are used commonly as synonyms but indeed they refer to different situations. In reality rainfed agriculture includes both dry farming and dryland agriculture. According to the definition given in the “Encyclopaedia Britannica” dry farming is farming without irrigation in areas where the moisture supply is the chief limitation to crop production. In dryland agriculture, emphasis is on water conservation, sustainable crop yields, limited inputs for soil fertility maintenance and both wind and water erosion constraints.

Dryland areas generally received less than 750 mm of annual rainfall in arid and semi-arid regions. The success of crop production in dryland areas depends on the amount and distribution of rainfall, as this influences the stored soil moisture and moisture used by crops.

The nutritive vegetable crops from an important component of the flora of dryland. They provide nutritive products to alleviate the problems of malnutrition and improve health standard of the people.

Vegetable crops for dryland : Among the

vegetable crops, Bottle gourd (*Lagenaria siceraria*), ridge gourd (*Luffa acutangula*), sponge gourd (*Luffa cylindrica*), water melon (*Citrullus lanatus*), round melon (*Citrullus lantus var. fistulosus*), long melon (*Cucumis melo var. utilissimus*), bitter melon (*Momordica charantia*), snap melon (*Cucumis melo var. momordica*), kachari (*Cucumis callosus*), arya (*Cucumis sp.*), drumstick (*Moringa odeifera*), cluster bean (*Cyamopsis tetragonoloba*), cowpea (*Vigna unguiculata*), okra (*Abelmoscous esculentus*), amaranth (*Amranthus sp.*), brinjal, chilli and tomato are common.

Selection of cultivars : Cultivars differ in their

adoptability to different climatic conditions. Varietal variation in endurance to drought has also been observed in vegetable crops. Early maturing cultivars seem to escape stress conditions caused by reducing soil moisture stored in soil during monsoon. Suitable cultivars of some vegetable crops have been identified (Table 1).

Soil moisture conservation techniques : Soil moisture stress during summer and post-monsoon period appears to be one of the major constraints for economic yields of most of the vegetable crops under dryland conditions, particularly in degraded shallow land with very poor water

holding capacity. Soil moisture status, particularly during vegetative growth and fruit development period, greatly affects productivity of vegetable crops. However, by adopting moisture conservation measures like water harvesting, mulching, use of antitranspirants and appropriate weed management, considerable part of the moisture requirement can be fulfilled.

Mulching : Intense

aridity in dry regions causes considerable evaporate losses. Mulching with organic materials (eg. Hay, straw, dry leaves, sugarcane trash and local weeds) has been found highly beneficial in reducing these losses. The practices also suppress weed growth, prevent erosion and add organic matter to the soil.

Anti-transpirants : Water loss due to transpiration can be reduced by the use of radiation reflectants, stomata closing chemicals and plastic films. Spraying of 4-6 per cent kaolin or 0.5-1.0 per cent liquid paraffin and 1.5 per cent power oil, after occasional rains in low rainfall areas and after the post-monsoon rains in high rainfall areas,



Table 1: Popular cultivars of vegetables in drylands of India

Crops	Cultivars
Amranth	Chhoti Chaulai, Badi Chaulai, CO-1, CO-2, CO-3
Bitter gourd	Pusa Do Mausami, Arka Harit, Pride of Gujarat
Bottle gourd	Pusa Summer Prolific Long, Pusa Naveen, Narendra Rashmi
Brinjal	Pusa Purple Long, Pusa Kranti, Pusa Anmol, Punjab Sadabahar, Arka Sheel, Arka Kushmakar, Arka Navneet, Arka Shirish
Chilli	Pusa Jwala, Mathania, Sindhur, Pant C-1, Arka Mihini, Arka Gaurav, Arka Basant, Indra, NP-46A
Cluster bean	Pusa Sadabahar, Pusa Mausami, Pusa Navbahar, Durga Bahar, HBG-4, ARG-80
Cowpea	Pusa Dofasali, Pusa Phaluni, Pusa Barsati, Pusa Rituraj, S-203, S-488
Drumstick	PKM-1, PKM-2
Muskmelon	Pusa Sharbati, Pusa Madhuras, Hara Madhu, Punjab Sunehari, Durgapur Madhu
Okra	VRO-6, VRO-5, Hisar Unnat
Onion	Pusa Red, Agrifound Light Red, Pusa White Round, Pusa White Flat, Hissar-2
Pumpkin	Arka Chandan, CO-1, CO-2
Ridge gourd	Pusa Nasdar
Round melon	Arka Tinda
Sponge gourd	Pusa Chikani
Tomato	Pusa Ruby, Pusa Early Dwarf, S-12, S-7
Watermelon	Sugar Baby, Arka Manik, Arka Jyoti, Durgapur Meetha, Durgapur Kesar, Mateera

considerably reduced plant water losses. Phenyl mercuric acetate (PMA), Decinyl succinic acid (DSA), Abscisic acid (ABA) and Acetyl alcohol cause closure of stomata and thereby reduce transpiration. Shelter belt and wind breaks can reduce evapotranspiration by reducing wind speed and stabilizing microclimate.

Cropping system : Monoculture is often risk prone due to crop failure under dryland condition. Suitable tree crops combination, besides alleviating the risk, also generates extra income, improves productivity per unit area/volume as a result of efficient use of natural resources and inputs. Agri-horticulture combinations with legume intercrops such as mung bean, moth bean, cluster bean and cowpea are beneficial. In rainfed orchards of guava and ber growing of cluster bean, okra and cowpea has been proved promising in medium rainfall region of Gujarat. Growing

cluster bean in rainy season as intercrop is economical. Some area of South India cowpea, mungbean, cluster bean and horse gram in ber orchards and bitter gourd, tomato and okra in acid lime orchards have been grown successfully as intercrops.

In low rainfall (300-500 mm) zone, khejri or ber or drum stick + vegetables (legumes and cucurbits); in 500-700 mm rainfall zone mango or ber or aonla or guava + pomegranate or sour lime or lemon or drumstick + solanaceous or leguminous or cucurbitaceous vegetables and in 700-1000 mm rainfall zone, mango or jackfruit or mahua or palmyra palm or tamarind or guava + sour lime or lemon or pomegranate or aonla + vegetable cropping system can be adopted.

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