**DRY LAND AGRICULTURE:PROBLEMS, SOLUTION AND ITS MANAGEMENT**

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**ABSTRACT**

Dryland agriculture is the practice of growing crops with natural rainfall and without the use of irrigation. It is a type of subsistence farming in areas where a lack of soil moisture inhibits the growth of crops like sugarcane, rice , and others that need water to flourish. Low and unpredictable rainfall and a lack of irrigation systems define dry places. The majority of the coarse grain crops, pulses, oilseeds, and raw cotton are farmed on these lands, making desert agriculture crucial to the seconomy. Drought-resistant crops, like sorghum, have the ability to minimise transpiration and they may even almost stop growing when there is a lack of moisture, picking up again when the conditions are favourable . During times of the year when heat and drought conditions are not extreme, drought crops grow the most. Crops that are adapted to dry farming typically require more land and mature more quickly than crops cultivated in humid environments.

**Keywords**: Dryland farming, agricultural practices, drought resistant crops.

**Introduction**

Dry land agriculture, also known as rain- fed agriculture, is agriculture system that relies solely on natural downfall for crop product, making it largely dependent on seasonal rainfall patterns. Rehearsed in thirsty and semi-arid regions where water coffers are limited or unreliable, dry land agriculture faces multitudinous challenges similar as erratic downfall, famines, and soil declination. To overcome these obstacles, growers borrow technical ways and crop kinds that can repel water failure and harsh conditions. Conservation tillage, soil humidity operation, and failure- resistant crop traits are among the strategies employed. also, agro forestry, water harvesting, and community- grounded operation systems are integrated to optimize water operation and enhance sustainability. Despite the challenges, dry land agriculture plays a pivotal part in furnishing food security and supporting livelihoods in regions where irrigation may not be doable, and climate change adaptability becomes decreasingly essential for agrarian success.

Dry land agriculture is rehearsed in vast regions across the globe, covering roughly 80 countries and supporting the livelihoods of millions of people. These regions are characterized by low and unreliable rush, performing in water failure, which poses a significant handicap to agrarian development. The livelihoods of growers and pastoral communities in these areas depend heavily on the success of rain- fed agriculture, making their adaptability to climatic oscillations a matter of utmost significance.

 The success of dry land agriculture hinges on the effective operation of water coffers. Given the failure of water, growers must precisely plan their cropping patterns and agrarian conditioning to optimize its operation. One of the essential practices in dry land agriculture is the selection of failure- resistant crop kinds. Factory parentage programs have been necessary in developing crop strains that can tolerate dragged dry spells and thrive in low humidity conditions. These failure- resistant crops are equipped with mechanisms to conserve water, similar as deep root systems that can reach groundwater sources or the capability to close stomata during hot ages to reduce water loss through transpiration.

 Conservation tillage is another critical fashion employed in dry land agriculture. Unlike conventional tillage, conservation tillage involves minimum soil disturbance and leaves crop remainders on the field after crop. This practice helps retain soil humidity, help corrosion, and ameliorate overall soil health. The accumulation of crop remainders on the soil face acts as a defensive sub caste, reducing evaporation and promoting better water infiltration into the soil during downfall events.

In addition to conservation tillage, growers use soil humidity operation ways to maximize water vacuity to crops. Mulching, for case, involves covering the soil with organic accoutrements like straw or plastic to reduce water evaporation and weed growth. By maintaining soil humidity situations, mulching helps sustain crop growth during ages of limited downfall.

To optimize the application of available water coffers, rainwater harvesting is extensively rehearsed in dry land regions. This fashion involves capturing and storing rainwater for agrarian use during dry ages. Rainwater is collected through colorful styles, similar as constructing small ponds, check heads, or using rooftop rainwater harvesting systems. The stored water can be used for irrigation, beast watering, and indeed for domestic purposes, therefore minimizing water destruction.

 Incorporating trees and shrubs into agrarian geographies through agro forestry systems is another essential element of dry land agriculture. Agro forestry provides several benefits, similar as windbreaks to reduce water evaporation, protection of crops from strong winds, and bettered soil fertility. Trees in agro forestry systems can fix nitrogen, enhance soil structure, and contribute to overall biodiversity. Also, the integration of fruit and nut trees can diversify income sources for growers and ameliorate food security.

 Community- grounded water operation practices are current in numerous dryland regions. In similar systems, original communities inclusively manage water coffers, including distribution, operation, and conservation. These community- led enterprise foster a sense of power and responsibility, performing in further sustainable water operation practices.

Piecemeal from crop product, dryland agriculture frequently involves beast parenting to round agrarian conditioning. Beast can give fresh income and serve as an insurance medium during crop failures. Still, managing beast in thirsty surroundings requires careful consideration of grazing patterns to help overgrazing, which can lead to land declination and reduced foliage cover. Rotational grazing and the integration of crop remainders as beast feed are employed to balance the requirements of beast with sustainable land operation.

Soil declination is a major concern in dryland agriculture, where wind and water corrosion can lead to the loss of rich clod. Sustainable land operation practices, similar as terracing, figure furrowing, and the use of cover crops, help cover the soil from corrosion and ameliorate its overall health. also, soil conservation measures, similar as gravestone bunds and vegetative walls, are enforced to control runoff and minimize soil loss.

Given the challenges and pitfalls associated with dryland agriculture, threat operation and climate adaption strategies are of consummate significance. One similar strategy is crop diversification, where growers cultivate a variety of crops with different growth cycles and water conditions. Crop diversification not only spreads the pitfalls associated with climate variability but also improves the overall adaptability of the agriculture system. To manage with climate variability and reduce the vulnerability of growers, climate- flexible agriculture practices are promoted through agrarian extension services. These practices are grounded on climate-smart agriculture principles, which aim to increase productivity, enhance adaption, and reduce hothouse gas emigrations. Climate-smart practices may include bettered seed kinds, water-effective irrigation styles, and sustainable soil operation ways. Information and communication technology( ICT) have also set up their way into dryland agriculture. ICT tools, similar as rainfall soothsaying apps and remote seeing technologies, give growers with real- time rainfall information and data on soil humidity situations. Armed with this information, growers can make further informed opinions regarding planting times, irrigation scheduling, and threat operation strategies. likewise, the integration of climate- adaptive insurance can play a pivotal part in securing growers' inflows against the adverse goods of climate change. Climate- adaptive insurance products are designed to give compensation to growers in the event of rainfall- related crop failures or product losses. This fiscal safety net can help growers recover from the impacts of extreme rainfall events and continue their agriculture conditioning. Exploration and development sweats continue to be essential in advancing dryland agriculture. Scientists and agrarian experts work on developing innovative results, including new crop kinds, bettered water operation ways, and sustainable land use practices. Governments and transnational associations play a critical part in supporting exploration enterprise and easing the dispersion of knowledge and stylish practices to growers. Government programs and support mechanisms can significantly impact the success and sustainability of dryland agriculture. By enforcing programs that incentivize sustainable water use, soil conservation, and climate- flexible practices, governments can produce an enabling terrain for growers to borrow further sustainable and productive approaches. Promoting women's participation in dryland agriculture is also pivotal for the sector's development. Women play significant places in agrarian conditioning, including crop civilization, beast operation, and water collection. icing that women have equal access to coffers, information, and decision- making power can lead to further inclusive and sustainable agrarian practices. In conclusion, dryland agriculture is a critical element of global food product and livelihood support for millions of people. Despite the challenges posed by water failure, climate variability, and soil declination, dryland growers employ colorful innovative ways and strategies to enhance productivity and adaptability. Sustainable land operation practices, failure- resistant crop kinds, water conservation measures, agroforestry systems, and community- grounded water operation are among the crucial approaches espoused in dryland agriculture. With continued exploration, investment, and policy support, dryland agriculture can contribute significantly to food security, poverty relief, and environmental conservation in thirsty and semi-arid regions worldwide. The significance of dry land agriculture will only grow in the face of climate change, making it essential to prioritize sustainable and climate- flexible practices to insure the well- being of communities and ecosystems in these grueling surroundings.

**Dryland agriculture in India:-**

Indian agriculture is predominantly a rainfed agriculture under which both dryfarming and dryland agriculture are included. Out of the 143 million ha of total cultivated area in the country, 101 million ha (i.e. nearly 70 percent) area are rainfed. In dryland areas, variation in amount and distribution of rainfall influence the crop production as well as socio-economic conditions of farmers. The dryland areas of the country contribute about 42 percent of the total food grain production. Most of the coarse grains like sorghum, pearlmillet, fingermillet and other millets are grown in drylands only. The attention has been paid in the country towards the development of dryland farming. Efforts were made to improve crop yields in research projects at Manjari, Solapur, Bijapur, Raichur and Rohtak. An all India co-ordinated research project for Dryland Agriculture was launched by ICAR in 1970 in collaboration with Government of Canada and later Central Research Institute for Dryland Agriculture (CRIDA) was established at Hyderabad.

**Dryland agriculture in the world:-**

Dry farming may be practiced in areas that have significant annual rainfall during a wet season, often in the winter. Crops are cultivated during the subsequent dry season, using practices that make use of the stored moisture in the soil. California, Colorado, Kansas, South Dakota, North Dakota, Montana, Nebraska, Oklahoma, Oregon, Washington, and Wyoming, in the United States, are a few states where dry farming is practiced for a variety of crops.

Dryland farming is used in the Great Plains, the Palouse plateau of Eastern Washington, and other arid regions of North America such as in the Southwestern United States and Mexico (see Agriculture in the Southwestern United States and Agriculture in the prehistoric Southwest), the Middle East and in other grain growing regions such as the steppes of Eurasia and Argentina. Dryland farming was introduced to southern Russia and Ukraine by Ukrainian Mennonites under the influence of Johann Cornies, making the region the breadbasket of Europe. In Australia, it is widely practiced in all states but the Northern Territory.

**PROBLEMS FACED IN DRYLAND AND THEIR SOLUTION :-**

There are various types of problems faced in dryland areas which control the performance of crops and income of the village or local people.

The problems are classified as:-

* Soil and moisture problem
* Environmental changes of water logging and salinity
* Quality of crop produce
* Marketing problems of dryland produce
* Innovation in technology transfer

**SOIL AND MOISTURE PROBLEM:**

Soils are highly different in dryland areas of India. In semiarid regions the laterite soil(alfisols ) and clay soils(vertisols) predominant, whereas in river basins alluvial soils are seen and in desert regions, desert soil(aridisols) are seen. Crops that are grown in laterite soil or alfisols are subjected to severe drought stress , whereas those are grown in clay soil or vertisols have less drought stress and it is dur its better water holding capacity. Alluvial soils of arid region have low soil fertility , but respond well to inputs and are highly productive under irrigated conditions.

 The major problem in dryland areas is moisture problem which is made by rainfall and as our country India is a monsoon country and monsoon decide the water availability for plants. There is no irrigation facilities in dryland agriculture .This Moisture availability decides the growth period of crops. The crops raised suffers due to lack of moisture whenever prolonged dry spells occur due to their low moisture holding capacity.

There is low soil fertility due to lack of adequate soil moisture and also limited scope for extensive use of chemical fertilizers.

**ENVIRONMENTAL CHANGES OF WATER LOGGING AND SALINITY:**

Soil degradation has a link with water logging and salinity problems. Irrigation salinity has major impact on dryland crops .Over irrigation , poor drainage ,improper irrigation for damaged soils etc. are the major causes for water logging and salinity. All this factors causes an increase in groundwater recharge and rise in water table ,resulting in the accumulation on salts on the soil surface. These environmental changes results in reduction of yields and abandonment of lands which has facilities for irrigation.

**QUALITY OF CROP PRODUCE :**

The above mentioned problems of dryland agriculture put a big question mark on the quality of produced in dryland or arid conditions. Grain quality is the biggest issue in this area as it is of inferior quality due to underdevelopment. This results in less fodder production and farmers get less return on their produce from the market . This are few common problems of dryland agriculture.



Marketing problems of dryland produce :

Marketing is one of another problem faced in dryland agriculture areas . Farmers usually grow same crops. At crop maturity farmers want to market their produce as it is difficult to store it due to lack of storage facilities. This enables the traders and the middleman to have upper hand on them and thus agriculture produce is sold in difficulty at very low price . For this there is a option for the farmers to grow or cultivate different crops in a season or also the can use the money to built local level storage facilities, this can be a solution.

Innovation in technology transfer :

In order to achieve stability in dryland production ,an integration of long , medium and short term technologies are needed. The technologies developed must be in a watershed basis with people’s participation. Methodologies should be developed to initiate and encourage farmers participation in dryland agriculture. Participatory rural appraisal, group interaction of farmers to know more about farmer perception are to be utilized for the better understanding of a programme to make it beneficial for the dryland farmers . Grass root level extension is to be the prime criteria. Even though there is tremendous growth in agricultural research and education, a vast number of farmers are not been exposed to the improved technologies which are been developed. This results in reduction in the final output of the whole improvement of the drylands. Nongovernmental organization having linkages with farmers has been working well in many parts of Indian drylands. The self-help group approach is also gaining momentum in many states of India. All the approaches put together will help to develop the land for a sustainable production . The indigenous technical knowledge (ITKs) which are present in the farming communities on the various.

**PROBABLE SOLUTION :**

Agronomic approaches :

The primary objective to dryland farming is to preserve the soil and water, in order to achieve maximum productivity. Agronomic approaches are developed based on the land terrain concerned. In the undulating terrain, soil erosion being the major constrain. Gullies can be seen in areas with severe erosion. Management of such areas can be achieved by stabilizing the soils by forestry and pasture, with regulated grazing. The land can be further developed by contour bunding and terracing. In marginal lands with poor fertility proper application of fertilizer are beneficial. But these lands possessing reduced moisture, deep placement of fertilizers are needed. Drylands near the river beds are to be given management based on the onset of monsoon. Since these drylands are prone to floods in certain part of the year. Crops grown should be able to manage drought stress, as these areas lack irrigation and should be harvested before the floods. Agronomic measures that has to be followed in plain dry lands tracts to increase the soil productivity can be achieved by proper tillage, proper management of the time of sowing, fertilizer management, selection of proper cropping systems suitable to the area like double cropping, alley cropping, use of better cropping pattern for specific locations, proper weed control and plant protection measures.

Engineering approaches :

Various engineering approaches are utilized for conservation of soil and water by the collection of excess rainwater, regulation of runoff, managing evaporation and seepage losses. Lands with 3-5 per cent slopes are subjected to contouring, which preserves moisture and prevents soil erosion. The opening of ridges and slopes across the slopes reduces the flow of water and makes it to percolate into the soil. Compartmental bunding to areas with less than 1 per cent slope provides even spreading of water to the entire area. Water harvesting measures are utilized for improving the moisture status of the soil. Construction of check dams, farm ponds are other measures being utilized . Aspects of farming could be refined with the modern research facilities. The refined ITKs are more readily accepted by the farmers . Other technical knowledge of remote sensing can also be utilized in mapping the drylands based on various criteria and further utilization into development of area based projects.

**CROPS SUITABLE IN DRYLAND AND RESISTANT VARITIES**

**FRUIT CROP**

1. Mango:Badami,Raspuri,Mallika
2. Sapota:Kalipathi,cricket ball etc.
3. Jackfruit:Singapoor local
4. Pomegranate:Ganesh,Kesari,Bhagya
5. Amla:Banarasi,Krishna,Cakaiya,Kanchan
6. Jamoon:Arabhavi-1, Arabhavi-2
7. Cashew:Chinthamani
8. Guava:Sardhar,Alhabadsafed

**VEGETABLE CROP**

1. Drumstick:GKVK-1,Dhanaraj,PKM Bhagya
2. Curry leaves:Suhasini

**FLOWER CROPS**

1. Micheliachampaca

**MEDICINAL PLANTS**

1. Ashwagandha
2. Oleander

**OTHER VARITIES**

1. Rubber:R.R.I.M-700,R.R.I.M-600
2. Coffee:Robasta

**DRYLAND FARMING TECHNIQUES :**

**Increase Water Absorption**

Prevent a Crust at the Soil Surface. Probably the greatest deterrent to a high rate of water absorption is the tendency for soils to puddle at the surface and form a seal or crust against water intake. The beating action of raindrops tends to break down clods and disperse the soil.

• By tillage, create a rough, surface which lengthens the time necessary for the rain to break down the clods and seal the surface. For seed bed preparation in general, small seeds should have a finer, mellower bed than large seeds.

• After harvest, create a stubble mulch on the surface. Such material not only prevents raindrops from impinging directly on the soil, but impedes the flow of water down the slope, increasing absorption time. Reduce the Runoff of Water. To the extent that waterlogging is not a problem, the runoff of water and its attendant erosion must be stopped.

• Cropland should be as level as possible.

• All tillage and plantings must run across (or perpendicular to) the slope of the land. Such ridges will impede the downward movement of water.

• For every two feet of vertical drop or 250 feet of horizontal run, the field should either have bunds or contour strips (details of these practices are discussed later).

**Reducing the Loss of Soil Moisture**

Reducing Soil Evaporation. Water in the soil exists as a continuous film surrounding each grain. As water near the surface evaporates, water is drawn up from below to replace it, thinning the film. When it becomes too thin for plant roots to absorb, wilting occurs.

• Shelter belts of trees or shrubs reduce wind speeds and cast shadows which can reduce evaporation 10 to 30 percent by itself and also reduce wind erosion.

• Mulching reduces the surface speeds of wind and reduces soil temperatures.

• Shallow tilling can create a dirt mulch 2 to 3 inches deep which dries out easily but is discontinuous from the subsurface water, preventing further loss. Tillage must be repeated after each rain to restore the discontinuity. This is most workable where rainfall occurs in a few major rainfalls with relatively long intervals in between. Reducing Transpiration. All growing plants extract water form the soil and evaporate it from their leaves and stems in a process known as transpiration.Prevent a Crust at the Soil Surface. Probably the greatest deterrent to a high rate of water absorption is the tendency for soils to puddle at the surface and form a seal or crust against water intake. The beating action of raindrops tends to break down clods and disperse the soil.

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**MECHANICS TO CONSERVE WATER IN DRY LAND AREA FOR AGRICULTURE**

# Introduction

Water is a jewel for arid agriculture farmers. Rainfall being the chief source of water for cropping purposes in these areas is precious. Arid areas are characterized by very low rainfall (less than 100mm as defined by FAO) high temperature and barren land. Even after the rainfall, the rate of evaporation and evapo-transpiration from water body structures and plants is high that available water loses at a fast pace.

Special treatment for arid lands

To sustain agricultural activities and generate food and livelihoods of the farmers of arid zones, special measures are taken in each cropping activity right from sowing to harvesting and post-harvesting. However, water has central importance in this scenario and conservation of available water (through any mode of precipitation) requires special structures and techniques.

**5 BEST SUITED AND EASY TO INSTALL METHODS OF WATER CONSERVATION IN ARID OR DRYLAND AGRICULTURE SYSTEMS**

**1.MICRO OR DRIP IRRIGATION**

This is the most effective and efficient way of water conservation technique suitable for arid lands. Not only this method helps in water conservation, but it also help in soil conservation. In this method, water is delivered to plants from soil surface using a system of tubes that bear small holes and other destructive outlets. This method also allows the application of fertilizer by mixing it with irrigation water through Drip irrigation. It has been estimated that drip irrigation saves 50-70 percent water as compare to traditional methods of irrigation and also it supplements more crop production by 20-90 percent due to direct availability of fertilizer to plants.

**2.ZAI PITS**

Another efficient method of water conservation in arid agriculture systems is Zai Pits. These planting pits are made around the plants and trees to conserve water and moisture. The pits are prepared with hands. The excavated soil generated during digging is used to make small ridges around the pits. This helps in capturing maximum rain water. Usually these are 10 inches deep and wide and 3 feet apart (25cm x 25cm holes one meter apart). The objective is to trap rain water to increase moisture around the plant. It also aids in increasing soil fertility especially in dryland or arid regions where occurrence of crusty and degraded soil is common. These pits are then planted with a mixture of crop residues, compost, animal manure and seeds.

**3.RIPPER-FURROW PLANTING SYSTEM**

This technique is famous in Africa where water is scarce and agriculture suffers. Farmers are using this technique by employing Ripper-Furrower to rip 2 feet deep and form furrows. The function of this structure is to harvest rain water to sustain agriculture. Tractors are used during the first year to start this system. However, in next years, farmer crops directly into the rips lines using direct seeder powered by animal. The seed are then planted in the rips along-with the compost or fertilizer.

With the occurrence of rainfall, water is funneled by the furrows and reaches to crop roots. This technique gives best output for drought tolerant varieties of sorghum, maize and millet. Crop rotation with legume cropping is encouraged while following this system.

**4. SUBSURFACE IRRIGATION SYSTEMS**

It is an expensive system to setup; however, the returns in the long run are good. It is suitable for arid agriculture lands. In this system; water is supplied directly to the roots of plants. The advantage is water saving, zero nutrients loss as runoff, chances of weeds are less as they will not get desired water and nutrients, increased crop yield and production, zero surface evapo-transpiration, labor expense is saved, uniformity in application of water and nutrients and is most suitable for those agriculture areas where winds are frequent.

**5. GATED PIPE IRRIGATION**

 In this technique, water is supplied to agriculture fields through plastic or aluminum pipes. Quite popular in arid zones of USA and Latin America, this techniques reduces the leakage and evapo-transpiration losses and saves 30-50 percent of water. It also aid in reducing the soil erosion. An advantage of this technique is that the gates can be opened and closed as per need that is; one can irrigate the selected furrows only.

**TYPES OF IRRIGATION:**

**1.Surface irrigation:**

•In surface irrigation systems, water moves across the surface of agricultural land, in order to wet it and in order to filtrate into the soil.

•Surface irrigation can be subdivide into furrow, border strip or basin irrigation it is often called flood irrigation when the irrigation results in flooding or near flooding of the cultivated land.

**2. Localized irrigation:**

•It is a system where water is distributed under low pressure through a piped network, in a pre-determined pattern and applied as a small discharge to each plant or adjacent to it.

•Drip irrigation, spray or micro sprinkler irrigation and bubbler irrigation belong to this category of irrigation methods.

**3. Subsurface textile irrigation**

•It is a technology designed specifically for subsurface irrigation in all soil textures from desert soils to heavy clays.

•A typical subsurface textile irrigation system has an impermeable base layer (usually polyethylene), a drip line running along that base, a layer of geotextile on top of the drip line and a narrow impermeable layer on top of the geotextile.

•Unlike standard drip irrigation, the spacing of emitters in the drip pipe is not critical as the geotextile moves water along the fabric up to 2 meter from the dripper.

**MANAGEMENT OF DRYLAND FOR AGRICULTURE**

Management of dryland agriculture is crucial for maximizing productivity and sustainability in areas where water availability is limited. Dryland agriculture refers to farming practices in arid and semi-arid regions, where rainfall is often irregular and insufficient to support conventional farming methods.

Effective management strategies for dryland agriculture include the following:

**1.SOIL CONSERVATION:** Soil erosion is a significant concern in dryland areas, where rainfall can be intense but sporadic. Implementing erosion control measures like contour plowing, terracing, and conservation tillage helps retain soil moisture and prevent nutrient loss.

**2.WATER MANAGEMENT**: Efficient water management is essential in dryland agriculture. Techniques such as rainwater harvesting, drip irrigation, and mulching can conserve and optimize water usage, making it more available to crops during dry spells.

**3.CROP SELECTION:** Choose drought-resistant crops that can thrive in arid conditions. Drought-tolerant crop varieties and native plants adapted to the region can help maximize yields even with limited water availability.

**4.CROP ROTATION AND INTERCROPPING**: Implement crop rotation and intercropping systems to enhance soil fertility and reduce pest and disease pressures. These practices also help improve water-use efficiency and overall crop productivity.

**5.ORGANIC MATTER AND COMPOST:** Adding organic matter and compost to the soil improves its structure and water retention capacity. It enhances soil fertility, making it more resilient to drought conditions.

**6.AGROFORESTRY**: Introducing trees and shrubs in the agricultural landscape can provide multiple benefits, such as windbreaks, shade, and improved soil health. Agroforestry systems can help protect crops from harsh weather conditions and conserve soil moisture.

**7.CONSERVATION OF NATIVE VEGETATION:** Preserving native vegetation and adopting agro ecological practices can promote biodiversity and improve the overall resilience of the ecosystem.

**8.USE OF DROUGHT-TOLERANT TECHNOLOGIES**: Incorporate modern technologies such as drought-tolerant seeds, precision agriculture, and weather monitoring systems to optimize resource use and increase productivity.

**9.TRAINING AND EDUCATION**: Provide farmers with training and education on sustainable dryland farming practices. Building their capacity to adapt to changing climate conditions and use modern techniques will contribute to long-term success.

**10.GOVERNMENT SUPPORT AND POLICY**: Encourage policies that support sustainable dryland agriculture, such as subsidies for water-efficient technologies, insurance schemes for drought-related losses, and research funding for developing drought-resistant crops.

**11.COMMUNITY ENGAGEMENT**: Foster community involvement and cooperation among farmers, researchers, and extension services. Shared experiences and knowledge exchange can lead to better strategies for managing dryland agriculture.

**CONCLUSION :**

There is no one solution for the dryland farming to make it more productive. Dryland farming must be an integrated approach of all the system . Mainly the ignorance of the land users makes it more and more vulnerable to further degradation. Each dry environment

is distinct in its own; solutions developed should be based on the basic needs of the local conditions prevailing in that region.Soil, water and all the natural resources are never taken for granted, these resources when utilized in a judicious manner gives maximum output. Green

revolution of the 1960s was oriented on growing improved varieties and the present day emphasis should be a sustained development of agriculture especially in dryland areas.

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