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WATER SHADE MANAGEMENT IN SOUTHERN RAJASTHAN

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Abstract-

In addition to ensuring that water is stored and conserved, the goal of this mission on water conservation is to make villages self-sufficient in their use of water, and therefore give a lasting solution to the problem of meeting the demand for water. With the use of satellite-derived information, a number of different hydrological aspects of the Balesar block have been investigated as part of this study, and watershed management has been scrutinised. Two of the most important natural resources for maintaining both life and the environment are the earth's soil and its water supply. Since the beginning of the human race's presence on earth, these resources have been used to a variety of different uses. These resources and the way they are managed are an extremely important factor in determining the well-being of people everywhere on the planet. In the natural world, the soil and water resources are frequently in a state of delicate equilibrium. However, as a result of an extraordinary growth in the population of both humans and cattle in the desert portion of the nation, the demand for food and fodder has significantly grown. The inequalities in the distribution of natural resources have led to a fall in the productivity of the land.

Keywords: *Water shade, Management, southern*

INTRODUCTION

Numerous ancient societies' myths and histories feature prominently with water serving as a significant symbol throughout. The majority of mankind throughout history were aware that their water resources may eventually run out, and as a result, they acquired a healthy regard for preserving whatever water they could find. This is in contrast to those living in urban, industrialised nations in the 21st century. It has suddenly become abundantly evident that India is rapidly running out of fresh water. Every new day brings with it a new opportunity for humanity to pollute, redirect, and deplete the wellspring of life that supports all of its existence. The quantity of fresh water that we use exceeds what is available, putting the health of thousands of additional people at jeopardy. Already, the social, political, and economic effects of water shortage are rapidly becoming a force that may be described as destabilising. This is seen by the proliferation of water-related conflicts across the country. Simply put, unless we make significant changes to the way we live our lives, over the next quarter of a century, between one-half and two-thirds of the world's population will be forced to deal with catastrophic fresh water shortages. The patterns of water scarcity and water consumption that we witness presently in the state of Rajasthan have inspired planners, administrators, researchers, and intellectuals to ponder about a problem that may become extremely severe for the people of the twenty-first century, and that day is not very far away at all. This problem may become very severe for the people of the twenty-first century because of the trends that we observe currently in the state of Rajasthan. This issue will not be restricted to Rajasthan by itself, and if it is not dealt with in an adequate manner, it will make life more challenging everywhere on the earth, and it may even result in a catastrophe for the human species. This harmful pattern was brought into existence by man himself since he had engaged in the careless exploitation of water, which resulted in a significant imbalance within the eco-system. It is impossible to find a solution to the problem of the water crisis without the participation of the people, and it is imperative that efforts be made to include each and every person in the many water conservation plans. This work is an effort in this direction and recommends numerous indigenous water collecting strategies that will be beneficial for better water management systems. This work is part of a larger body of research. This research would be useful to ecologist, political elite, policy planners, irrigation technocrats, agronomic scientists, social scientists interested in ecological parameters of developmental change, and anyone else interested in water management. The research focuses on a fragile eco-system that is undergoing significant changes that have been implemented without much forethought.

WATERSHED DEFINITION

The phrase "watershed" refers to a region that is characterised by well delineated hydrological as well as physical borders, and from which all of the runoff ultimately drains into a singular outlet. A watershed collects precipitation, processes and stores water, and controls how much of it is released into the environment. Groundwater aquifers that both flow into and receive discharge from other streams are also included in the definition of a watershed. The term "watershed management" refers to the "rational utilisation of land and water resources for optimal and sustained production with minimum hazard to natural resources." This definition was developed by the American Water Resources Association. It essentially pertains to the conservation of soil and water in the watershed, which means proper land use, protecting land against all forms of deterioration, building and maintaining soil fertility, conserving water for agricultural use, proper management of water for drainage, flood protection, sediment reduction, and increasing productivity from all forms of land use. It is possible for watershed management programmes to deliver monetary advantages in addition to having a favourable influence not only on the biological and environmental systems but also on the social and cultural systems. Both the people who live in the upland watershed and the communities that are located farther downstream can stand to gain economically from upland development provided it is carried out in accordance with effective watershed management principles.

Watershed Characteristics

- Watersheds are the primary physical features responsible for the landscape's subdivision into hydrologically distinct geographic areas
- Watersheds are the ecological units that integrate all of the environment's functions
- Water quality and flow are determined by physical, chemical, biological, and human usage and management
- Because of the intrinsic conditions, uses, and management practises that are specific to each watershed, the responses to changes in water quality and flow can be very varied and complicated.

WATERSHED PLANNING

The following requirement must be met for planning watershed

(i) Conducting a reconnaissance study of the watershed region with the goal of elucidating the nature of soil-water conservation and the challenges associated with it, as well as the possible solutions to these issues and the necessities for its overall growth. The next step should be a preliminary and in-depth examination of the available fundamental materials. A map of the land area should be created using scales that are appropriate for carrying out these surveys.
(ii) The preparation of a soil map and the categorization of land according to its potential applications, such as agriculture, horticulture, forestry, pasture development, and the raising of cattle and sheep, among other purposes.
(iii) Creating an inventory of the many uses of land that are already in existence, as well as farm sizes and fragmentation.
(iv) An evaluation of the agricultural production pattern and potentials.
(v) The topographic characteristics and hydrology of the area that makes up the watershed.
(vi) Conducting geophysical and geohydrological surveys in order to identify regions that are ideal for the development of ground water.
(vii) Specific information on the frequency, volume, and pattern of rainfall on a weekly and daily basis.
(viii) The creation of a time-based plan that is incorporated into the overall plan.
(ix) Determination of the most important goals to pursue in order to carry out the programme.
(x) Analyse the proportion of benefits to costs.
(xi) The influence of social and political forces on the watershed development programme and their participation in it.

STUDY AREA

The state Rajasthan is situated in north western part of India and extends from 230 3' North to 300 12' North latitudes and 690 30' East to 780 17' East longitudes. It covers an area of 3,42,239 sq.km. Physiographical the state has four following distinct units:

(i) Western sandy plains and sand dunes,
(ii) Aravalli hill ranges and adjoining areas,
(iii) Eastern plains and

(iv) Vindhyan scarp land and Deccan Lava plateau. The physical features of study area are dominated by the low rugged highly dissected topography. There are different hydrogelogical environments in which ground regime behaves differently, which has to be considered while planning its exploitation of ground water a port from this there are problems of considerable depletion of water table ground water quality and pollution. Surface water flow has been much influenced by its relief and climate.

The climate of Rajasthan is mostly classified as dry or semi-arid, and the state's surface water resources are severely lacking. The fact that the state of Rajasthan is physically split in two by mountain ranges known as the Aravallis has a significant impact on the state's climate. Although the entire state endures hyperthermic conditions, the regions west of the Aravallis are particularly inhospitable. These regions are characterised by large temperature swings, extended periods of severe drought, high wind velocities, and low relative humidity. Although there is a large amount of variance in temperature and rainfall, the climate in the regions that are located to the east of the Aravallis is generally less taxing. Rainfall is the primary contributor to both the surface water and the groundwater levels. Because of its location and its distance from the ocean, the pattern of rainfall that occurs over the state is highly irregular in both time and space, which can result in floods and draughts occurring concurrently in one or more locations. The south-west monsoon begins in the middle of June and lasts all the way through September. This monsoon is responsible for the state's monsoon rainfall. During the monsoon season, people often see the greatest amount of precipitation. The average annual precipitation in the state is 573 millimetres, however it ranges from 164 millimetres in Jaisalmer to 1004 millimetres in Jhalawar. The mean annual precipitation in the state is 573 millimetres. Isohytes tend to move in a direction that heads south-eastward from northwest to southeast. The average annual rainfall in this part ranges from less than 100 mm in northwestern Jaisalmer (lowest in the state) to 200 to 300 mm in the Ganganager, Bikaner and barmer regions, 300 to 400 mm in the Nagaur, Jodhpur, Churu and Jalore regions and more than 400 mm in the Sikar, Jhunjhunu and Pali regions, and along the western fringes of the Aravallis. The amount of precipitation that falls on the eastern side of the Aravallis ranges from 550 millimetres in Ajmer to 1020 millimetres in Jhalawar. In the plains, the districts of Banswara (920 mm) and Jhalawar (950 mm) receive the most amount of yearly precipitation. The annual average rainfall varies greatly from one region of the state to the next. In the western part of the country, it is the most variable, with frequent spells of dryness that are periodically broken up by prolonged periods of copious rainfall in certain years. This is because low-pressure systems move across the region. During the previous decade, i.e. 1999-2000, it had been noticed that from 1990 to 1994, alternate rainy and dry phases have been experienced over the State, followed by wet spells up to 1997, but in 1998, it was much below normal. This observation was made during the time period known as 1999-2000. Rainfall totals in the state were much lower than average in both 1999 and 2000. As a direct consequence of this, the state was experiencing a drought condition. The relative humidity of Rajasthan ranges from as low as 50% in the west to as high as 70% in the east, with the average falling somewhere between 60% and 65%.

METHODLOGY

The majority of the information included in the study is secondary data, which was gathered from a wide variety of government and non-government institutions and organisations. Secondary data have been collected from many important agencies, including the State Ground Water Board in Jaipur, the Central Ground Water Board's Western Office in Jaipur, the State Irrigation Department in Jaipur, the State Agriculture Department in Jaipur, the State Department of PHED, Planning, and Horticulture, and Jaipur. Primary data for assessing the effectiveness of water management have been obtained from samples taken both at the village level and the home level. This study uses the secondary data base that is now available in order to develop an initial base profile for both existing and potential sources of water in the present and the future.

WATER RESOURCES POSITION IN RAJASTHAN

All management and planning of water in the state should keep this pivotal fact in focus and provide priority significance on merit basis to various user sectors of the state's economy, taking spatial variations into account while charting development. Rajasthan is endowed with approximately one percent of the country's total water resource, which evidently speaks of the position of this essential commodity in the state. Rajasthan accounts for approximately ten percent of the country's geographical area but only has 5.5 percent of the country's population. The state as a whole receives an inadequate amount of precipitation, which is very variable and unpredictable in terms of its water supply reliability. Rainfall is the primary source of water supply. The impressionistic views indicate and emphasise a drop in the total rainfall, as well as an increase in the unpredictability of rainfall in different places and notable swings in the seasonal behavioral pattern. A more in-depth, all-encompassing, and critical study of the rainfall records and data that are already available from districts, tehsils, and other stations can shed more light on this spatiotemporal phenomenon and provide a foundation for strategic planning for the future.

GROUND WATER RESOURCE

The state has a total ground water potential area of 2,15,142 square kilometres, which accounts for 63% of the state. On the other hand, the saline area encompasses 100,223 square kilometres, the majority of which is located in western Rajasthan and accounts for 29% of the state. A total area of 26874 square kilometres, or 8% of the state, is covered by hilly terrain. On the basis of the recommendations provided by the Ground water Estimation committee, a calculation of the ground water resources in the state as of January 1, 1998 has been made. As a direct consequence of this, the gross yearly recharge, ground water draught, balance, and stage of ground water development have all been estimated. According to the calculations, the recharge, draught, and balance of ground water are correspondingly 12602, 8708, and 3894 mom. The whole stage of development of the ground water reaches to 69.10% overall. The categorization of blocks was completed based on the stage of stage of the status of ground water development and the long term trend of water levels before and after the monsoon season.

CRITERIA OF CATEGORISATION

Category	Ground water withdrawal	Trend of water level
Safe(white Zone)	less than 70%	No significant depletion water level
Semi critical (Grey Zone)	70-90%	Water level depletion either in per-or post-monsoon period.
Critical (Dark Zone)	More than 90%	Water level depletion either in per-or post-monsoon period.
Over exploited	More than 100%	Water level depletion in both per-&- post monsoon period.

GROUND WATER LEVEL

The amount of water present varies depending on the amount of precipitation, the topography, the drainage, and the climate. The characteristics of the state's ground water vary greatly from place to place. In the canal commands region, the depth of the water ranges from less than 5 metres to 20 metres, but in the non-command areas, the depth of the water ranges from 7 metres to more than 100 metres. The year 1984 has been selected as the base year for the purpose of analysing the trend of the water level and the long-term fluctuations. Prior to the onset of the monsoon in 1984 and prior to the onset of the monsoon in 2000, the trend was examined (Table 1). According to the findings of investigations, out of 32 districts, 26 districts indicate an average decline in water level, while 6 districts show a minor increase. However, among the municipalities that have seen an increase in water level, there are some localised areas that have witnessed a decrease in water level. Ajmer, Alwar, Jaipur, Jalore, Jhunjhunu, Jodhpur, Nagaur, Pali, and Sirohi are among of the districts that have been severely impacted by falling water levels.

Table - 1: Change in water level between 2016 & 2020 in Table - 1: Different Districts of Rajasthan

Sr.No.	District	AveragePre-monsoon WaterLevel(m)		Drop/Risein WaterLevel(m)
		Year1984	Year2000	
1.	Ajmer	7.82	13.41	(-) 5.59
2.	Alwar	11.08	16.20	(-) 5.12
3.	Banswara	6.35	6.351	(+)0.001
4.	Baran	7.50	9.51	(-) 2.01
5.	Barmer	31.58	32.91	(-) 1.33
6.	Bharatput	7.78	8.89	(-) 1.11
7.	Bhilwara	10.27	14.98	(-) 4.71
8.	Bikaner	65.34	62.87	(+)2.47
9.	Bundi	9.23	12.53	(-) 3.30
10.	Chittorgarh	11.12	15.21	(-) 4.09
11.	Churu	42.88	42.84	(+)0.04
12.	Dausa	11.06	13.24	(-) 2.18
13.	Dholpur	8.69	10.04	(-) 1.35
14.	Dungarpur	7.34	9.36	(-) 2.02
15.	Ganganagar	19.22	13.60	(+)5.62
16.	Hanumangarh	22.51	18.09	(+)4.42
17.	Jaipur	20.00	25.74	(-)5.74
18.	Jaisalmer	45.29	45.06	(+)0.23
19.	Jalore	13.18	21.18	(-) 8.00
20.	Jhalawar	8.13	9.35	(-) 1.22
21.	Jhunjhunu	28.32	34.54	(-) 6.22
22.	Jodhpur	30.23	36.83	(-) 6.60
23.	Karauli	11.04	14.47	(-) 3.43
24.	Kota	8.87	10.38	(-) 1.51
25.	Nagaur	28.39	34.89	(-) 6.50
26.	Pali	12.64	19.33	(-) 6.69
27.	Rajasmand	10.38	15.07	(-) 4.69
28.	Sawaimadhopur	9.58	11.32	(-) 1.74
29.	Sikar	30.91	35.68	(-) 4.77
30.	Sirohi	11.89	18.38	(-) 6.49
31.	Tonk	8.49	10.86	(-) 2.37
32.	Udaipur	9.25	11.92	(-) 2.67

REASONS OF GROUND WATER DEPLETION:

The excessive extraction of ground water to satisfy the ever-increasing requirements of our society for agricultural, household, and industrial uses is the primary contributor to the lowering of water tables. Further jeopardised by the unexpected growth was the long-term viability of the rainy season's unpredictable patterns. The end effect of this is a decrease in the amount of ground water resources, which in turn leads to the drying up of wells and a decline in the chemical quality of ground water. It is nothing but a tragedy of the worst order that when both rainfall and ground water are a scarce commodity in the state, and whatever and wherever available, it is under constant threat of either being polluted by industries or is being mis-managed in place and time in the name of'so-called development' inflicting unbearable damage on their dependent fragile ecosystems. During the severe conditions of 1984–1988 and 1999–2000, the people as a whole faced unprecedented difficulties in even procuring the drinking water supplies, and they were reeling under the constant threat of infectious water–borne diseases. At the same time, the rich–resourceful industries sector exploited the situation in an unscrupulous manner, using an array of tankers for managing waters at the cost of not only agriculture, but even the bare domestic drinking water needs of the helpless masses. The water table beneath our feet is dropping at an alarming rate, and with each passing summer, either our wells become deeper or the older ones go dry. This poses an ongoing risk to agriculture, which is and will likely continue to be the primary profession of the people living in Rajasthan. Unless we alter our connection to the water and the systems that keep it alive, all of our money and expertise will be for naught.

The availability of clean water is essential to our survival, just as it was for our ancient predecessors. However, it appears that a significant number of people are unaware of the diminishing availability of this invaluable resource. They are unaware that time is running out, yet the clock continues to tick. Concerns have been raised over the mismanagement and haphazard application of fresh water for agricultural and industrial purposes in India, despite the country's abundant supply of this resource. There is a significant amount of variety in the water availability rate throughout the country's various areas. India frequently experiences bouts of sporadic water scarcity. The classic illustration of this is seen in the state of Meghalaya's Cherapunji and Mwasinram regions, which receive the greatest rainfall in the world yet still struggle with a lack of water throughout the late winter and early summer months. The state of Rajasthan, on the other hand, is plagued by severe water shortages during the whole year.

MANAGEMENT ISSUES:

The preceding conversation has brought to light a multi-faceted problem that is connected to the availability, volatility, and changes of water resources in various locations as well as several competing demands as an integral element of the overall process and strategy of development. The inadequacy of the available water resource in comparison to the minimum basic needs of the population is one specific issue that may be listed as a barrier to water management. This gap is sure to widen further under the pressure of a higher rate of population growth. Additionally, the spartio-seasonal variations of rains and water resources are most pronounced in Rajasthan, and this variability and fluctuations are on recent records further increasing. thirdly, and most disappointingly, as a phased regular activity, particularly in and around rural areas (under one excuse or garb and name), the traditional methods of water conservation in practise were systematically abandoned, detericrated, and even destroyed; in some places, they were either obliterated or becoming extinct; fourth, the wasteful use of water in agricultural and irrigation sectors by the urban population in a false-sense of higher standard of living reflected in and measured through high per capita consumption of water when in their very neighbourhood, the poorer sections of society including slum dwellers pine and precariously manage even their drinking water needs; and fifth, the ever-raging, dominantly powerful, and widening demands of industries and multiple urban activities (in particular, in the case of the former), which are causing water shortage This competition is going to take place in and around the expanding urban, industrial, and tourism centres that are located across the state.

PLANNING STRATEGY FOR SUSTAINABLE DEVELOPMENT:

Water sustainability can only be achieved if we work toward greater regional self-sufficiency rather than less. The only way to combine strong environmental regulations with people's productive capacities and to conserve our water at the same time is to build our economy on local watershed systems. The pursuit of answers to the water shortage conflicts with the values of unrestricted expansion and escalating economic globalization. Economic globalization undermines local communities by facilitating simple capital migration and resource theft. In Rajasthan, despite the variety of landform features, the majority of them suffer from a lack of water. As a result, it is primarily needed to establish a foundation for improving their data on available and potential water resources while also being dependable. Thoughtful consideration and the application of scientific study and analysis may be used to address the challenge in a select few areas requiring immediate attention.

1. An analysis that compares different water management systems, planning strategies, and the execution and attainment of target goals in the state, particularly in regard to irrigation and cropping patterns, the influence of new technology, and the responses of cultivators to it. to explore the extent to which farmers have been able to accept and alter the traditional know-how as well as the new technology developments pertaining to water as such.
2. It is high time that a scientific approach be taken to the delimitation of water zones in Rajasthan. This approach should take into account the availability of both surface and ground water resources on the one hand, and an evaluation of the relative impact and utility of well, tank, and canal irrigations in spatiotemporal perspectives, on the other. An investigation of their difficulties with the goal of improving their management, keeping the conservation of water in view as one of the main features, may go a long way toward ensuring that our precious but limited water resources are used in the most effective way possible.
3. Plans are in place to establish ground water augmentation projects in rural regions and roof top rain water gathering programs in large cities and towns.
4. Artificial recharge of ground water by means of building of various structures such as subsurface barriers, percolation tanks, Gabion structures, and other similar structures; identify crucial regions and alert them. An historic traditional village pond tanka system is being brought back to life.
5. It is important to support a shift in cropping patterns (the cultivation of plants that use less water) and the adoption of improved irrigation techniques.
6. To make regular withdrawals from ground water in places that have been over-exploited and are crucial, to prohibit the building of new structures, to regulate indiscriminate drilling by legislation, and so on.
7. There is an immediate need to reexamine the performance of various irrigation systems, as well as their relative economic gains and utility, in an effort to search for alternative usages, such as the growing of plantations, grass animal farming, and even fuel-forestry, in order to replace the traditional cropping patterns, which will result in greater and more certain gains for the wider field of farming community. If a fresh attempt is made to re-examine and evaluate the management of tank irrigation in southern Rajasthan and the complete gamut of canal water usage in Rajasthan, a similar evaluation would prove to be useful. Similar assessments will be advantageous. To reinvigorate the rural water scenario as a whole and realize specific advantages, it is imperative that canals be made to run at their intended levels of efficiency and that tanks that have been abandoned or destroyed be brought back into service.
8. The time has come to take stock of the current usage pattern of water resources in the state by agriculture, residential and drinking water requirements, industry, tourism-recreation, etc., by assessing their respective future shares and claims and competitiveness under anticipated demands. The time is ripe to take stock of the current utilization pattern of water resources in the state. In this regard, people's

answers to shortage situations might give some lessons for future management and planning insights, as these responses are totally indigenous and are based on real, gross-root experience.

9. Increasing the water supply by thoroughly and completely utilizing the principal and major areas of (i) the available rainfall and river valley flows within the state, (ii) acquiring water in all possible quantities from inter-state river agreements by remaining more vigilant about its share, and (iii) exploring all channels and technical know-how for tapping even deeper ground water resource (though its limitedness as an exhaustible stock resource character should never be forgotten), and (iv) procuring water in all possible quantities from inter-state river agreements
10. Water conservation should be a top priority for all aspects of water management, including the planning and preparation of water systems, particularly in Rajasthan. In water, as in energy, "an unit saved is a unit produced," and in virtually all of Rajasthan's parts (because by now no region of the state has remained unvisited by drought, including Kota and Udaipur regions, and now it is Jaipur's turn for a much more severe ensuing summer), conservation and saving for better utilization is an effort in the production cycle of water, both in the physico-natural sphere (the conservation of rain water) and
11. In a way, water conservation and the efficient use of water has much to achieve in the sphere of irrigation, (by improved regulation of the main canal and its distributaries, their lining, and the entire aspect of operational techniques), in the urban region, (where the households-the biggest user culprits of being "islands of opulence amid ocean of water scarcity" reflecting wide distributional preferential mismanagement within a unit), the industrial sector, and the recreational sector. A strategy that is more reasonable may incorporate features such as equitable and just water supply, cost-effective price of water utilized by individual families, and some form of moral institutional restriction on private ownership of water through tube wells, etc. Evaluating the productive capacity of per unit of water consumed under a variety of use-heads is not any less fascinating as a result.
12. The most recent three decades in particular have been witnesses to the occurrence of environmental and ecological difficulties and risks near industrial complexes connected with their usage of water. In this inter-disciplinary field, where technocrats, administrators, social scientists, and possibly others must contribute collectively to maintain the fragile agrarian base in the state, diversify the state's economy by involving shifts in the traditional structure, and do so without causing further irreversible damage to the physico-human environmental balance. It is imperative that any desired safeguards, such as treatment facilities, be incorporated into the production process at all times in order to prevent a recurrence of the environmental ramifications that were seen in the past surrounding industrial and mining regions of the state.
13. A provision should be added in the building bylaws stating that if there is no sewerage in the area, the owner of the home would be required to empty the unclean water from the home into a hole that is between 70 and 80 feet deep. This provision would go into force if there is no sewerage in the region. This would help avoid the spread of illnesses and contribute to the enhancement of the water resources underneath. There is a requirement like this one in place in Tamilnadu.
14. In the more rural regions, particularly those that are arid, the people living there should be encouraged to build underground tanks (also known as "Tankas") so that rain water may be collected and put to better use. This is particularly important in the desert areas.
15. People should be educated on the benefits of sprinkler and drip irrigation, and they should be encouraged to use these techniques by being provided with incentive grants and generous loans from banks. In addition, people should be taught the advantages of sprinkler and drip irrigation.

16. Ongoing efforts need to be made by the government and various groups to raise water users' awareness of the issue. These efforts can take the form of training, motivating camps, posters, wall paintings, hoardings, news papers, radio, and television, among other mediums.

CONCLUSIONS

Because of natural increases, dry regions all across the world, including the most arid ones, have seen increases in their human and cattle populations, just like every other location. The ever-increasing population pressure has put a strain on the fragile eco-system's few natural resources. As a result of the fact that excellent areas are already being intensively farmed, attention has turned toward dry zones all over the world for the purpose of agricultural production. Taking a scientific approach to understanding the challenges and limitations of an arid region and implementing the appropriate technology for watershed management may be of tremendous assistance in working toward the objective of satisfying the aspirations of the people who live there on a sustainable basis. It is necessary to have an integrated watershed strategy in order to successfully implement any soil and water conservation measures that are intended to improve productivity. In dry regions, circumstances such as soil, climate, socioeconomic variables, and the list goes on and on, which means that no two locations are the same. Because of this, it is necessary to make sure that the technology you choose is appropriate for the area in question. When designing any construction for a particular location, keeping the structure's cost-effectiveness in mind is essential. Repairing a building is typically more cost-effective than creating a sturdy and expensive structure to withstand extreme catastrophes that occur once every 100 years. All of the watershed technologies that have been mentioned up to this point are, for the most part, site-specific, and various components need to be combined as part of a holistic strategy in order to optimize output on a sustainable basis. These technologies have stood the test of time and have been demonstrated to be effective in harsh environments such as desert ones.

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