WATER CRISIS IN IGATPURI TALUKA

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ABSTRACT

A Water Crisis is a situation when the supply of water is less than the demand due to non availability of water or mismanagement of water resources. Water is the most valuable natural resource as it is essential for human survival and life on earth. However, the availability of freshwater for human consumption is highly under stress because of a variety of factors. This crisis of water scarcity is most visible in India as well as in other developing countries. India receives 4000 bcm (billion cubic metres) rainfall each year. Out of this, 1869 bcm remains after evaporation = The actual availability is only 1137 bcm. Even in that 1137 bcm of water, there is a lot of temporal as well as regional variations in the availability. For instance, on the one side, there are water surplus states such as Uttar Pradesh, Himachal Pradesh and on the other side, there are water scarce states such as Maharashtra (Vidarbha, Beed), Karnataka, Tamil Nadu, Rajasthan and parts of Gujarat.

Keywords: *Water Crisis, Non-Availability, Mismanagement, Human Survival, India, Rainfall, Variations, Water Scarce State, Maharashtra.*

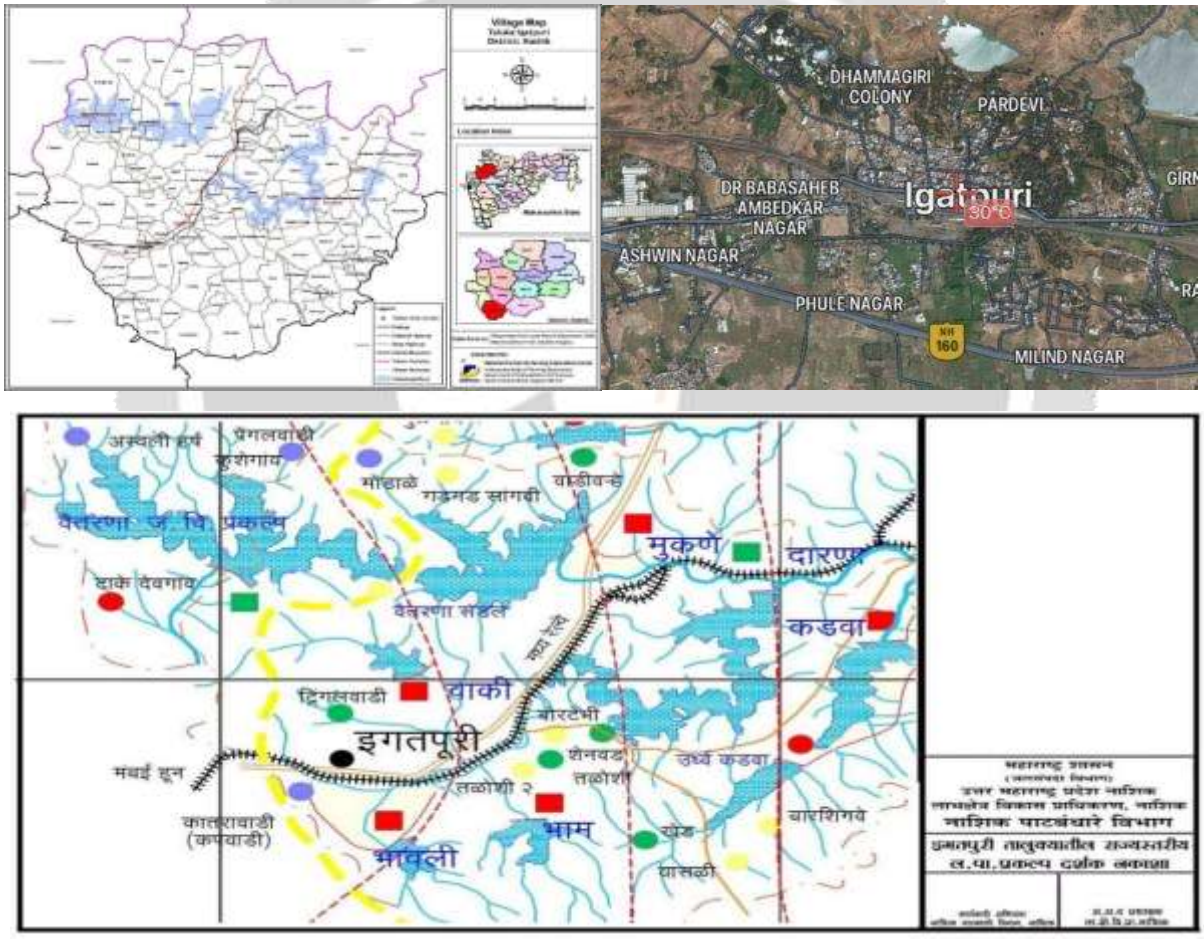
INTRODUCTION

As Water is basic need of the living things. We know that water crisis seriously treating the world, it causes millions of deaths per year. As we know out of 100% only 1% water on earth is drinkable & amp; usable, 2% glaciers & 97% is not usable because it contains different salts & minerals. With a growing population and rising needs of a fast developing nation as well as the given indications of the impact of climate change, availability of utilizable water will be under further strain in future with the possibility of deepening water conflicts among different user groups. Low consciousness about the scarcity of water and its life sustaining and economic value results in its mismanagement, wastage, and inefficient use, as also pollution and reduction of flows below minimum ecological needs. In addition, there are inequities in distribution and lack of a unified perspective in planning, management and use of water resources. The objective of the National Water Policy is to take cognizance of the existing situation, to propose a framework for creation of a system of laws and institutions and for a plan of action with a unified national perspective. Reports by international bodies like UN & WHO & other non-governmental organization have indicated that water supply is not always commensurate with demand which they need. The supply of water which is done is not adequate & safe. The daily per capita consumption of water varies between 10-27 litres with an average of 46 litres during water crisis period which is far below the internationally recommended value of water that is used by the person & that value is 115 litres per person per day. Inspire of having large irrigation area we are facing water crisis problem the reason for this is lowering of ground water level & the main reason of this lowering of water level is overexploitation of water, Scanty rain fall & temperature change etc. People have to bring

water from long distances which contains pathogens in it & later intake of this impure water leads to several water borne diseases like cholera, typhoid etc. Which add to economic burden especially in the rural areas. Available water treatment technologies are expensive and not affordable to the rural communities.

STUDY AREA

Igatpuri tehsil lies between 19° 35′ 00 ″ N to 19° 49 ′ 30″ N latitudes and 73° 31′ 30″ E to 73° 52′ 15″ E longitudes. It is situated on eastern side of Sahyadri mountain of Maharashtra, covered by the catchment area of Darna River and characterized by hill ranges, escapements, cliffs, waterfalls, flat topped interfluves and heavy rainfall in monsoon. Igatpuri tehsil is situated in the southwestern part of Nashik district in Maharashtra state. Igatpuri region is classified as Am by Kappen and Geiger. The average annual temperature of Igatpuri is 24.30 C and receives an average rainfall of 3178 mm annually. There are two towns and 117 villages in this tehsil. This tehsil is confined by Trimbakeshwar tehsil Towards north west, Nashik tehsil to north east, Sinner tehsil to east side, Ahmednagar district towards south side, Thane district to south west side and Palghar district towards eastern side. Igatpuri tehsil possess loam soil texture with deep soil on a gentle to moderate slope along Darna basin at eastern side and most of the western areas are covered by thin and shallow soils with steep to precipitous.



Igatpuri map :Area under consideration

NECESSITY

Igatpuri is a taluka place in Nashik district and is well developed in tourist area and agricultural fields. Igatpuri is surrounded by the highest peaks in Sahyadri i.e., Western Ghats, most of them are forts build in sat vahana dynasty. Igatpuri is a place of significance in term of vipassana meditation Igatpuri connected between two major cities, Nashik and Mumbai. As of 2011 India census, Igatpuri had a population of 2,53, 513.Tourism is most significant segment of Igatpuri economy. It has an average elevation of 600 meters. Igatpuri covered by the catchment area of Darna river and characterized by hill regions, escapements, cliffs, waterfalls, flat topped interfluves and heavy rainfall in monsoon. The average annual temperature of Igatpuri is 24.3°C and receives an

average rainfall of 3178mm annually. Igatpuri is the homeland of rain. There are two towns and 117 villages in the tehsil.

OBJECTIVE:

1. To assess the availability of surface and subsurface water in the Igatpuri taluka.

2. To seek the opportunity for the rainwater harvesting program.

3. To check the feasibility of new techniques for irrigation.

4. To reduce the losses from the distribution system.

5. To create the awareness amongst the people.

LITERATURE RREVIEW

This chapter presents the studies carried out by various researchers from the all over the world in field of water resources, water crisis, rain water harvesting, irrigation practices and reuse of domestic waste water for irrigation.

Water Crisis:

ZENITH International Journal of Multidisciplinary Research ISSN 2231-5780 Vol.9 (6) JUNE (2019).pp.224-236: Drought Response And Relief By "JALDOOT EXPRESS" A Case Study Of Latur Drought 2016

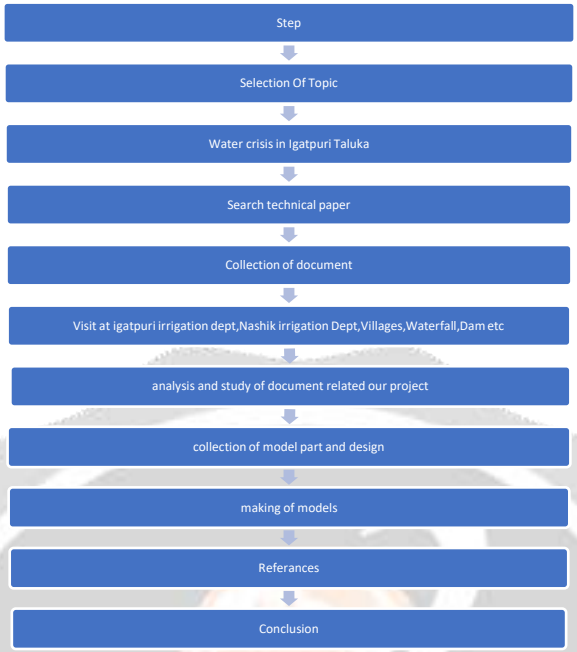
This paper analysis the administrative capacities for drought response and relief management from the prospective of regional water users and decision-makers.it is the study of water supply of Latur city for the drought 2016. It involves study of water requirement of Latur city, feasibility analysis of supply option and effective distribution of water.

Yamini yoga (2017): Water equity and tourism: A Case of Nainital District, Uttarakhand. This study is based on fieldwork that was carried out in the north Indian state of Uttarakhand over the course of few years since 2014 under to project The first project was the Himalayan, adaptation, Water and Resilience, In involved in the capacity of research in term the objective. The second project carried out in the Kumaon region of Uttarkhand mapped the impact of multiple stresses on mountain farmers in two blocks of the Nainital district.

C.G. Maheshwari et.al.(2010) Addressed the water crisis in India in near future and revealed that the with the country's water potential, it is possible to alleviate the water crisis by adopting the balance approach toward the demand and supply solution. A balance water management approach, involving radical change in policies, practices, performance and public behaviour apart from changes in the constitutional provisions, is required to bridge the gap between the demand and supply. Such an approach alone can solve India's water crisis in sustainable manner.

Central Ground Water Board, Ministry Of Water Resources, Govt Of India (2010) Reported the Ground Water Information of Ahmednagar District. According to the report kopargaon region comes in semi-critical Taluka, "The major parts of the place are showing falling ground water level trends mainly in central, northern and western part of the district. The ground water quality is also non potable at many places as the concentrations of most of the parameters are above desirable limit. Also 50% of samples are having high nitrate concentration, the ground water quality is also getting affected due to industrial pollution from sugar and allied industries like distillery and paper. The effluent generated from these sugar and allied industries and other industries are causing environmental problems because of its improper storage and disposal without adequate treatment"

METHODOLOGY



CLIMATE AND RAINFALL:

The climate of the district is characterized by a hot summer and general dryness throughout the year except during the southwest monsoon season, i.e. June to September. The mean minimum temperature is 21.2°C and mean maximum temperature is 28.2°C.

r for Nashik, Ahmednagar and Aurangabad districts, besides providing water to Mumbai as well . It is the minimum in the northern parts of the district around Igatpuri it gradually increases towards southeast and reaches the maximum around Aambevadi. The district being situated of western ghats, it often suffers the drought conditions. Almost entire district covering Avalkhed, Sonoshi, Taked, Adharvd, Vadhera 2, Jamunde, and Devla comes under "Drought Area". The average rainfall for the period 2011-2021 ranges from 2575 mm (Igatpuri) to 2423 mm (Trimbak). It is noticed that the average annual rainfall has decreased during the last 10years period as compared to the normal annual rainfall.

SR.NO	YEAR	TALUKA		
		Nashik	**Igatpuri**	**Trambak**
1	2011	503	2758	1646
2	2012	543	2793	1474
3	2013	591	3775	1980
4	2014	663	3386	1762
5	2015	429	2575	955
6	2016	913	3383	1744
7	2017	1336	4063	2423
8	2018	653	3317	1624
9	2019	1731	5531	3935
10	2020	1152	3880	1439
11	2021	776	3462	1985

CAUSES AND EFFECTS

Why is there a shortage of water even after having so many water resources?*(causes)*

- Due to hilly terrain
- Climatic change
- Increase in population
- Improper pipeline system

Effect of water crisis

- Lack of drinking water
- Water bone diseases
- Water conflict
- Economic slow down
- Sanitation issue

OUR PLAN OF ACTION:

- Usage of Strong Tarpaulin Plastic
- Rain Water Harvesting
- Continues Counter Trench (CCT) `

Visit at Panchayat samiti, irrigation dept, villages etc

REDUCING PERCOLATION BY USE OF TARPAULIN SHEET

It is mainly done to reduce percolation of water from the. It provides the water proofing essential for a successful for dams and small pond where water is stored. As vast amount of water are lost through seepage, especially where the soil is gravel and porous. It is estimated that 70% of water is lost between the storage and usage point. Lining of canals reduces supply losses lining is done by using plastic sheet in the form of LDPE film below the hand cover lining is effective in improving water tightness of lining.

The Lining Film

- Damages the plastid is a revolutionary concept which dramatically reduces seepage loss at a reasonable cost.
- It is tough multilayer, wide width, low density polyethylene (LDPE) film.
- It is available in various widths (4-10m) and thickness (100-250)
- First of all the ponds dimensions (L*B*D, Side slope) are to the identified and then mark the top level as well as the bottom level length and breadth on the ground clearly. Put pegs at the corners of the pond and tie a rope to demarcate pond dimensions.
- Next start digging the pond from the inside rectangle (l*b) and dig till desired depth is achieved. Excavated soil can be kept near the pond around the demarcated periphery and can be use later after screening as a soil cover. Screening is very important as it will remove big boulders and sharp edges gravel which could dace film.

Benefits of Pond and Reservoir Lining with Plastics films

- Reduction in seepage losses to the maximum extent (95%).
- Harvesting and storing of rain water from early monsoons.

- Utilization of harvested rain-water for short during crops as well as during off season.

- Lining of ponds and reservoirs improve water availability over a longer period of time.
- It is highly useful in porous soils where water retention on ponds and water harvesting tanks is minimal.
- Economical and effective method of stories water.
- Eliminates water logging and prevents upward instruction of salts into stored water.
- Useful for the purpose of storage of drinking water, for Pesci-culture and for providing supplementary irrigation. A large number of ponds have been lined with plastics for providing drinking water in the coastal and hilly areas of Gujarat, West Bengal, Karnataka and Himachal Pradesh, Maharashtra and Uttaranchal.
- Prevents soil erosion.
- Technique is also suitable for effluent ponds and channels to reduce soil and ground water contamination.
- Excess water losing seepage result in a continuing loss of fertility.
- A newly built pond usually loses more water than and older pond as the pond is being used and well managed, the organic matter produce from fertilization and feeding falls to the pond bottom where it gradually blocks the soil pores and so reduces the bottom soil permeability.

RAIN WATER HARVESTING

Water is the most common or major substance on earth, covering more than 70% of the planet's surface. All living things consist mostly of water. For example, the human body is about two third water. In most urban areas, the population is increasing rapidly and the issue of supplying adequate water to meet societal needs and to ensure equity in access to water is one of the most urgent and significant challenges faced by the policy-makers. With respect to the physical alternatives to fulfil sustainable management of freshwater, there are two solutions: finding alternate or additional water resources using conventional centralized approaches; or utilizing the limited amount of water resources available in a more efficient way. To date, much attention has been given to the first option and only limited attention has been given to optimizing water management systems. Among the various technologies to augment freshwater resources, rainwater harvesting and utilization is a decentralized, environmentally sound solution, which can avoid many environmental problems often caused by conventional large-scale projects using centralized approaches. Rainwater harvesting, in its broadest sense, is a technology used for collecting and storing rainwater for human use from rooftops, land surfaces or rock catchments using simple techniques such as jars and pots as well as engineered techniques.

Has been practiced for more than 4,000 years, owing to the temporal and spatial variability of rainfall. It is an important water source in many areas with significant rainfall but lacking any kind of conventional, centralized supply system. It is also a good option in areas where good quality fresh surface water or ground water is lacking. The application of appropriate rainwater harvesting technology is important for the utilization of rainwater as a water resources.

CCT DESIGN:

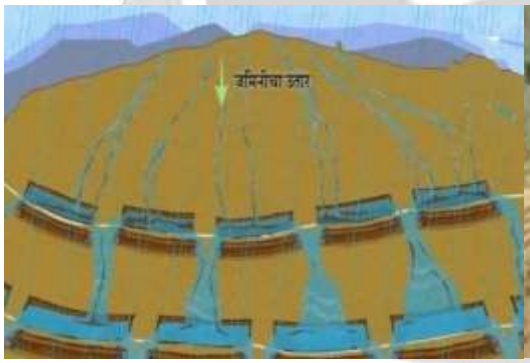
As agriculture is traditionally the major economic activity in Maharashtra, soil and water are two basic essentials for agriculture**.** Maharashtra is the third largest State in Union of India considering population as well as area. The population of the state is about 112 million. Nearly 58% of population lives in rural area

which depends largely on agriculture for their livelihood. The rainfall varies from 400 mm to 6000mm.The agriculture suffers due to vary of monsoon. In Maharashtra state nearly 82% area under Maharashtra is a drought prone area, especially its region of Vidarbha and Marathwada. Maharashtra is one of the most drought prone states in India. In Maharashtra water is consider more valuable than soil Due to soil erosion, water logging and other deteriorating factors nearly 50% of our cultivable land suffers from land degradation at various stages. If it is not checked the land will become waste land and unfit for cultivation. The degraded lands which have reached to severe stage of degradation are not under cultivation. If these lands are not treated immediately, they will turn into waste land. Water conservation structures like Nala bunds, which serve as percolation reservoirs in the upper catchment. These are to be located on pervious strata to improve vertical percolation, Gambian structures where velocity and volume of peak run-off is too high for loose boulder structures Farm ponds to harvest runoff and many more and amongst these all-water conservation structures, for the present study Continuous contour trench (CCT) is considered as one of the water conservation structure. CCT are excavating continuous trenches (60 cm wide x 30 cm. deep) on continuous contour lines which are mark, prepared with the help of contour marker. Trenching was started from top to bottom. Distance between two trenches is depends upon the slope as well as availability of time and resources. At its simplest, contour trench construction is an extension of the practice of ploughing fields at a right angle to the slope. CCT is the best suitable technique for low rainfall, hilly and undulating terrain areas. Contour trenches are ditches dug along a hillside in such a way that they follow a contour and run perpendicular to the flow of water. The soil excavated from the 5fditch is used to form a berm on the downhill edge of the ditch. The berm is planted with permanent vegetation (native grasses, legumes) to stabilize the soil and for the roots and foliage in order to trap any sediment that would overflow from the trench in heavy rainfall events.

Functions of Continuous Contour Trenches (CCT)

The major functions of using CCT technique are as follows:

- Construction of CCT helps to stop the soil loss.
- Constructing CCT reduces the rate of runoff and thus results in increase in percolation rate.
- Due to construction of CCT, increase in the ground water level has been noticed.
- Increase in groundwater level helps in increase the green cover over the area and soil quality. An increase in the availability of drinking water, agriculture development and employment has been noticed.
- Overall CCT helps indirectly in increasing the soil moisture to vegetation and develop the degraded lands.



Design Consideration :

Provides guidelines for how much space to allow between trenches based on storage.

Type for Selection :

Continuous contour trenches (CCT): Uniform slopes, steep slopes, high rainfall.

Staggered Contour trenches (SCT): Dissected slopes, gentle slopes, low to medium rainfall.

Surveying and mapping:

- Land Slope by Dumpy Level.
- Soil Texture Analysis.

Design:

The cross sectional area of the trenches is designed to collect the runoff from intense storms at recurrence.

If possible, trenches should be dug in the dry season so that the rain does not destabilize or b wash away the berm before vegetation's can provide stabilization.

Construction Process:

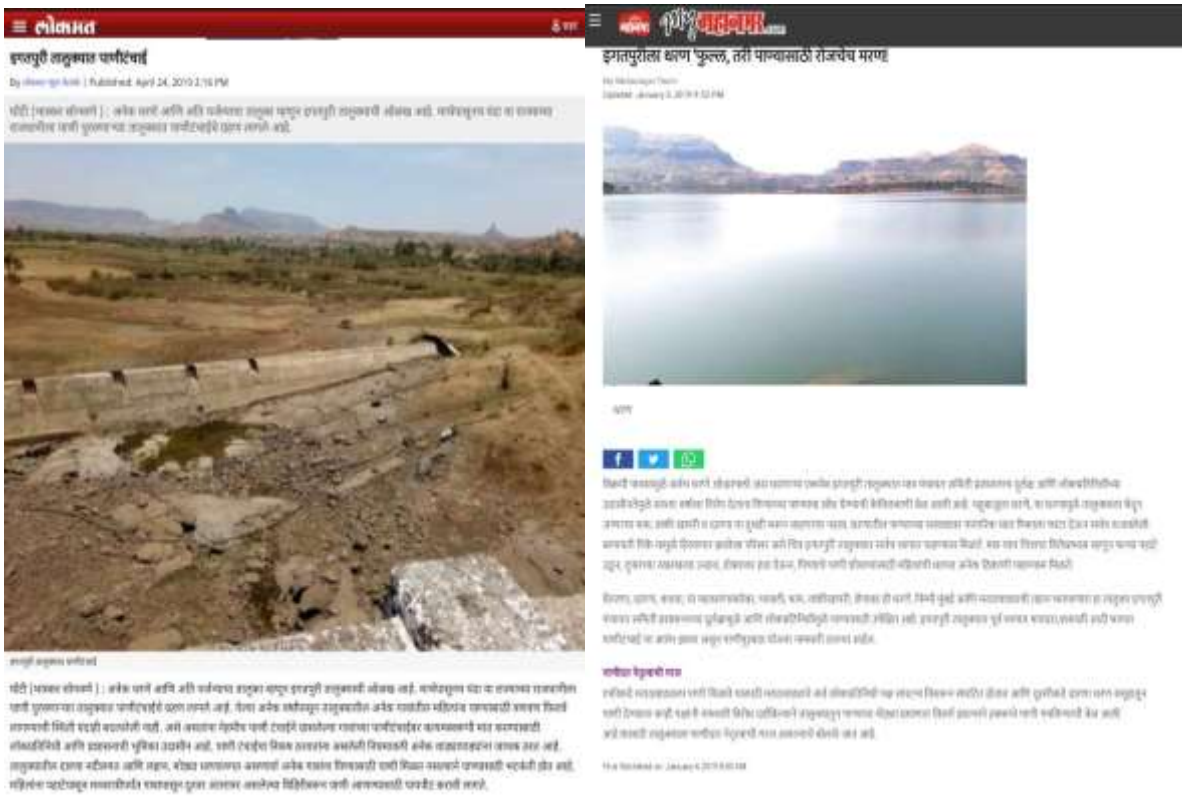
- Once the contours have been marked the farmers can begin to excavate the trench.
- To maintain structural rigidity on the uphill slope of the hill, the shovel should be applied to the contour with the user facing downhill, not along the contour, so that the uphill face of the trench is not structurally compromised.
- Place the excavated soil down slope along the edge of the trench.
- Pack excavated soil to create a berm on the downhill border of the trench.
- Plant native grasses, legumes, or perennials on the berm. These varieties have a root system capable of providing adequate structure to the berm.
- Apply mulch to berm to prevent erosion while the plants take root.
- If possible, trenches should be dug in the dry season so that the rain does not destabilize or wash away the berm before vegetation's can provide stabilization.

Objectives of CCT:

- To arrest Maximum runoff in the Village area.
- To create decentralized water bodies.
- To increase ground water level in Drought prone areas.
- To encourage people for Tree Plantation.
- To create new structures of Water conservation in the State.
- To create awareness and encourage People for efficient use of water for farming.

FUTURE SCOPE

- To Find the Financial Aspect of the Scheme.
- To Determine the Quantity of Rainwater Which can be harvested.
- To Analysis the Cost Benefit Ratio of Rainwater harvesting System for Opted site.
- To Implement the Action Plan on the Set Guidelines for the Area Facing Similar Issues.
- To Analysis the Water Storage Network and Design of New Techniques.



Some article related our project

CONCLUSION

- In upcoming years water scarcity is expected to glow considerably and hence as part of the global India it's our duty to conserve and alert all the causes of crisis.
- This is a universal fact that sustaining and recharging the ground water of the limited fresh water resources is the need of the hour.
- We have to catch water in every possible place it falls because it is well know that water is in abundant quantity in hilly areas.
- Equal and positive thrust is needed in developing and encouraging both the types of harvesting systems.
- Constructions of CCT help in increasing the ground water level and water level in nearby well situated at the downhill were CCT are constructed.
- This technique should be used on the large scale at wider part of Maharashtra to solve the soil and water conservation.

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