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"Water Resource Management in Drought Prone Area of Haroli Village, Dist. Sangli"

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Abstract

In this paper an emphasis is given on the management of water especially in drought prone area in Haroli village. From last few years Haroli village is facing scarcity of water due to uneven rainfall accompanied by mismanagement of water. The severity of problem is increasing day by day. It is a challenging task to supply water for the vast population along with agriculture and industrial area. We can deal with the problem of security only with vision and planning and proper management of water. Drought is a natural phenomenon caused by changes in weather patterns due to reduced there is less rainfall than usual. Manage the implementation of all the features and capabilities of existing and prevent water waste, speed up performances is needed to alleviate the drought. Prevent water loss, water in agriculture management and control, environmental management and treatment, water control and approach to water resources management in drought conditions in village. It is observed that Groundwater is recharged naturally by rain to a smaller extent by surface water (river and lakes). These activities can result in loss of topsoil resulting in reduced water infiltration, enhanced surface runoff and reduction in recharge. Use of groundwater, especially for irrigation, may also lower the water table.

Keywords: *Irrigated area, transit losses, water budget, uneven rainfall, infiltration.*

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INTRODUCTION

Water resources management is an international, multidisciplinary forum for the publication of original contributions and exchange of knowledge and experiences on the management of water resources. In particular, the journal publishes contributions on water resources assessment, development, conservation and control, emphasizing policies and strategies; Contributions examine planning and design of water resources systems and operation, maintenance and administration of water resources systems.

Coverage extend to these closely related topics: water demand and consumption, applied surface and groundwater hydrology, water management techniques, simulation and modeling of water resources systems, forecasting and control of quantity and quality of water, economic and social aspects of water use, legislation and water resources protection.

Water resources management is supported scientifically by the European water resources association, a scientific and technical nonprofit-making European association.

According to an article published in the Economist Magazine on November 5, 2016, "Researchers from MIT predict that by the middle of the century, more than half of humanity will live in water stressed areas, where people are extracting unsustainable amounts from available freshwater sources" (Water the dry facts, 2016). Understanding the significant role drought plays in water management and the costs of reactionary decision making can help stakeholders create proactive regulation approaches to water allocation.

OBJECTIVES OF THE STUDY

The main objective of the present work is,

1. To study the types, Intensity, frequency associated with droughts.
2. To understand how drought conditions affect water management strategies.
3. To study the future alternatives to current water management strategies.
4. To study the regulation is affected by drought condition and how local agencies and state authorities interact to manage water resources.
5. Prepare model of with and without water conservation system at village areas.
6. Suggestions for the locating new site & type of water harvesting structure.

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7. To enhance the ground water recharge to increasing filtration of rainwater.

8. To apply & utilization of new modern irrigation technique to increases the rate of irrigation in study area.

9. To apply soil conservation technique to increase the ground water level of study area.

GENERAL SURVEY OF HAROLI VILLAGE

Physical landscape of Haroli village:-

The study area is covered by plain region. The basalt rock is main characteristic of haroli village. The middle part shows undulating topography. Generalized slope of village is middle to south. The rainfall in haroli village is about 570mm. (2018)

Climate:-

The overall temperature of the area is high (>40) & evapotranspiration is always more than rainfall. It's estimated that about 35% of rainfall is subjected to evaporation losses & 10% is infiltration loss & total runoff was 55%.

Soil condition:-

The middle part of village area has thin soil cover with high proportion of gravel & sand.

Pre-project Existing Drinking Water Structures:-

1. 20-25 years old piped water supply scheme based on dug well as source well, the rising main pipes damaged and leaking reservoir.

2. One bore well with hand pump. Bore well having low yield, inadequate in summer.

Pre-project Drinking water availability:-

1. The piped water supply scheme source sustainability was only up to march. There after the village required tanker water.

2. Bore well with hand pump – Intermittent pumping after March. The village received less than 10 LPCD water from the existing drinking water source.

Social Impact due to lack of availability of water:-

1. No social functions such as marriages, annual fare, and social gatherings were held as the existing structures cannot cater the requirement of drinking water to the population.

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2. A portion of population shifting to the nearby village for work and water.

3. Livestock shifting to the nearby areas having adequate drinking water

4. Refusal of giving brides to the village grooms

5. Spread of epidemic due to contaminated water at the onset of monsoon.

Post Project Drinking Water Sources:

1. The existing piped water supply scheme required – rising main pipes replaced, Pump house repaired, new reservoir constructed. The scheme is being utilized up to March.

2. Construction of 10,000 liters capacity individual Ferro cement tank for collection of rain water for only drinking and cooking purposes. 130 individual tanks rain water harvesting structures constructed.

3. Construction of 3 water storage wells (Shiv Kalin Tanks) to be used for domestic

Social impact due to new structures:-

1. The repaired piped water supply scheme could cater adequate water up to march.

2. The 3 water storage wells provide the requirement of domestic water.

3. No spread of epidemic at the onset of monsoon.

4. Number of social functions such as marriages, annual fare, social gatherings held even in summer.

5. People have started considering giving of brides in the village

6. Expenditure on tanker saved.

7. The villagers are happy, satisfied regarding availability of drinking water through the rain water harvesting structures.

8. The villagers have started campaigning about adopting the rain water harvesting structures to the neighboring villages.

9. 130 rain water harvesting structures constructed is providing safe and hassle free drinking water after March.

Water auditing and watershed management:-

Haroli is a village in Maharashtra's drought prone Sangli district. It was environment degraded, but less than a decade it turned itself into one of the most

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prosperous villages of the country. Water harvesting and watershed management depends on rainfall received by the watershed and its litho logy.

In village Haroli water harvesting and watershed management works are done after studying and analyzing water budget of the village. This budgeting was done under the technical guidance given by the District Groundwater Department. (G.S.D. A.) Groundwater budgeting program was started in 2014-15 by people's participation in this village.

By this innovative program total availability of water was calculated by measuring rainfall received by the village and regular monitoring of water level of six observation wells established in the watershed of the village. Collecting of rainfall and water level data is done by the villagers.

A budget of available water of the village was presented before gramsabha after monsoon season. After keeping drinking water and day today requirement of human beings and animals, Seventy percent of remaining water was used for irrigation purpose. Management of this water was done by modifying area of cultivation and type of crop to be cultivated and such resolution was passed in grama sabha.

Since the village experienced drought in the past years and its position in drought prone area, about thirty percent of available water (excluding drinking and domestic water) is preserved for future use by allowing it to recharge to the groundwater. So that declining groundwater level of the village is restored.

Water audit based on rainfall up to the month June for the year 2018indicated that 2.67 cr. litter of water deficient in the village as per proposed area of cultivation. Available water was managed for drinking, domestic and irrigation purpose according to the proposed water budget. In 2014-15 total 450 mm of rain fall was received by the village.

During this year also 2.67corelitters of water was deficit as per the proposed water budget. This deficiency was overcome by increasing drip irrigation from 57 hec. To 87 hec., decreasing area of higher water required crops and change in cropping pattern. During the year 2018 village received 150(June 2018) mm of rainfall. As per last year's planning of cropping pattern, about 124.47 cr. litters of water

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was surplus in the village. This surplus quantity of water was used for irrigation by increasing 150 ha. Of jawar, 60 ha of wheat & 50 ha, Of Gram in rabbi and vegetable in hot weather

From water audit it was cleared that if village receives above 400 mm of rainfall, it can manage ground water scarcity in summer season. Since the village receives an average rainfall of 350 to 400 mm rainfall, it experienced a shortage of water in the range of 5 to 8 cr. liters. To overcome this shortage gramsabha of the village decided to ban drilling of bore wells for irrigation.

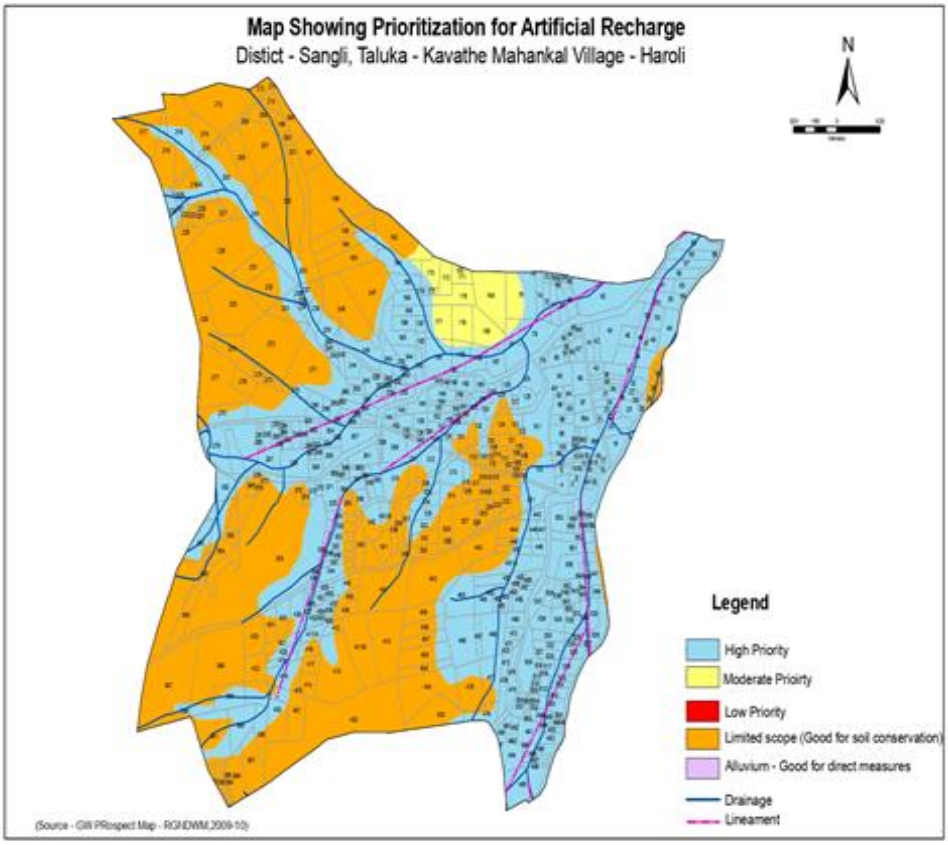


Fig. 1 Map Showing Prioritization for Artificial Recharge Distict - Sangli, Taluka – Kavathe Mahankal Village - Haroli

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CONCLUSIONS AND RECOMMENDATIONS

The Haroli is the examples of how development of an urban water market can be an innovative way to encourage more sustainable and equitable water management. In contrast, the haroli model is poorly administered and inefficient. haroli experiences climatic variations, water scarcity, and population demographics that are similar to sangli district, indicating that a water market structured similarly as these countries might be successful in haroli. Further, haroli has the necessary infrastructure already in place and enjoys a stable socio political structure, with citizens who value the environment, and regulators with an understanding of the connectivity and function of the haroli waterscape. As has been seen in sangli, sustainable use of water resources provides the foundation for quick recovery following drought.

In addition, a water market could stabilize water pricing, which is currently wildly geographically variable. It is estimated that in the face of climate change, drought events in haroli will be longer and drier than previously experienced. An overhaul of the current haroli water market, and development of a trading platform similar to those used in haroli, would promote sustainable use of the state's water resources, encourage balanced water rates to end uses, and incentivize investment in both the environment and infrastructure.

After the estimating water budget for haroli village it observed that there is;

1. Available water for drinking purpose = 4.015cr.liter
2. For animal purpose = 1.87 cr. liter
3. For industrial & other use = 11 cr. Liter
4. For agricultural use = 821 cr. Liter
5. Total available water in village (by all source of consideration and losses) = 168.19 cr. Liter
6. Required water (for all types of use in village) = 837.88 cr. liter

Advantages:-

1. It is necessary for reduce the drought future.
2. It influence economic infrastructure.

Disadvantages:-

1. Initial cost is more.
2. Periodic maintenance is necessary.
3. Skilled labors are required.

Application Guidelines:-

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1. Water level increases.

2. Land gets cultivated where cultivation is difficult.

3. Water is properly used for agriculture as well as for village.

EXPECTED OUTCOME

The outcomes of this project is

1. To manage the water supply for the selected village to prevent drought condition.

2. For this hilly region we provided slits or cups across the slope to collect the water flowing downward.

3. This slits or cups collect the water due to which the ground table increases then the collect the water is supplied to the village as per their need.

FUTURE SCOPE

1. By referring estimated water budget for village it's possible to prepare water budget after provision of all types of water resource management techniques.

2. Its increases ground water level after suggested ground water level improvement techniques.

3. It's possible to adopt new irrigation techniques and cropping pattern as per water availability and season.

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