



”STUDY OF KALAJ STREAM WATERSHED IN PHALTAN TEHSIL A CASE STUDY FROM LOWER REACHES OF NIRA RIVER”

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Abstract: -

Kalaj is a settlement located 16 kilometers from Phaltan city in Satara district, between N18°00'47" and E74°17'32". Several approaches have been taken to replenish ground water resources. As a result, it is proposed to use biological and engineering methods to shift excess runoff to groundwater storage. The most unique aspect of this effort is that if such engineering solutions are developed and implemented on a larger scale in remote places, thousands of villages across the country will be spared drought and water supply by tanker. A geographic information system (GIS), also known as Google Earth, is a crucial tool for watershed management and planning. For GIS mapping drainage network, topography, and water flow path.

At Kalaj tributary, Nira River several measures have been adopted to recharge ground water resources, but it has been found that these measures do not work with full efficiency in some areas. In Nira River watershed area, demand of water for agricultural, domestic purpose is increase rapidly while on other hand water resources rapidly depleting due to over population and draught condition. Efforts are made to divert large amount of rain water to recharge ground water resources to meet the needs. Further steps are being undertaken to recharge the ground water effectively by watershed management techniques.

Keywords: Drought conditions, Geographic Information System, Drainage work, Topography

1. INTRODUCTION:-

The hydro-geological geographical unit known as a watershed is where rainwater originates and drains into a single outlet. Small streams channel the precipitation that falls on the slopes as they descend. Numerous such streams converge to form larger streams, which merge to form rivulets, which merge to become waterways, and so on. This is similar to how time works. The smallest water retention structure, known as a bund, eventually unites to form a check weir. Numerous check weirs connect to check dams, which are massive water-saving facilities that connect to carthen constructions.

It then links to the Nala Bund. The Watershed is the entire area that, at any one time during its flow, contributes water to a stream, rivulet, or river. Every year, water is scarce in Maharashtra because to irregular rains; there are periods when an area has considerable rainfall, resulting in excessive soil erosion produced by heavy flow from high land to low land. Due to the high intensity of runoff, groundwater recharge is quite poor.

Land and water are the two fundamental components needed for the growth of agriculture and drinking water resources, Indian agriculture is much more reliant on the monsoon as a result of the country's rapid population growth, urbanization, industrialization, and agricultural area, which has led to a steep indine in water demand. However, due to insufficient rainfall were the past three to four years, people have begun turning to underground water as a substitute supply without considering how to recharge it, which has caused the ground water table to

sink by 100 to 200 meters below the surface. The major component of the Indian economy is rainfall. Even though the monsoons affect the majority of India, various regions experience varying amounts of rain, from heavy to sparse. The spread of rainfall varies significantly across regions and over

1.1 Study Area

The Lower reaches of Nira River in Phaltan tehsil of Satara district is a part of present study. Kalaj stream having fan- shaped catchment area, which selected for our case study, of present watershed study. Over the past few decades, the level of groundwater has totally low, which has also caused a draught-like situation in this area. The watershed in remote areas is now also more susceptible to contamination of both surface and ground water. The overuse of pesticides in Agriculture, the development of cities above them, and the disposal of human waste. The greatest illustration of this is the current Kalaj steam. The groundwater has been noted, the level in this area is continuously declining due to less rainfall and mismanagement of water. This watershed as compared to the others is covering a sizable area but showing some issues. Therefore, it's priority level is selected for the project work stream channel.

2. OBJECTIVE

1. To understand the land form characters and climatic conditions of Kalaj stream, from Phaltan tehsil.
2. To study the water bearing characters of Kalaj area.
3. To understand the demand of water in the basin and to fulfil its requirements by water budgeting aspect.
4. To study the soil and water conservation structures and their suitability to recharge the surface as well as ground water in the basin, and based on this to suggest the new structure as per the requirements.

TAVLE AND FIGURES

Sr.no.	Tests	Readings	Permissible value
	Temperature	23°C	30°C
	Odour	Bad Odour	Odourless
	pH		6.5-8.5
	Turbidity (NTU)		
	Alkalinity	100	100 mg/lit
	Hardness	140	310 mg/lit



Geomorphology of ground



Testing water samples collected from the site



Collection of data and samples





Topography of the stream

3. ENVIRONMENT

This region has a inland climate and temperature ranges 15 to 45° C summer in phaltan is comparatively hot and dry when compared to neighbouring inland climates. Additionally, it has caused draught-like circumstances in the summers for the past few years. The volume of the ground water has drastically decreased due to evaporation.

4. GEOMORPHOLOGY

The deccan trap basalt formed by tremendous out bust of volcanic energy in upper cretaceous to cuocymperate that is before 65 lakh years ago. This flood basalt due to its eruption it develops a central western part of India in the shield ground by the deposit of highly fluidy basic lavas. Such tables ground are characterized by some landforms of high land & low grounds (include valleys, river valleys & depressed land covered with water bodies).

- 1) Black cotton soil 1 feet
- 2) Deeply weathered rock 2 feet
- 3) Modertly weathered rock 3.5 feet
- 4) Fresh compact basalt 10 feet
- 5) Red takallit basalt 14 feet

5. HYDROLOGICAL STUDY

To understand the quality of the water in drinking point of view and determine whether any anthropogenic factors are influencing the ground water, certain tests were carried out on samples collected from 14 wells, canal and borewell in accordance with the stream. The wells that were ultimately chosen came from both sides of the stream channel. The primary goal of the study is to determine whether the water is drinkable or contaminated by various dissolved minerals and chemicals that will have an impact on the health of people living in the watershed area.

6. MATERIAL AND METHOD

6.1 Watershed Study

Kalaj watershed is connected to Phaltan town via a stream that flows nearly west to east. Due to the several critical issues inherent in this tiny watershed, a detailed ground survey was conducted to better understand the landscape character, density, drainage frequency, slope, lithology, visitations, land use, and land cover. This project's most important component is the availability of soil and water conservation buildings, which are used to determine their efficiency and deficit, as well as their suitability for surface and ground water recharge. Taking into account all of the crucial factors mentioned above, some of the entire existing soil and water conservation structures in the basin were thoroughly investigated.

6.1.1 Available Structures

- a) Gully Plug (N17°09'46.6" E74°17'1.5")
- b) Earthen Structure (N17°09'46.5" E74°17'1.5")
- c) Check dam (N18°00'40.3" E74°17'26.9")
- d) Vanrai bandhara (N18°00'48.6" E74°17'25.7")

6.1.2 Proposed Structures

- a) Check weir and check dams

(N 17°59'50.2" E74°17'0.54", N 17°59'55.4" E74°17'11.2", N 18°00'06" E74°17'21.5", N 18°00'12" E74°17'27.2", N 18°00'21.2" E74°17'31.3", N 18°00'51.4" E74°17'26.7")

- b) Stone Bund

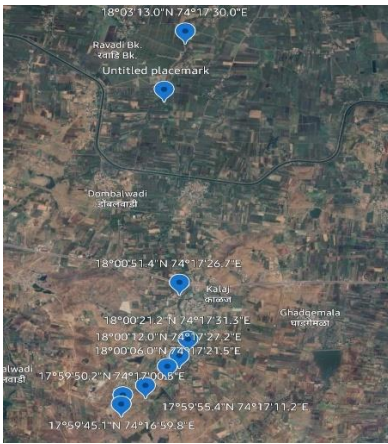
(N 18°00'34.8" E74°17'31.7")

- c) Gully Plug

(N 17°59'45.1" E74°16'59.8", N 17°59'49.4" E74°17'0.42")

- d) Gabion

N 17°59'45.5" E74°17'0.05"



Locations suggested Structures

6.2 Sampling

1. To analyze the quality of water is also one of the important objectives of this project. Dugwell, borewell, water recharge structures and from channel also. Therefore, the available sources of ground water were explored in the watershed and samples were collected from these sources
2. Fourteen wells along the Kalaj stream make up the sampling sites. Samples were gathered after the monsoon season, and data was acquired through conversations with the owners. In order to ensure that the sample chosen for analysis acts as a representative sample, samples were collected in 15. plastic bottles. The samples that were thus obtained were carefully carried to the laboratory and examined in accordance with best practices.

6.3 LAB ANALYSIS

As previously mentioned, groundwater was examined for physiochemical and biological parameters after being made aware of the significance of studying the behaviour of groundwater and surface water also the stream that was drawn from wells upstream and downstream.

7. RESULTS AND DISCUSSIONS

The quality of collected sample from surface water (stream, channels, water conservation structures, wells etc.) and ground water sources such as (dugwell, borewell etc.) were tested. The result clearly shows that the present water is crossing the PII and it is less turbid and odour less. While the result of chemical properties clearly shows that this water is under the limit of alkalinity and hardness. In conclusion, the water is not heavily contaminated but it is slightly polluted by an anthropogenic activity formed in source region.

8. CONCLUSION

- I. 2066 is the population of the Kalaj village (Phaltan tehsil) and they require the 154950 litre water and total calculation of the proposed and available structure is 200000 litre there are the efficiency of water per capita per day is 75 litre these will be satisfied.
- II. Under such situation there is no any alternative way's to regulate to surface and ground water resources in their own areas and basin.
- III. Therefore, the watershed is the only way to conserve and preserves the surface ground water for it's longterm use drinking domestic irrigation and other purpose.
- IV. Therefore, in the present context a detail Safety investigation of the watershed carried out to understand geology, geomorphology, water bearing characteristics of the Deccan trap which are very useful to recharge the surface

and ground water and scope character and construction of soil and water conservation structure at places etc. where study.

The available soil and water conservation structure and their present structure that is weather in a good condition and broken. partially and completely, wheather they are surving their purpose or not are documented properly.

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