

Application of Different Preventive Measures to Reduce the Evaporation of Water

Suraj Sukhadev Vankamble¹, Sumit Sukhdev Vhankamble²

¹Assistant Professor, Civil Engineering Department, SBGI Miraj.

²UG Student, Civil Engineering Department, Shivaji University, Kolhapur.

Abstract – Water is the fundamental need of every living creature. It is valuable national resource so maximum utilization of available water resources and there conservation is immensely important. Rain is the primary source of water, which is available from Rivers, Canals and Wells. India has 3.75% of total water available in the world and about 16% Population of the world Resides in India. Among this 60% water is used for farming and 30% is about for Industrial use. There are lots of regions in India which mainly face the problems of water scarcity due to lots of unavoidable reasons and lack of water conservation planing.

In this case study we use the two methods which play the effective role in conservation of water by reducing the evaporation losses. A combination of chemical Cetyl Alcohol (hexadecanol) and solar panels are used to reduce the Evaporation losses and conserve the water. This solar panels are also useful for to convert the solar energy into electrical energy. This methods are usually applicable at villages where the rainfall percentage is less and temperature is high. To overcome such Scarcity problems we apply this preventive measures over that site.

Key Words: Water Conservation, Cetyl Alcohol, Solar Panels, Topography, Evaporation Losses.

1.INTRODUCTION

The conservation of water is the measure which consist of lots of technics to prevent the water loss. The technics for prevent the Evaporation Losses, Transpiration losses, Evapotranspiration Losses, Transit losses and many more.

In this case study we choose the site near village Navalwadi Gaon, Jath taluka, Sangli distict in Maharashtra. The topographic study of that site shows that the presence of actual site conditions favorable for storage of water, same as natural lake. In monsoon season only for respective four months from June to September the Rainfall occur, other than that remaining months of year the village face the drought condition. The high temperature upto 42-44 degree Celsius is main reason behind the draught condition.

In monsoon season, the some amount of water get stored naturally in that valley portion. But due high temperature the Evaporation of water Takes place and

that’s why the people from Navalwadi gaon are not able to use that stored water for maximum amount of time.

So in this case study, to minimize those scarcity problems we study the topography of that particular village, collect the rainfall data, collect the Temperature data from respective department and Geological conditions of that particular site.

2. FIELD SURVEY

2.1 SITE LOCATION ON MAP:

A site selected for the case study is located at Jath taluka, Sangli district of Maharashtra state.

A location of site is found out by using map, which is given below:



Fig. 1 Location of site in the Sangli district map.

2.2 TOPOGRAPHIC STUDY:

Topographic study of that site gives the overall Bird-view data which shows the open plane terrain with less percentage of greenery over there. Also the terrain with different gradients having slope to flow the water with high intensity and stored at the points of low reduced level value.

Topography of that particular site gives the idea of type of soil strata present over there, which is mainly useful for study the drainage capacity of soil.

The Topographic view is given in below figure.2 :



Fig.2 Topography of that site

2.3 CONTOUR PLAN STUDY :

A Contour is a line connected the points on the ground that is having same RL (reduced level) values. Contour map is helpful for site study to decide whether the water flowing from top portion of hilly area is stored at one point or not.

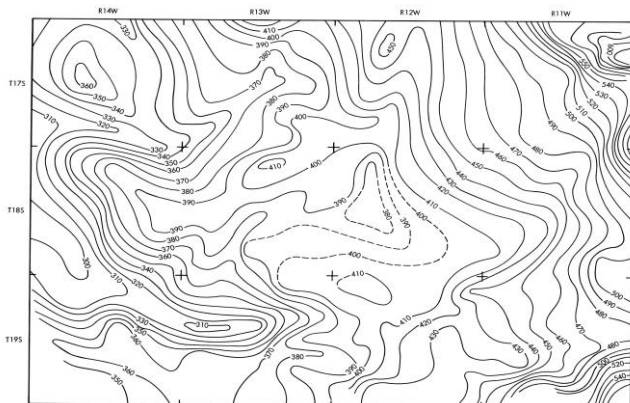


Fig. 3 Contour map of selected site.

The points inside the map having less RL values shows the valley points that are capable of huge amount of water.

2.3 ANNUAL RAINFALL DATA :

The Annual rainfall data of that jath taluka gives the availability of water :

Table.1 Annual Rainfall Data of Jath Taluka

Year	Avg. Rainfall (mm)
2008	406.32
2013	370.00
2018	443.26

The Overall of Population of of that Near by site is as given below:

Table.2 Population of that near by 2 villages:

Census Parameter	Census Dta
Total population	1500
No. of houses	350

3. METHODOLOGY

3.1 USE OF CETYL ALCOHOL (HEXADECANOL)

The combination of Hexadecanol and Octadecanol is used as Steryl alcohol, which is used on the site to protect the Evaporation of water.

Also a Cetyl Alcohol (hexadecanol) is used as a Membrane. Membrane wich is having capability of allow the rainfall water to pass through it and mixed in to the water source such as river or lake, but protect the Evaporation of water by not allowing the vapours pass through it. Cetyl Alcohol is chemical which is also harmful for human skin.

The area of 75 meter * 96 meter *3 meter, that is 21600 meter cube is selected as water body where the 21600000 litre of water get stored.

If we calculate the stats, we get that about 1000 persons, 250-300 families can use this water for at least 4 months (135 litre/ person/ day) after the monsoon season. But the the factor Temperature is affecting over that water body. The temperature range of 33-43 degree Celsius is responsible for High percentage of Evaporation, that is upto 20% to 40% of water gets evaporated. This percentage find out by using Pan-Evaporation Method. To reduce such Evaporation losses the chemical that is Cetyl Alcohol is spread over the water body. The layer of this gas doesn't allow to water to evaporate through water body.

At the time of spreading of Cetyl alcohol over the water body the precautions should be taken.

3.2 USE OF SOLAR PANELS

Solar panel is a device which converts the Solar energy into Electrical energy. To avoid or reduce the some percentage of evaporation. this solar panels are acts as obstruction between the water surface and solar energy source. Due to which, two types of results (benefits) we will gate, as follows:

- 1) Generate the continuous and huge electricity. These generated electricity can be useful for farming work or residential purpose or street lightning.

- 2) To reduce the percentage of evaporation from that water body, so that water can be useful for day to day life if villagers.

The fig.4 & fig. 5 shows the how to spread the solar panels over the water body:

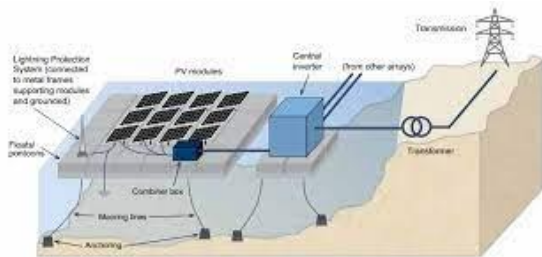


Fig.4 3D dia. Of solar panels spread over water body



Fig.5 Actual site figure of panel spreading over lake

A one normal solar panel can generate 3kwatt electricity per day. If we spread near about 60 solar panels, about 200 kwatt Energy will be generated. Generated energy is very useful for the villagers for different purposes.

4. CONCLUSIONS

- Study shows that it gives positive results if we applied the combination of Cetyl Alcohol and Solar panels to prevent the Evaporation of water from the water body.
- As water is very important need of human being, it should be used in proper manner. The conservation is necessary for reducing the problems such as water scarcity.
- In a country like India where huge population is present, it is necessary to every single person should get sufficient amount of water to complete his day to day life cycle. But the losses like Evaporation and transpiration are responsible upto some percent to water scarcity problems.
- In this study we use the cetyl alcohol as a membrane layer between the water body and solar energy source. This method reduces about 20 to 40 % of evaporation losses.

- The use of solar panels is helpful for two purposes, mainly: A) Reducing the evaporation of water upto 10 to 15 %. & B) Generate the Electricity upto 200 kwatt per day.
- This generated Electricity is useful foe villagers for farming purpose, residential purpose, commercial purpose and so on.
- By using this methods water can be conserved upto some percentage and the villagers or people will not face the problems like water scarcity.
- The use of Cetyl Alcohol is harmful for the human skin, so proper preventive measures should be taken at the time of applying the same method over the field.
- This method is also applicable where the same topographical and geological conditions are present.

5. REFERENCES

- Berkes, F., Community based conservation in globalized world. Proceedings of the National Academy of Science, 15188-15193, (2007).
- Kale and Gond, Drought in Maharashtra: water scarcity worsening situation in Marathwada., Proceedings of international journals innovative research in science, Engineering and technology, vol-5, pg.8376-8384, (2016).
- IOSR Journal of Business ana Management (IOSR-JBM) e-ISSN :2319-7668, P.P. 32-38.
- Phadke, R. , Assessing water scarcity and water shed development in Maharashtra, India : A case study of baliraja memorial Dam. Science, Technology & Human values, 27(2), 236-261, (2002).

BIOGRAPHIES

1. MR. SURAJ SUKHADEV VANKAMBLE.

- ASSISTANT PROFESSOR, CIVIL ENGINEERING DEPARTMENT, SBGI,MIRAJ, (2021-22)
- M-TECH (GEOTECHNICAL ENGINEERING), COLLEGE OF ENGINEERING PUNE, COEP, (2019-21).
- B-TECH (CIVIL ENGINEERING), DR. JJMCOE, JAYSINGPUR, (SHIVAJI UNIVERSITY), (2014-18).

2. MR. SUMIT SUKHDEV VHANKAMBLE.

- B-TECH (CIVIL ENGINEERING), DR. JJMCOE, JAYSINGPUR, (SHIVAJI UNIVERSITY), (2015-19).