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Study of Cetyl Alcohol as Evaporation Preventive Agent and its Effect over the Surrounding Factors

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Abstract – Conserving water is important because its keep water pure and clean while protecting the Environment. As water is the main source of oxygen for living things. The natural sources of water is surface water, subsurface water and frozen water. In case of surface water there is large chances of Evaporation losses, which will resulted into water scarcity problem. In india, there are many districts which are face the large draught situations. So to minimize this draught problems we have to take different preventive measures to conserve the water. Spreading of Cetyl Alcohol over the open water surface is one of the effective measure to conserve the water.

In this respective paper we study the dual role of Cetyl Alcohol as a Evaporation preventive measure and another one is effect of cetyl alcohol over the surrounding environment. For this study we choose the particular site of Kavathemahankal taluka, from Maharashtra state and perform this study.

Key Words: Water Conservation, Cetyl Alcohol, Topography, Evaporation Losses, Effect over the environment.

1.INTRODUCTION

The conservation of water consist of different methods to prevent the losses such as Evaporation losses, Transpiration Loses, evapotranspiration losses and many more. In this study we mainly focus on the evaporation losses.

In this case study we choose the site near village Dafalapur Gaon, Kavathemahankal taluka, Sangli distict in Maharashtra. The hilly terrain is helpful for good drainage of water and store at valley region. In this site the various geographical conditions are satisfied such as site location, structure of soil, geological condition, terrain and many more.

In monsoon season a large amount of run-off get collected into that selected site, which is mainly available for next eight months to use. But due to the some natural factors, mainly high temperature in that region (36-42 degree Celsius) causes the evaporation of water. The amount of water collected in that water body id get reduced. It is the main region of water scarcity.

In this case study we use one chemical to reduce the evaporation losses and also study the effect of that chemical over the surrounding nature.

2. FIELD SURVEY

A field study consist of mainly following study:

a) Location map

b) Topographic study

c) Contour plan study Etc.

2.1 SITE LOCATION ON MAP:

A site selected for the case study is located at Kavathe Mahankal 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 TOPOGRAPHY :

Topographic study consist of the overall top view study of that particular location. In this respective case study , we got the hilly area, less amount of green surface, terrain with various gradients. At near by area is full of residential area and farm land is there.

The Topographic view is given in below figure.2 :

Fig.2 Topography of that site

2.3 CONTOUR STUDY :

A Contour is a map which consist of the area or terrain having the same reduced level are connected with same close loop. In this particular site the loop with less RL values get inside, that means the valley area is available. Such site is suitable for storage of water.

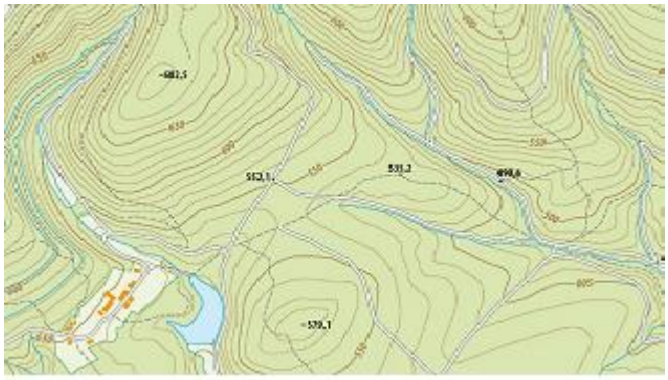

Fig. 3 Contour map of selected site.

The above map shows the actual contour map of that kavathe mahankal, sangli district region.

2.3 ANNUAL RAINFALL DATA :

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

Table.1 Annual Rainfall Data of Kavathe mahankal taluka

Year	Avg. Rainfall (mm)
2007	401.20
2011	365.12
2015	331.12
2019	442.03

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	1200
No. of houses	400

3 . METHODOLOGY

3.1 USE OF CETYL ALCOHOL (HEXADECANOL)

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

A cetyl alcohol is act as the membrane. A membrane which mainly having capacity of to allow the rain water to pass through it and mixed with water body and also having the capacity of to prevent the evaporated portion of water to mix with surrounding.

In this study we measure the total volume of water storage present at that village. We calculate the total volume of water evaporated from total water body by using the Evaporation Pan Method.

A) VOLUME OF WATER BODY = 98m*54m*3m = 15876 cubic meter.

B) TOTAL WATER AVAILABLE = 11907000 litre.

C) EVAPORATION PAN METHOD =

by using evaporation pan method we calculate the amount of water loss into evaporation in twenty four hours.

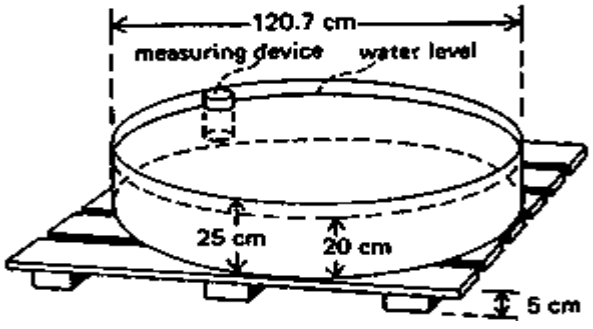

Fig. 4 Evaporation pan method

- The volume of evaporation tank = 1.20*.785*1.20*.20= 0.22608 cubic meter. (226.608 litre of water).

- The volume of water not evaporated from pan = 1.20*1.20*.785*18= 0.20308 cubic meter (203.308 liter).
- Amount of warter evaporated = 23.608 litre.
- Amount of water evaporated after spreading the layer of cetyl alcohol for that 24 hours = 4.24 litre.
- Hence reduction in percentage of evaporation = 87%.

3.2 EFFECT OF CETYL ALCOHOL OVER THE SURROUNDING FACTORS:

Cetyl Alcohol is Insoluble in water. Cetyl alcohol are likely to be degraded via both chemical degradation and microbial oxidation. It is mixture of fatty acids abd it is biodegradable.

Cetyl alcohol is 95% pure and natural, fatty alcohol from natural oil. It is mainly used as cosmetic ingredients. Cetyl alcohol is a flaky, waxy, white solid that is combination of cetyl and steryl alcohol, which occur naturally in plants and animals. Cetyl and steryl alcohol are often derived from coconut , palm, corn vegetable oil and typically from corn plants.

The U.S. food and drug administrative (F.D.A.) has deemed cetyl alcohol can be used safely as both a direct and indirect food additive.

The cosmetic ingredient review panel (CIR) expert panel has concluded that fatty alcohols, including steryl alcohol, are safe for the use of the cosmetics products. In clinical studies, cetyl alcohol was found to be have no significant toxicity and was non mutagenic. A mutagen is a chemical agent that changes your DNA.

4. CONCLUSIONS

- Study shows that it gives positive results if we applied the Cetyl Alcohol to prevent the Evaporation of water from the water body.
- After cpmparing with evaporation pan methods readings we get the 87 % reduction in evaporation losses.
- 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 this study we use the cetyl alcohol as a membrane layer between the water body and solar energy source. This method reduces about 80 to 90 % of evaporation losses.
- 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.
- The cetyl alcohol is mainly made up of fatty acids. There is no any adverse effect of cetyl alcohol on human being and surrounding environment.
- Mainly cetyl alcohol is non soluble in water, so there is no any chances of reaction of cetyl alcohol spreded over the water body.
- Cetyl alcohol is mainly used for cosmetics making, so there is no any affect ovet the human skin and hair.
- As per this study, we get that the use cetyl alcohol over the water body to reduce the evaporation losses is very effective. This technic must be used in the area where the water scarcity problem is arrised.

5. REFERENCES

- Berkes, F., Community based conservation in globalized world. Proceedings of the National Academy of Science, 15187-15194, (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.8326-8334, (2016).
- IOSR Journal of Business ana Management (IOSR-JBM) e-ISSN :2319-7668, P.P. 30-34.
- 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), 235-267, (2002).
- Webb, E.K. 1960 Investigation of the evaporation from Lake Eucembene. CSIRO (Aust) Div. of Meteorological Physics. Tech Paper No.10 1960
- Webb, E.K., Pearman, G.I amd Leuning, R. 1980 Correction of flux measurements for density effects due to heat and water vapour transfer. Quart. J. R. Meteorol. Soc. 106 85-100
- Webster, I.T., and Sherman, B.S 1995 Evaporation from fetch limited water bodies. Irrig Sci 16 : 53-64
- Weeks, W.D. The Calculation of Evaporation in Queensland. Qld Div. Tech. Papers IEAust Pub. No. QBG 1756

- Weick, P. 2003 Instrumentation assessment for evaporation from storages. BEng(Ag) thesis, University of Southern Queensland.

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