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Review on Research Study on Evaporation Control of Lower wardha project Reservoir

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ABSTRACT*:* We the human creatures of the world are living because we are having a set of sustainable elements on the earth such as the water, the air, the land, etc. These all natural elements are useful for our survival on the planet earth. Out of these basic elements, the most common liquid which is widely available on our planet is the water. The water is the most vital, primary, elementary and basic requirement of the human. Contribution of the water in the development of India is very much crucial and key role is always played by the water in socio-economic development of India. As our country is agrarian country and the water is the prime need to increase the yield of agriculture product. This project revealed that the physical methods can reduce evaporation effectively without environmental consequences methods of Evaporation Control. For the effective method of Evaporation Control, Lower wardha project Reservoir has taken For the analysis .

KEYWORDS: Evaporation, *Reservoir,* Evaporation Control, temperatures, vapour pressure

I. INTRODUCTION

Water is one of the nature's precious gifts, which sustains life on earth. Civilizations over the world have prospered or perished depending upon the availability of this vital resource. Water has been worshiped for life nourishing properties in all the scriptures. Vedas have unequivocally eulogized water in all its virtuous properties. We the human creatures of the world are living because we are having a set of sustainable elements on the earth such as the water, the air, the land, etc. These all natural elements are useful for our survival on the planet earth. Out of these basic elements, the most common liquid which is widely available on our planet is the water. The water is the most vital, primary, elementary and basic requirement of the human. Contribution of the water in the development of India is very much crucial and key role is always played by the water in socio-economic development of India. As our country is agrarian country and the water is the prime need to increase the yield of agriculture product. Our gross domestic production, all over demands, the bullishness of each and every sector, very much depends on the availability of the water and the Gross Domestic production is higher in the year in which availability of the water is sufficient. It is also found that for the efficient development, the optimum use of the water is very much important.

Nowadays, the water has become a part of non-profit to profit organization, which engages various countries across the world with-holding sewage data for nearly all the countries and provides a better way of the water use and its management which can be useful for various routine activities. But due to a huge wastage of the water, the water is becoming one of the scarce resource day-by-day in the world and also in our country, India. The corporation and the farmers draw ground water which is less costly and easily available. Moreover, as and when they need the water, it can be drawn from the ground and thus groundwater levels have reduced, as the ground water level reduces, relatively the sea water level becomes higher so there is land ward hydraulic gradient which results into the flow of the seawater or the salty water stars approaching towards the ground which is called as the sea water intrusion into the ground and the amount of pollutants in the water is increasing rapidly, as per the report by the World Resource Institute. The report states that with more than half of India's total areas are facing high to extremely high stress; almost 60 core people are at very high risk of the surface-water supply disruptions.

A. Factors Affecting Evaporation

Evaporation is a process by which a liquid changes into vapour form. Water molecules are in constant motion and some have the energy to break through water surface and escape into air as vapour. Evaporation in general is a beneficial phenomenon in regulating global water balance through the hydrological cycle and it is the same phenomenon contributing to massive losses from water bodies. Control of evaporation from land based water bodies, has thus

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remained one of the main planks of water conservation strategies. This assumes greater significance in arid regions, where water scarcities are already a common problem.

II. STATE OF DEVELOPMENT

Gujarat Engineering Research Institute, Vadodara

This Institute had conducted field experiments in a small irrigation tank namely Jambuvai in the Vadodara District of Gujarat State. The studies were carried out during the period from 2/86 to 5/86 and 12/86 to 2/87 by using the chemical Acilol TA 1618 (Cetyl Stearyl Alcohol), which is manufactured by M/s AEGIS Chemical Industries, Mumbai. A meteorological station with pan evaporimeter, anemometer, windvanes and thermometer screen was erected at the site and observations were taken. . The Acilol TA 1618 was used in emulsion as well as powder form. The emulsion was spread at 300 gm/day-hectare for the initial 15 days and reduced to 250 gm per day per hectare during subsequent period. The emulsion was diluted with water 20 to 25 times by volume for ease of application. Application of the solution was done by dripping from a storage drum fitted on floating raft. A drum of 30 litres capacity was found to cover a water surface area of about one hectare. Presence and continuity of the film was ascertained by putting a drop of indicator oil like castor oil on treated water surface. If the drop of indicator oil maintains its shape, it was considered that the film is intact on the water surface. The chemical in powder form was spread at a rate of about 75 gm/ha per day. The powder was dispersed from a boat by means of two manually operated dusters placed on both sides of the boat. About 10-15% of the daily dose was kept in reserve for use whenever film gets broken. The details of the equipment used for the experiment alongwith their costs are given in Table 7.11. The percentage of savings in evaporation loss achieved and other details of the experiment are indicated in Table 7.12. The conclusions drawn from the experiments were : i) The percentage of savings in evaporation losses were to the tune of 23.6% to 26.2%. ii) The site conditions play an important role in control of evaporation loss. In general where wind speed is high the percentage of savings is low

2 Stephen Creek Reservoir, Broken Hill, Australia

The studies on evaporation control were carried out on Stephen Creek reservoir at Broken Hill, Australia. During a period of 14 weeks with the application of 10% Cetyl alcohol solution with the average daily dosage of 0.2 oz of solid alcohol / acre. This reduced evaporation by 37%. Due to high velocity of wind, the results were less encouraging.

3 Lake Hefner, USA

The U.S. Bureau of Reclamation, along with a group of collaborating organisations, investigated the application of the monolayer technique to Lake Hefner, USA. The use of Cetyl Alcohol reduced the evaporation by 9% with an accompanied rise in water temperature by 1o C. The practical observation from this investigation is that of all the factors influencing the survival and effectiveness of the monolayer film, the wind speed could probably be considered to be most important. When the wind speed exceeds 8 m/s coverage becomes impossible (Crow et al., 1969).

4 Malya Reservoir and Other Lakes, Africa

A 3 % solution of Cetyl+Stearyl alcohol blended in Kerosene was used in the experiments conducted on Malya Reservoir and other lakes in Africa and it resulted in 11% saving of water under adverse conditions. Ordinary Portland cement is recognized as major construction materials through out the world. Researchers all over the world today are focusing on ways of utilizing either industrial or agriculture waste as source of raw material for industry. This waste, utilization would not be economical but may also in foreign exchange earings and environmental pollution control.

5. Evaporative Loss Calculations

While Class A pan evaporation data relating to specific sites is available, the Bureau of Meteorology website provides maps of annual and monthly Class A pan evaporation across Victoria that should suffice. The maps can be found at:

$$E_{gross}\ (mm) = 0.67 \times E_{pan}$$

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Where
E gross (mm) Loss from a water body (ie dam) due to evaporation
E pan (mm) Evaporation from a Class A Open pan for the period of interest
0.67 is a conversion factor
The net evaporative loss from the farm dam takes into account the amount lost due to evaporation and the amount gained from rainfall direct onto the dam surface.

$$E\ net\ (mm) = E\ gross - R$$

where
E net (mm) Net Losses from surface of dam (evaporation - rainfall onto dam surface)
R (mm) Rainfall (over the period of interest)
Total loss from the dam is calculated by multiplying the net evaporative loss by the surface area,

$$E\ dam\ (kilolitres) = \frac{E\ net\ (mm) \times A\ top}{1000}$$

where
E dam (kilolitres)Total Losses from dam due to evaporation
A top (square metres) Surface area of dam when full

Note1 kilolitre = 1000 litres = 0.001 megalitres
To convert kilolitres to litres, multiply Etotal (kilolitres) by 1000 megalitres, divide Etotal (kilolitres) by 1000

III. CONCLUSION

This research is solely discussed in terms of a literature review. The study's findings suggest that there are always various types of water losses in the water supply system of any city. The evaporation losses are taken into account in this research work among all the water losses, as the rate of the evaporation losses is considerably high. The problem of evaporation losses is more critical when there is a shortage of water in a region. For further study, Evaporation from Lower wardha Reservoir can result in the loss of significant amounts of water The amount of water lost due to evaporation is proportional to the surface area of the water Lower wardha Reservoir should lose a lower proportion of their total water stored due to evaporation than shallow dams.

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