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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.

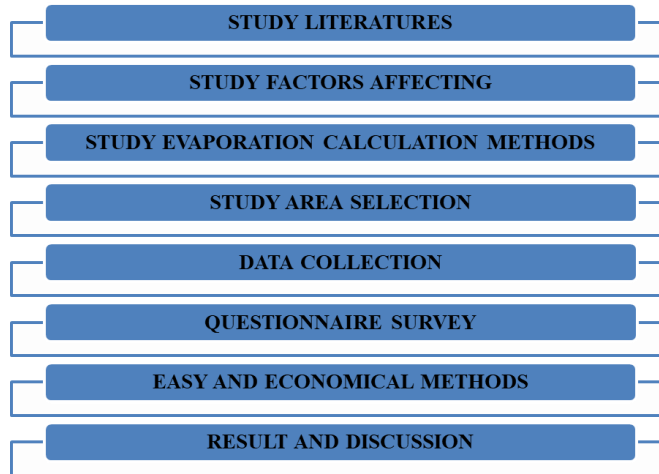
### A. Factors Affecting Evaporation

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 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. METHODOLOGY**



**Fuzzy Method**

The data analysis is determined to establish the relative importance of various factors that contribute to causes, effects, and minimization Evaporation Control. Analysis of data consists of the following to find out perfect method for the Lower wardha project Reservoir:

- 1) Calculating the(fuzzy)
- 2) Ranking of factors in each category based on the (fuzzy)

$$\text{Fuzzy} = \sum W / (A+N)$$

Where, fuzzy is the Relative Importance Index,

- W = weighting given to each factor by the respondents (ranging from 1 to 5),
- A = highest weight (i.e. 5),
- N = total number of respondents

**III. LOWER WARDHA PROJECT RESERVOIR**

**Tah.-Arvi Dist.- Wardha**

Lower Wardha Dam is an earthfill and gravity dam on Wardha river at Varud (Baggaji) Dhanodi near Arvi in Wardha district but falls under Amravati district in the state of Maharashtra in India.

1	<b>Irrigation Project Name</b>	Lower Wardha Major Irrigation Project
2	<b>Irrigation Project Name Alias</b>	
3	<b>Purpose</b>	Irrigation
4	<b>Type</b>	Major
5	<b>Engineering Type</b>	Diversion, Lift, Storage
6	<b>Status</b>	Ongoing
7	<b>State</b>	Maharashtra
8	<b>Districts Benefited</b>	Wardha
9	<b>Basin</b>	Godavari
10	<b>River</b>	Wardha
11	<b>Project Sharing</b>	None
12	<b>Intercountry</b>	None



13	Interbasin	No
14	Work Started in 5 Year Plan	VI-Plan
15	Completed in 5 Year Plan	
16	Project Approval Status	Planning Commission
17	Year of Approval by Planning Commission	2007
18	Approved Cost (Rs. in cr)	857.7
19	Actual Cost (Rs. in cr)	
20	Culturable Command Area (CCA) (th ha)	78.87
21	Ultimate Irrigation Potential (UIP) (th ha)	63.33
22	Potential Created (PC) (th ha)	
23	Project Covered under ERM Scheme	No
24	Project Covered under CADA Scheme	No
25	Project Covered under AIBP Scheme	Yes



Fig 1 Actual Aerial Photograph of Lower Wardha-I

IV. RESULTS AND DISCUSSION

4.1 Evaporation Losses 2022- 23

Evaporation Losses 2022- 23		
CIRCLE:- NAGPUR IRRIGATION CIRCLE	Oct. to January = 0.60	
DIVISION;- LOWER WARDHA PROJECT DIVISION	Feb to may = 0.80	Mean Area X Evaporation X 1.14 X factor/ 1000
SUB-DIVISION;- LOWER WARDHA PROJECT SUB-DIVISION NO. 2 DHANODI	June to September = 0.70	
According to Haganmanhai, the vaporization L. d. I.		
Jul-22	0.521	
Aug-22	1.928	
Sep-22	1.924	
Oct-22	2.473	
Nov-22	2.981	
Dec-22	2.529	
Jan-23	2.175	
Feb-23	4.388	
Mar-23	7.230	
Apr-23	7.989	
May-23	8.999	
Jun-23	5.085	
	<b>48.221</b>	





According to the analysis economical methods for the Lower Wardha Major Irrigation Project are suggested are as follow

1. Wind Breakers- wind breakers are found to influence the temperature, atmospheric humidity, soil moisture, evaporation and transpiration of the area protected. Spacing of plants at 3 m is found to have little effect in reduction of wind velocity over the protected area
2. Self-Spreading Mechanism of Watersavr- Chemical methods of evaporation reduction save a small percentage of water (between 20-40%), their capital costs are not large, but their maintenance costs are significant.
3. Bubble Plume- The method of injection of air bubbles into the water is the most effective method of reducing evaporation in deep water bodies (for depth greater than +18 m).
4. Solar Panels- Natural cooling of SPVS is an additional advantage of using solar panels over irrigation canals, leading to increase the efficiency of the solar panels by 7%, compared to ground SPVS

Table 1 Responses collected for fuzzy method

Bubble Plume	Self - spreading mechanism of WaterSavr	Solar Panels on Canals	Wind Breakers
4	4	4	1
3	2	1	1
2	1	1	2
2	1	1	2
3	3	3	2
4	2	3	1
3	2	4	1
3	5	2	1
3	3	1	1
1	2	3	1
1	1	4	2
3	1	3	1
2	1	1	1
3	3	5	5
2	3	5	1
4	4	3	2
3	3	4	3
2	1	3	2
3	2	4	1
4	1	2	1
<b>W = 55</b>	<b>W = 45</b>	<b>W = 57</b>	<b>W = 32</b>
<b>A = 4</b>	<b>A = 5</b>	<b>A = 5</b>	<b>A = 5</b>
<b>N = 20</b>	<b>N = 20</b>	<b>N = 20</b>	<b>N = 20</b>
<b>RII = 2.29</b>	<b>RII = 1.80</b>	<b>RII = 2.28</b>	<b>RII = 1.28</b>

### V. CONCLUSION

- The evaporation rate from reservoirs is influenced by energy source, vapor pressure, air and water temperature, wind, reservoir volume, reservoir area, and water quality. 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. For the Questionnaire analysis 4 different types are methods are analyzed by collecting response from the peoples which are sincerely working with Lower wardha project the total 20 no of responses collected.

- For the Questionnaire analysis consider different kind of methods such as Bubble Plume, Self - spreading mechanism of WaterSavr, Solar Panels on Canals, Wind Breaker
- The FUZZY approach has used on primary collected data and calculate the weight of each factor. Then the major effective Method suggest for Lower wardha Reservoir project from the Questionnaire Survey have been identified base on FUZZY weight. As per the analysis the Bubble Plume and Solar Panels on Canals method would be more effective for the reservoir.

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