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Physical Status of Reservoirs from Latur District, Maharashtra, India. It's Impact on Ecology.

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Abstract: The study was conducted in the geographical area of Later district its aims to determine the physical status of major reservoir and its impact on ecology. There were twelve reservoirs studied, its physical aspects like height, maximum capacity, actual water storage, total command area, total cultivable area, some reservoirs provide a canals and impact of reservoir on ecology.
Keywords: Reservoir, Height, Actual water storage, Total command area, Hector.

I. INTRODUCTION

Water is an essential resource for life on earth. As a result of population and economic growth, global water demand will continue to increase in the near future. At the same time climate change will alter the global water cycle, reducing water availability in critical locations Bates et, al, (2008).Artificial water storage, originated by the construction of reservoir is essential for the sustainable health and welfare.

The construction of reservoirs is one of the most important practices for the development and management of water resources. A Reservoirs are the most beautiful and expressive feature of a landscape.

It is often described as the " Eye of the Earth" and rightly so. A pristine reservoir reflects the beauty and joy around it P. D. Patil (2007).Reservoirs are essential part of all community it's useful for supply the water to urban and rural area as well as for agricultural and industry Marisol Bonnet et, al, (2015).

Reservoirs are not constructed in few periods it takes a lot of period like four to ten years.

They are constructing from earthen and cement concrete. In Latur district lot of reservoirs constructed for the purpose of supply drinking water to domestic area, some are for water supply to irrigation. R.M. Baxter (1977). Some are confined a water for purpose a percolate water in land and increase ground level water.

The benefit of reservoir flood control resource utility. Risk loss is the damage caused by the dam safety risk. The establishment of decision model should be able to calculate the comprehensive benefit of reservoir flood resources utilization in a dynamic change between the economic benefit and risk loss, to weigh the risk and comprehensive benefit, to determine the best equilibrium value of limited water level. Xianfeng Huang et, al,(2015).In Latur district there are reservoirs placed Aurad Shah Ajani Project, De Vaan Project, Gharani Project, Girakchal Project, Manjara Project, Ta. Kaij, Masalga, Project, Nimna Terana Project, Renapur Project, Sakol Project, Tawarja Project, Tiru Project, Vati Project. Manjra project has actually geographically constructed in Beed district but its more utilization of water for Latur district.

These are large water body storage which is utilized for irrigation, industrial water supply and domestic water supply,

II. MATERIAL AND METHODS

Data was collected of Gharni Project, Tiru Project, Vati project, Girakchal project, Tawarja Project, Aurad Shahajani Project, Manjara project, Nimna Terna Project, Sakol Project, Devarjan Project, Masla Project , Renapur Project from regarding Government offices from Executive Engineer, Irrigation Department. Local Sectors, Superintendent Engineer, Irrigation Department, District committee, and analysed it statistically.

III. ABBREVIATIONS

M- Meter, MCM- Million Cubic Meter, Hec- Hector, KM – Kilometer

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IV. RESULT AND DISCUSSION

Table No. 1: Reservoirs constructed during 1969 to 1983.

Reservoirs Name	Construction Year	Height of Reservoir (M)	Maximum Capacity (MCM)	Actual Water Storage (MCM)	Total Command Area (Hec.)	Total Cultivable Area (Hec.)
Gharni Project	1969	15	25.08	7.04	4888	3542
Tiru Project	1976	21	23.32	9.29	2654	2625
Vati Project	1982	19.8	9.51	1.942	2613	1810
Girakchal project	1982	6.5	9.78	1.816	2146	2146
Tawarja Project	1983	14.56	27.72	5.799	4173	4173
Aurad Project	1983	6	3.67	1.20	883	883

Table No. 2: Reservoirs constructed during 1984 to 2013.

Reservoirs Name	Construction Year	Height of Reservoir (M)	Maximum Capacity (MCM)	Actual Water Storage (MCM)	Total Command Area (Hec.)	Total Cultivable Area (Hec.)
Manjara project	1984	25.5	224.093	104.776	26526	23690
Terna Project	1989	26.3	121.188	23.223	15600	14513
Sakol Project	1998	17.5	13.62	5.222	3050	2275
Devarjan Project	2002	15.2	12.41	5.88	3170	2853
Masla Project	2002	12.39	14.68	7.113	1664	1450
Renapur Project	2013	15	20.82	2.51	3270	3053

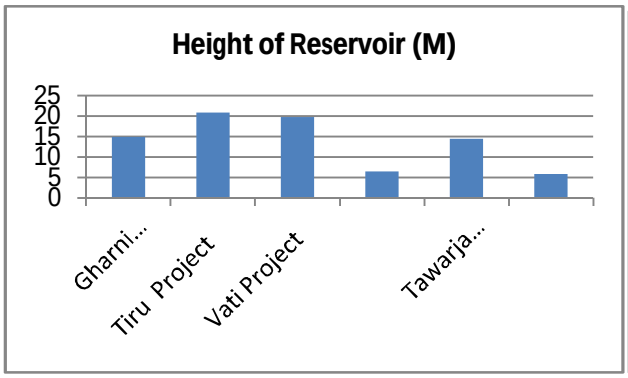


Fig No. 1: Height of Reservoirform Table no. 1

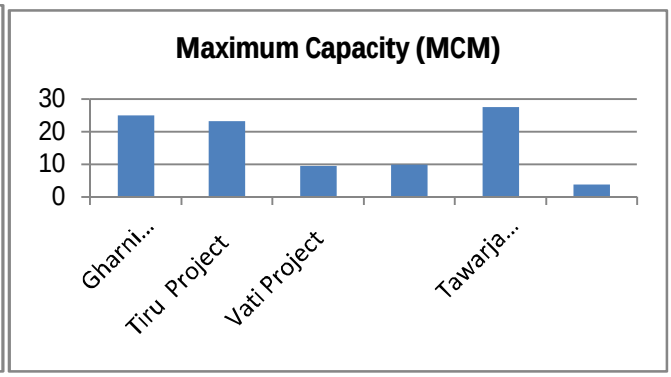


Fig No. 2: Maximum Capacity of Reservoir from Table no. 1.

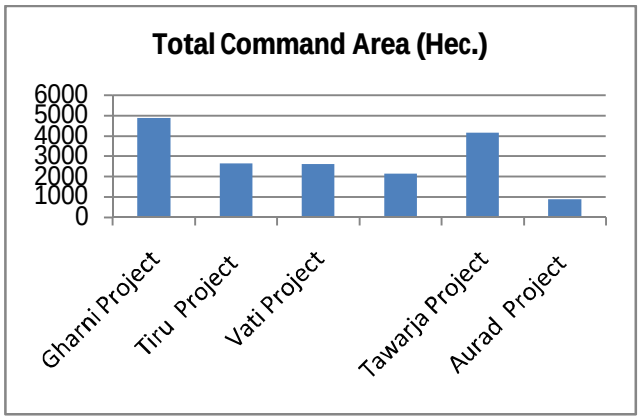


Fig No. 3: Total command area of reservoir form Table no.1.

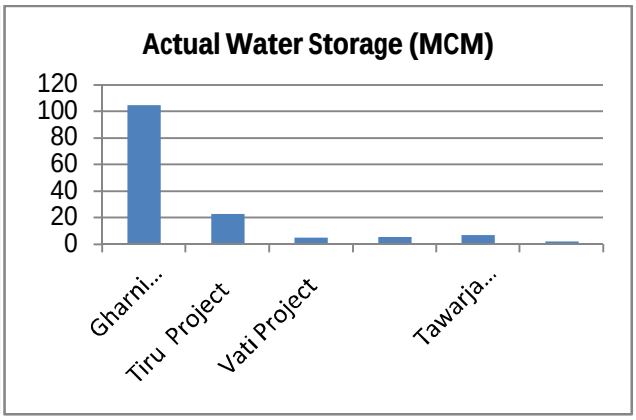


Fig No.4: Actual Water Storage of Reservoir from Table no.1.

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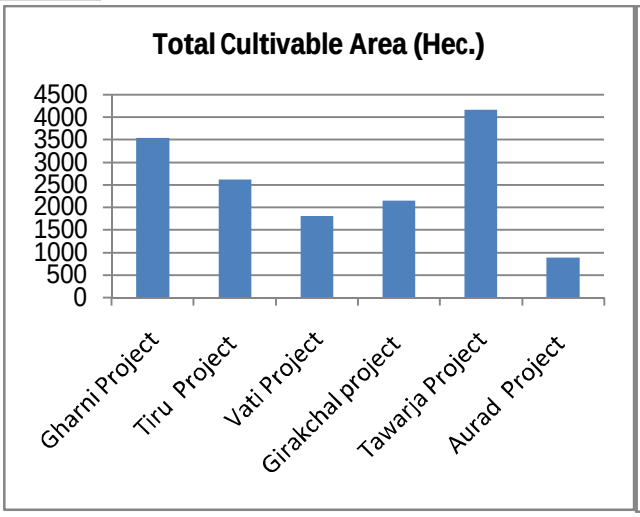


Fig No. 5: Total Cultivable area of reservoir form Table no.1.

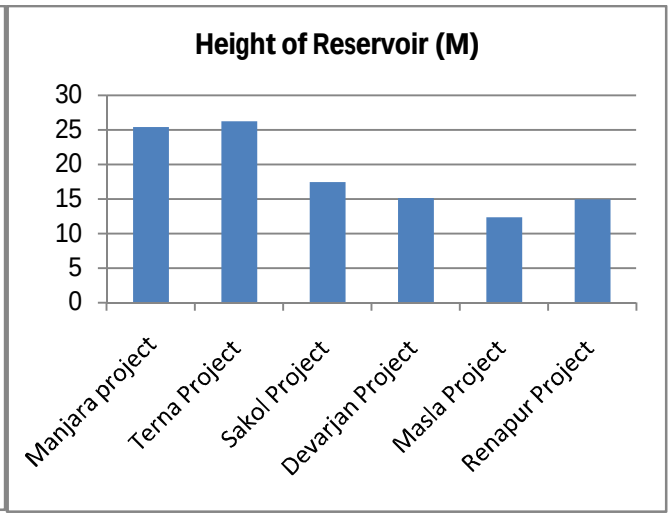


Fig No. 6: Height of Reservoir from Table no. 2.

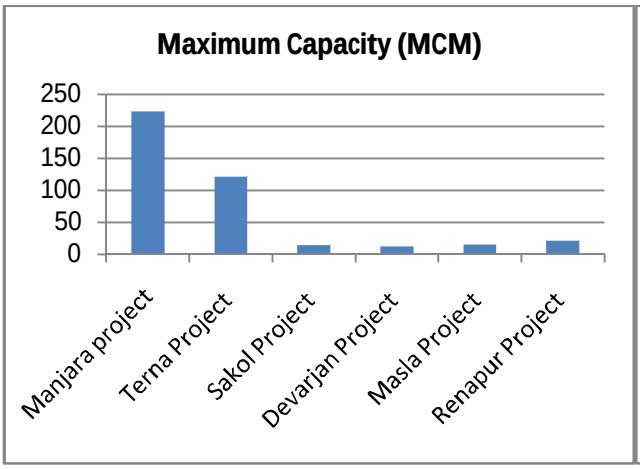


Fig No. 7: Maximum Capacity of reservoir form Table no.2.

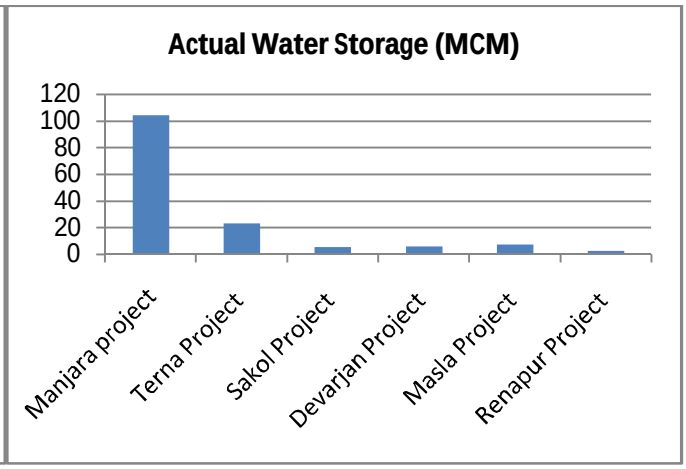


Fig No. 8: Actual Water Storage of Reservoir from Table no.2.

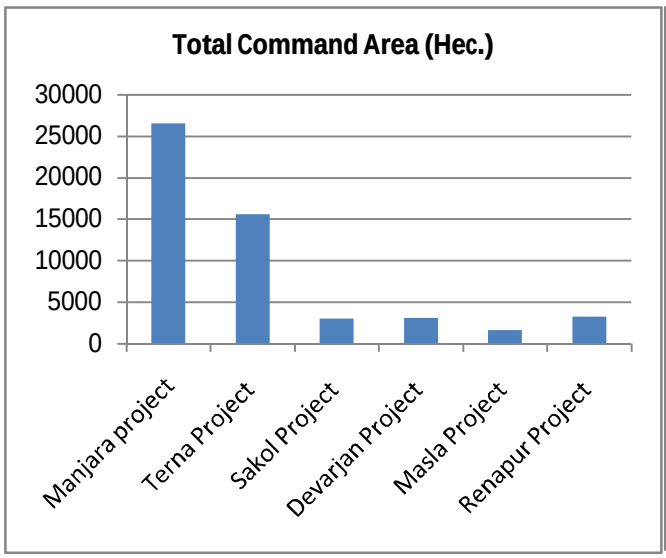


Fig No. 9: Maximum Capacity of reservoir form Table no.2.

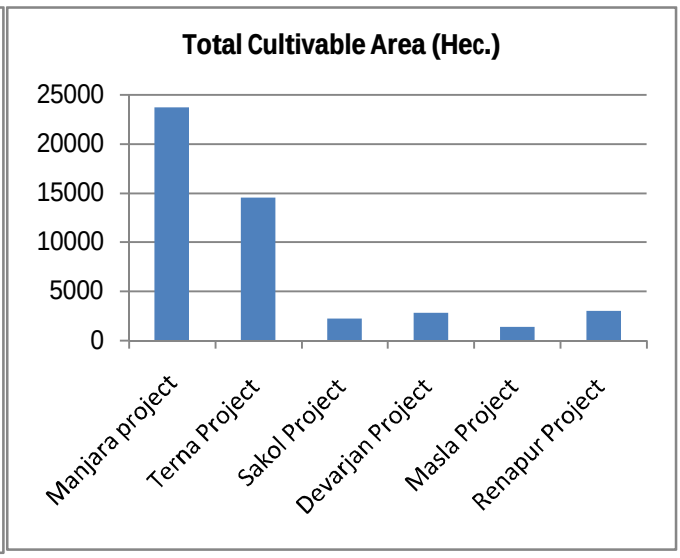


Fig No. 10: Actual Water Storage of Reservoir from Table no. 2.

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Table No. 1 shows first reservoir Gharni project constructed in year1969, its height is 15 meter, maximum capacity 25.08 million cubic meter, actual water storage area 7..04 million cubic meter, total command area 4888 hectors, total cultivable area 3542 hectors. Second reservoir Tiru project constructed in 1976, its height is 21 meter, maximum capacity 23.32 million cubic meter, total command area 2654 hector, total cultivable area 2625 hector. Third reservoir Vati project constructed in 1982, its height is 19.8 meter, maximum capacity 9.51 million cubic meter, actual storage 1.942 million cubic meter, total command area 2613 hector, total cultivable area 1810 hector. Fourth reservoir Girakchal project constructed in 1982, its height is 6.5 meter maximum capacity 9.78 million cubic meter, actual storage 1.816 million cubic meter, total command area 2146 hector, total cultivable area 2146 hector. Fifth reservoir Tawarja project constructed in 1983, its height is 14.56 meter, maximum capacity 27.72 million cubic meter, actual storage 5.799 million cubic meter, total command area 4173 hector, total cultivable area 4173 hector. Sixth reservoir AuradShahajani project constructed in 1983, its height is 6 meter, maximum capacity 3.67 million cubic meter, actual storage 1.20 million cubic meter, total command area 883 hector, total cultivable area 883 hector. Table No. 2 shows first reservoir Manjra project constructed in 1984, its height is 25.5 meter, maximum capacity 224.093 million cubic meter, actual storage 104.776 million cubic meter, total command area 26526 hector, total cultivable area 23690 hector. Second reservoir Terna project constructed in 1989, its height is 26.3 meter, maximum capacity 121.188 million cubic meter, actual storage 23.223 million cubic meter, total command area 15600 hector, total cultivable area 14513 hector. Third reservoir Sakol project constructed in 1998, its height is 17.5 meter, maximum capacity 13.62 million cubic meter, actual storage area 5.222 million cubic meter, total command area 3050 hector, total cultivable area 2275 hector. Fourth reservoir Devarjan project constructed in 2002, its height is 15.2 meter, maximum capacity 12.41 million cubic meter, actual storage 5.88 million cubic meter, total command area 3170 hector, actual cultivable area 2853 hector. Fifth reservoir Masla project constructed in 2002, its height is 12.39 meter, maximum capacity 14.68 million cubic meter, actual storage 7.113 million cubic meter, total command area 1664 hector, total cultivable area 1450 hector. Sixth reservoir Renapur project constructed in 2013, its height is 15 meter, maximum capacity 20.82 million cubic meter, actual storage 2.51 million cubic meter, total command area 3270 hector, total cultivable area 3053 hector.

Table No. 3: Canals Provided Reservoirs

Reservoir Name	Gharni Project	Tiru Project	Vati Project	Tawarja Project	Manjara project	Terna Project	Devarjan Project	Masla Project
Const. Year	1969	1976	1982	1983	1984	1989	2002	2002
Canal (KM)	54	50	20	49	168	154	27	31

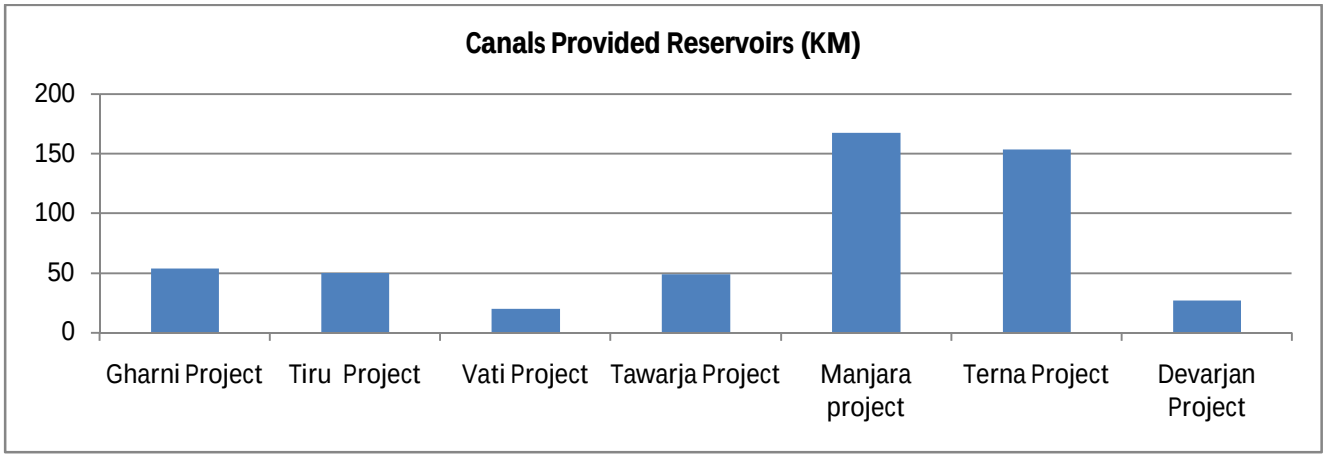


Fig. No. 11: Canal provided reservoirs in Kilometers.

Table No. 3 shows canals possess reservoirs, canals used for water supply to irrigation. First reservoir Gharni project has 54 kilometre canals provided to irrigatefor both sides land of canals. Second reservoir Tiru project has 50 kilometer canals provided to irrigate for both sides land of canals. Third reservoir Vati project has 20 kilometer canals provided to irrigate for both sides land of canals. Fourth reservoir Tawarja project has 49 kilometer canals provided to irrigate for both sides land canals. Fifth reservoir Manjra project has 168 kilometer canals provided to irrigate for both sides land of canals. Sixth reservoir Terna project has 154

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kilometer canals provided to irrigate for both sides land of canals. Seventh reservoir Devarjan project has 27 kilometer canals provided to irrigate for both sides land of canals. Eight reservoir Masla project has 31 kilometer canals provided to irrigate for both sides land of canals. In Latur district Manjra project and Terna project has highest length of canals and these canals use for more land irrigation.

V. ECOLOGICAL IMPACT

The reservoir wall itself blocks fish migrations, which in some cases and with some species completely separate spawning habitats from rearing habitats. The reservoir also traps sediments, which are critical for maintaining physical processes and habitats downstream of the reservoir Anton J. Schleis s*et, al,* (2016).Changes in chemical factors, dissolved oxygen levels, temperature and the physical properties of a reservoir are often not suitable to the aquatic plants and animals that evolved with a given river system.

Large scale wildlife habitat destruction due to river valley flooding. Interferes with natural wildlife migration patterns. Reservoir construction forces people to leave their homes if they live in or near the flooded river valley. Very expensive to build. Reduces areas for certain types of recreation such as fishing, camping, hunting, and hiking. Interferers with natural flow of water through environment. If natural fisheries are affected, harms the livelihoods of people who rely on those fisheries to make a living require maintenance. Can fall catastrophically. The reservoir gradually sediment so capacity of water storage decrease year by year Shigekazu et, al,.(2007).

The exchange of a river's flow and sediment transport downstream of a dam often causes the greatest continuous environmental impacts. Life in and around a river evolves and is conditioned on the timing and quantities of river flow Walter Wildi (2010). Disarray and exchange water flows can be as severe as completely de-watering river reaches and the life they contain. Exchanging the river bottom also reduces habitat for fish that spawn in river bottoms and for invertebrates.

In aggregate, confine drivers for reservoir have also impacted processes in the broader biosphere. Most reservoirs, especially those in the tropics, are significant contributors to greenhouse gas emissions.

A. Benefits of Reservoirs

Reservoirs more reliable source of water supply for irrigation, domestic and industrial use. The reservoirs directly support many activities including fisheries and wild life, navigation, sports and recreation. In reservoir water without any activity growth of algae and phytoplankton utilized by fishes, zooplankton and other invertebrates, those algae and phytoplankton is play a prime role of food chain in reservoir ecosystem and improve aquatic ecosystem Jose *et, al,* (2003). Algae release the oxygen by process of photosynthesis which is used for increase the oxygen content of water which water is useful for positive growth of fishes and other zooplankton Gilmor*e, al,*(2016).

B. Negative Impact

Large reservoirs have led to the extinction of many fish and other aquatic species, the removal of birds in floodplains, huge losses of forest, farmland and wetland, erosion of coastal deltas. Negative environment effects due to construction activities. Habitat loss due to inundation. Environment degradation due to increased human activities such as intensive agriculture, industries, and increased pressure on lands. Alteration tectonic activity, changes in water tables higher around the reservoir and lower downstream. Reservoirs affect the social, cultural and economical structure of the region considerably. Especially forcing people to migrate and affect their psychology negatively Rama Mehta *et, al,* (2012) and Subhajit Paul *et, al,*(2013). The large artificial reservoir created by habitat in which water-borne diseases and parasites thrive. It is increasingly acknowledged that the spread and incidence of diseases such as schistosomiasis, guinea worm, Japanese encephalitis, typhus, typhoid fever, cholera, hepatitis, malaria, yellow fever, dengue, sleeping sickness, scalies, trachoma and bacillary dysentery, is the direct result of large scale water projects. J. Manatunge*et, al,* (2000) and S.K. Sharma *et, al,* (2007).

VI. CONSLUSION

The reservoirs water can be used for irrigation purposes. Irrigation occurs only during the growing season Rost*et, al,* (2008). Reservoirs are extremely expensive to build and must be built to a very high standard. The high cost of construction to reservoir means that they must operate for many decades to become profitable. The building of large dams can cause serious geological damage. Building a large reservoir alters the natural water table. Reservoirs hold back a large volume of water because of which the reservoirs get over full and lead to an outbreak of water resulting in floods which cause a huge damage to life and property Xianfeng Huang et, al, (2017). Backwaters are a potential disaster for human life and property. Diseases spread near reservoir area. Some

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times phytoplankton and macro flora grow up on the water surface these events be harmful for the lives and people which is fishing and scums play a role of disease vectors.

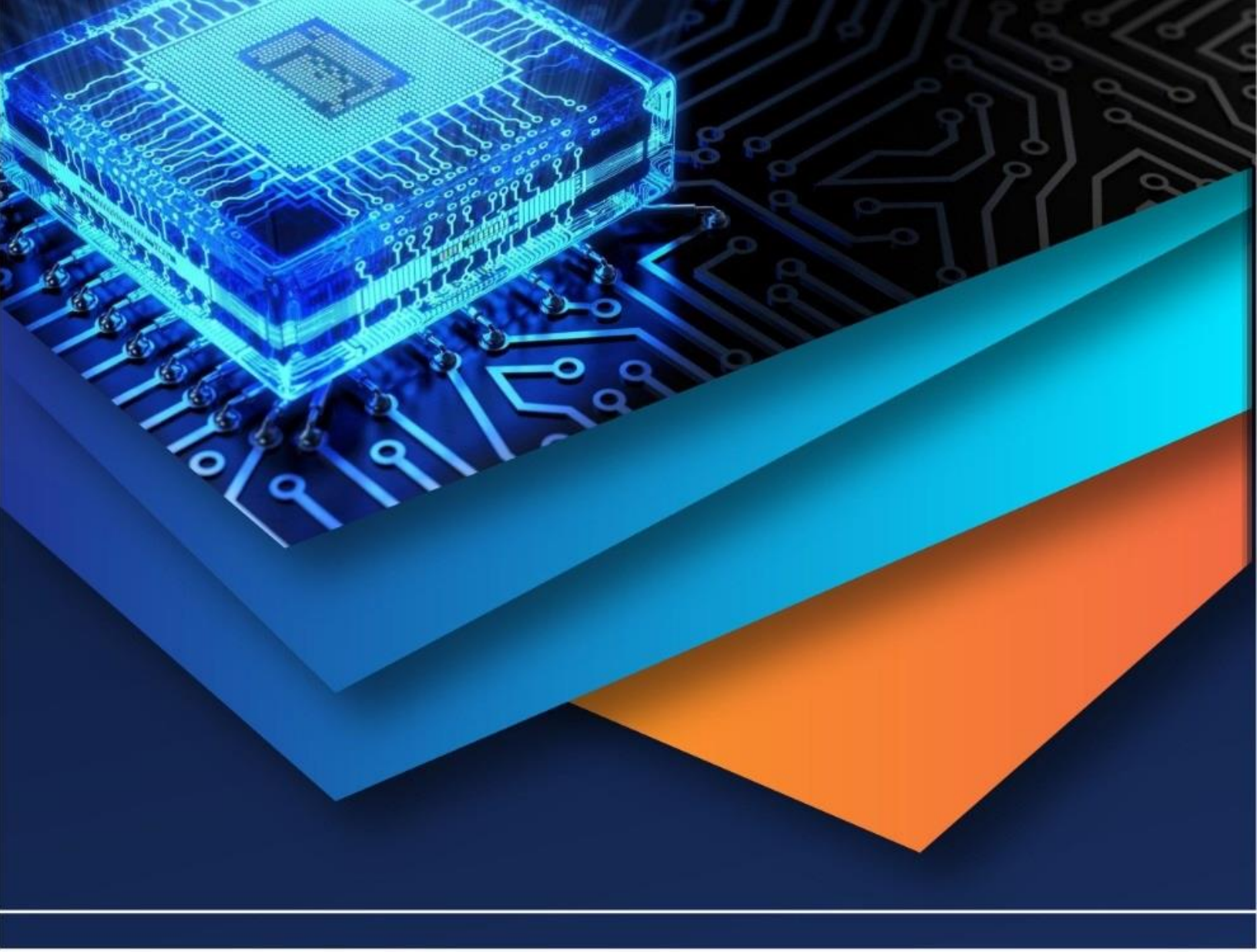
VII. SUGGESTIONS

Disaster from backwater should be taken care of very well to avoid any harm. Aware to community about spread diseases due to reservoir. Small reservoirs are more economic than big reservoirs.

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