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Evaluating economic sustainability of ponds (talab) of Dhar Town (M.P.)

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Abstract

The significance of ponds as water resources is being appreciated now as never before increasing population in town centers has put more stress on water management .This has necessitated proper management of the ponds economically for better water quality .Dhar town was famous for saddhe barah talab of different sizes spread within its municipal corporation boundary , but now a day's many of them destroyed by colonizers and construct colonies . Most of the ponds utilize for bathing, washing, irrigation, pisciculture etc.The ponds also have a great ecological importance in environment from climate control to biodiversity.

For the preparation of present paper six ponds of Dhar town studied for firstly aimed quality of water for people, secondly it deals with the issue of sustainable management of such ponds. The present study considers only use values, such as bathing, washing, and immersion of idols and cultivation of Fishes.

Keywords: Pisciculture | Sustainable management

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Introduction

Water is going to become the most natural resources in the 21st Century. In India relatively moderate average rainfall, water has still become a critical issue. Most city authorities cannot provide the required minimum water supply to its citizens. Even in those areas which have high rainfall also facing water scarcity in non rainy season.

Water is considered as the source, where life began thousands of species of flora and fauna found in these water bodies. Water bodies have served both the causes of the conservation of natures as well as human development. This paper focusing on a specific aspect of water resources – economic sustainability of water bodies with special reference to six ponds of Dhar town.

One of the main Functions of ponds is that they serve as receptors for rain water harvesting and maintaining local ground water levels. The Inter relationship of a pond with environment, economy and society is presented in Table-1.

Table-1: Role of Ponds in Town

Environmental Components	Activities	Description
Water Resource	Bathing	A large number of people from lower economic background use them for bathing.
	Washing	Washing of clothes, utensils and other domestic requirements
	Rainwater Harvesting	Acts as rainwater storage.
Environment	Climate control	Ponds affect local micro-climate, making it cooler and soothing
	Open space	Ponds provide an open space providing room for air movement. Space for recreational use.
	Trees	Generally the pond banks have tree plantations, preserving urban nature
	Aquatic Ecology	Ponds support many aquatic and other species, a receptacle of biodiversity in town
Economy	Fish cultivation	Source for local employment and good protein
Social	Community gathering	People spend time sitting around these ponds. Many ponds have seats around them and are an important place for local community gathering.
	Clubs	Because of open space, there often exist many clubs by the pond side. These clubs also manage the ponds.

STUDY AREA

Dhar district is located in the western region of the Madhya Pradesh at latitude between 22^0 1' 14 and 23^0 9 ' 49 " N and the meridians 44 ^{0} 28' 27" and 75 ^{0} 42' 43'E. For this present study total No. of Six ponds of the town are selected and studied. These six ponds are as under:-

1. Natnagra Pond
2. Devisaga Pond
3. Sitapot Pond
4. Munj Saga pond
5. Jetpura pond
6. Brumha Kundi Pond

METHADOLOGY

Historically Dhar town was famous for *Saade Barah Taalab* (Twelve and half ponds). Maximum population of this town depends on pond water for many water related activities- like bathing, washing, drinking etc. Collection of samples done before 8 a.m. and examined by standard methods of APHA (1998). The Temperature, Turbidity, pH, and D.O. were determined in the field. The collected samples brought to laboratory and analyzed within 24 hours except BOD which

requires a period of five days in cubation at 20 ^{0} temp.

No. of people using ponds for their daily activities. Hence its economic study becomes a necessity, then ponds are to be going on sustainability development. Generally the survey data shows that lower income group peoples are more dependent on pond water.

All the ponds are being used for bathing but Some ponds are for washing. Bathing and washing activities are considered as primary health care activities. After these activities the next major activity is the pisciculture . As a pisciculture is related with local employment generation. Some ponds are utilized for immersion of idols and other worship waste materials near the temple region of the ponds.

The ponds surrounding also make significant contribution to the social cultural and ecological environment. The survey found that all the ponds have some trees around them. Nearly half of the ponds have adjacent temples. Some of the ponds have decent sitting facilities around them.

Maximum surveyed ponds are owned by Municipal Council of Dhar town. One of the ponds is under the security of fishery department. Some ponds have leased by fishermen for fishing.

RESULT & DISCUSSION.

Increase in anthropogenic modeling as a consequence of disregard to the socio-economic cultural values of water. There is increase in quality deterioration of water. The quality of physical and chemical parameters serves as a good index in providing a complete and reliable picture of the conditions of ponds water (Zuber, 2007). The results are depicted in Table-2.

The Colour and Turbidity of the ponds water is comparatively higher due to silt load and idol immersion.

ph regulates most of the biological processes and biochemical reactions. In present study it was ranged from 7.8 to 9.4. Above 8.5. pH water will affect the mucous membrane or water supply system for aquatic life.

Quantitative analytical results of TDS, Alkalinity and Total Hardness show higher concentration. All ponds show slightly Alkaline character due to continuous sewage disposal and improper decomposition of organic waste. In Brumhakundi and Jetpura ponds these parameters found higher than other ponds. High value of Hardness during summer can be attributed to decrease in water volume and increase in rate of evaporation of water (Hujare, 2008).

Chloride considered as one of the basic parameters of classifying pollution by sewage into different categories. Chloride content of pond water was under the desirable limit. Flouride level was also in desirable condition.

In the present study Nitrate shows a level, which is much below the drinking water limits (45 mg/l) but higher for biological growth. The Sulphate value in the present study can be considered high because of bathing and cloths washing activities (Jain, 1996). Phosphate value was higher in the

present study. It accelerates growth of algae and vegetations.

S.No.	Physico Chemical and Micro biologicalparameters	Name of the Ponds																	
		1. Natnagra			2. Devisagar			3.Sitapat			4. Munjsagar			5. Jetpura			6. Bramhakundi		
		Rain y	Wint er	Summ er	Rain y	Wint er	Summ er	Rain y	Wint er	Summ er	Rain y	Wint er	Summ er	Rain y	Wint er	Summ er	Rain y	Wint er	Summ er
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Turbidity (NTU)	44.8	45	67.2	45.8	46.8	62.4	46	45.6	58.9	59	46	73.2	62.4	75.6	Dried	77.1	80.1	Dried
2	pH	8.3	9.4	8.2	8.03	7.79	8.01	7.84	8.17	8.3	7.8	7.8	7.77	8.84	8.17	Dried	8.23	8.17	Dried
3	Specific Conductvity	294	247	267	476	419	462	387	429	412	315	281	310	834	789	Dried	987	825	Dried
4	T.D.S. (mg/l)	225	260	240	327	322	300	278	249	267	346	350	348	764	753	Dried	752	736	Dried
5	Total Hardness (mg/l)	260	278	282	312	316	327	316	384	390	216	226	231	428	484	Dried	450	554	Dried
6	Total Alkalinity (mg/l)	219	225	260	230	275	292	345	372	384	261	278	310	512	672	Dried	449	525	Dried
7	Chloride (mg/l)	127	131	175	178	188	238	276	290	296	176	182	187	376	390	Dried	387	412	Dried
8	Fl0uride (mg/l)	0.35	0.5	0.34	0.46	0.48	0.52	0.47	0.51	0.54	0.37	0.41	0.39	0.47	0.51	Dried	0.42	0.52	Dried
9	Nitrate (mg/l)	1.2	1.6	2.6	1.06	1.04	1.8	1.9	1.63	1.74	1.06	1.7	1.4	2.9	2.6	Dried	2.6	2.8	Dried
10	Sulphat (mg/l)	56.8	52.6	54.4	68.2	65.1	63.9	46.3	34.7	45.8	53.3	58	54	66.3	64.7	Dried	58.6	54.3	Dried
11	Phosphate (mg/l)	1.26	1.8	1.48	1.6	1.3	1.21	1.36	1.24	1.54	2.4	2.1	1.8	6.1	5.8	Dried	8	7.26	Dried
12	D.O. (mg/l)	4.9	5.5	4.2	7	8.1	6.4	4.4	5.6	4	4.4	5.5	4.2	1.4	1.8	Dried	2.6	2.9	Dried
13	B.O.D. (mg/l)	4.8	4.3	5.2	4.8	4.1	5.4	5.2	4.8	5.6	5.2	4.6	5.6	5.6	4.9	Dried	6.6	6.2	Dried
14	C.O.D. (mg/l)	31.3	33	36.2	30	30.3	39.1	40.2	42.4	58.2	46.3	46.4	5.3	68.3	69.3	Dried	64.3	66.2	Dried

Table 2

The value of Flouride, Nitrate, Phosphate and Sulphate are under the desirable limit for irrigation and aqua culture.

D.O. is rising during winter and in summer it became decreases due to higher rate of decomposition of organic matter and limited flow of water in low oxygen holding environment due to high temperature (Rani, 2004).

BOD increase on temperature rising. This may be attributed to the photosynthetic activity and abundance of phyto planton during hot period (Abdo. 2004).

COD is the amount of oxygen required to oxidize the biodegradable organics as well as the non bio degradable organics both. COD increase in summer season. It is mainly attributed to the increase in the air and water temperatures facilitating the decomposition and oxidation of organic matter (Abdo, 2002).

VALUATION OF WATER BODIES

Unfortunately value of services provide by these ponds often gets unnoticed. A pond like many environmental assets can be used for consumption purpose as well as an input for some productive activities. Therefore it is necessary to form an estimate of the economic value of a pond.

For the present study only useful values of ponds have been considered like fish cultivation, bathing, washing, immersion of idols, recreation uses etc. Fish production of the ponds estimated by the fishery department and fishermen. Bathing, washing and cleaning activities purposes are estimated by proposed water supply cost. Pond committees can

charge a fee for immersion of idols and other worship waste materials. The committee can also charge for washing and bathing activities like professional swimming pools. In this way the pond committees can be economically strong.If the values are ecological and economically improved the valuation will be much more.

CONCLUSION

It may be concludes from the above analysis that

i) Utilization of pond users come from the poor section of the society

ii) Govt. Officials have a moral responsibility to ensure that the ponds are to be properly managed and not to be degrade.

iii) Sustainability from the viewpoint of human use and that from the viewpoint of pisciculture may have some mutual in compatibility and therefore requires an integrated approach.

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