ABSTRACT OF Ph. D. THESIS

STUDIES ON HYDROBIOLOGICAL MONITORING AVIFAUNA AND ICHTHYOFAUNA OF SINA DAM DIST. AHMEDNAGAR, (M.S.) INDIA

Nature serves as the best laboratory for studies. Environment consist of five elements i.e. air, water, land, flora and fauna that inextricable interlinked. These tend continuously to interact with each other but when there is least effects of one on the other environmental balance is achieved.

Water, which is vitally important abiotic component of the environment, occurs in all the three basic states of matter such as gaseous, liquid as well as solid and as a solvent for variety of organic and inorganic substances. Water becomes heavily contaminated with several substances and holds a key position in the biosphere. The water quantity as well as quality of water at a given time and given space is very significant. It acts as limiting factor and regular diversity biotic community and too much energy at different tropical levels.

Biodiversity in a crude way is referred to listing of species, their numbers and status in particular region. However, it is an ephemeral phenomenon and is more related to social and economic development of the region. Two decades back it was not a serious but after 1972 Stockholm conference it has been focused as a major bio-political issue.

The Swiss Professor F.A. Foral is the father of hydrobiology. It is a science deals with interrelationship of processes and methods whereby matter and energy is transferred within the lake. It also deals with the interrelationship between organism and fresh water. The hydrobiological study generally involves analysis of Physico-chemical and biological parameters. The hydrobiological study has been done regularly basis to help in proper development at agricultural activities, industrial activities domestic usages pattern aquatic bird sanctuaries also helps planning and strengthening biodiversity out of the total reservoir of water. Only 1% water is available in the form of rivers, lakes, Streams and ground water.

Birds are the most popular group of Animals. It has been said that birds could exists without man but that man could perish without birds. Intensely detailed studies on bird lifestyle showed that birds are an important part of the makeup of our planet and that we can ill afraid to loose. The international council for bird preservation list 1029 species is threatened in the world. Many of these birds that live in the great tropical rain forest which are together with all there flora and fauna being destroyed at such a greater rate at the present time. Birds occupy the important position in the animal kingdom especially in relation to man. Economically they are both useful and harmful to the man some of important uses are as follows –

- Biological controls.
- As a pollinators.
- As scavengers.
- Decorativeand commercial value.
- As seed dispersers.
- As fertilizers.
- Medicinally valuable.

The fishes are important components of ecosystem because the human being used as delicious and nutritious food from fishes. Similarly they also produce several important product line cord liver oil, soup from fins, covers of decorative articles from the skin of fishes which are used by man for various purposes. Fishes are the popular group of animals in each and every community and the number of fish species is about 40,000 which are live in different aquatic habitat.

Fishes and birds are important item of human food as well as the source of income of the segment of the population. At present our total annual fish production is about 5.7 million tones but the estimated potential based on the present levels of productivity is about 8.5 million tones irrespective of the advances and achievements, intensive fish forming remains a high risk investment, mainly due to the disease problem.

A simplistic assumption would be then that if fish health is taken care of fish production will improve. Hence, the control of disease and increment of fish and birds production could contribute greatly the rural development, the real India where about 70% of population still lives. Equally important is the fact that human population will get healthy fishes and birds to eat and will be less prone to diseases which could otherwise be possible because of eating a parasitized fishes and birds.

The most serious helminth infections are acquired in poor tropical and sub-tropical areas, but some also occur in the developed world. Other, less serious, infections are worldwide distribution. Exposure to infection is influenced by climate, hygiene, food preferences and contact with vectors.

Helminthes are transmitted to humans in many different ways. The simplest is by accidental ingestion of infective eggs, or larvae. Other worms have larvae that actively penetrate the skin. In several cases, infection requires on intermediate vector transmits infective stages when it bites the host to take a blood meal. In other cases, the larvae are content in the tissue of the intermediate

host and are taken in when a human eats the host. The level of infection in humans therefore depends on standard of hygiene, on the climate, on the ways in which food is prepared and on the degree of exposure to insect vectors.

In India, a large number of lakes, dams and reservoirs have been studied earlier and most of the studies were devoted to water quality fish and bird diversity. Silent features of Sina Dam as follows.

- Name of River — Bhima left Tributaries, Name Sina
- Geographical location (map) — No.47 J/1314 and N/2
- Original catchment area — 1584 Sq./Km.
- Annual rainfall — 562 mm.
- Total length of Dam — 1271 meter
- Maximum height of Dam — 22.90 meter
- Mean water depth — 13.5 meter
- Surface area of F.S.L. — 1391 hector
- Command area for irrigation — 1900 hector
- Nature of Dam — deep

Methodology:-

Water sampling of four selected sites of Sina dam worked out during the study period. The fish material was collected with help of local fisherman from lake for two year. The fish specimens collected were instantly fixed in 4-5 % formaldehyde solution and subsequently after 3-4 hours fixation and washing with water, transferred to rectified spirit. The large sized specimen was injected with 10% formaldehyde and given incision on its belly. While identifying the fish specimens, stress was mainly given on stable characters both meristic and morphometric. The latest authentic books on fish systematics and fauna volumes such as Day (1878, 1889), Jayaram (1981,1991) Menon (1964, 1987) and Talwar and Jhingran (1991) were referred to for fish identification.

Bird counts were carried out around the July 2006 to June 2008 from all four sites of Sina dam. Bird counts were done by two different methods. An actual

head counts were done by bird species which were small in number for fast moving birds or for birds present in flock. A bird behavior was studied by observing their movements and habitat. The identification of birds was done by the book of 'Indian bird' Salim Ali (2001) and 'A pectoral guide to the Birds of the Indian subcontinent' Salim Ali and Replay. All observation were made using binocular (Olympus 8x40) Photographic documentation was done with Nikon FE and with 300 mm telephoto lens.

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The thesis comprises of four sections:-

Section {A} Limnology.
Section {B} Biodiversity of Phytoplankton and Zooplankton
Section {C} Avifauna and Ichthyofauna.
Section {D} Bibliography.

Limnology:-

The section contains the introduction of ecological parameters categorized as physical and chemical parameters

Physical Parameters –

a) Water temperature b) Transparency of water to light (Secchi disc transparency),

c) Turbidity d) Colour of water

Chemical Parameters -

a) pH, b) Dissolved oxygen, c) free carbon dioxide,

d) Hardness e) Total Alkalinity, f) Cholorides,

g) Total dissolved solids, h) salinity

Biodiversity of Phytoplankton and Zooplankton or Biological Parameters -

a)Phytoplankton b) Zooplankton

Avifauna and Ichthyofauna:-

This section deals with the diversity of birds and fishes.

Avifauna: - Total 22 species were recorded.

Ichthyofauna:- There are 16 fish species with different orders and families are reported

Study of Protozoan and

Helminth Parasites:- This part of the thesis deals with the study of Protozoan and Helminth parasites from Sina dam.

Bibliography

Note: -

– List of paper publications

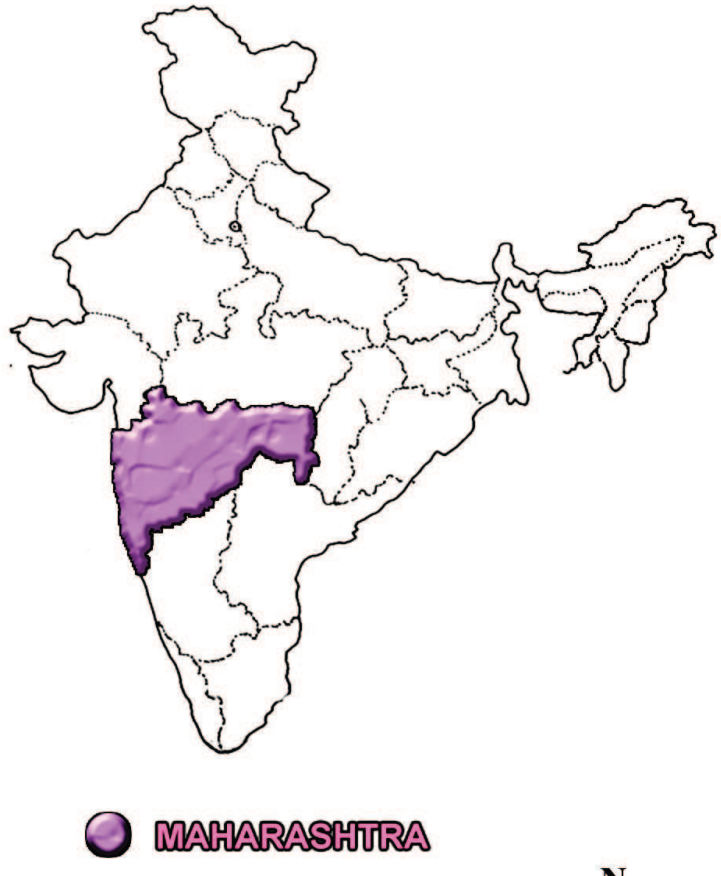
Research Guide **Research Student**

Dr. B.V. Jadhav **Mr. R.N. Abdar.**

PLATE NO. 1

STUDY AREA

Map Showing Location of Maharashtra State in India.



MAP OF AHMEDNAGAR DISTRICT SHOWING STUDY AREA

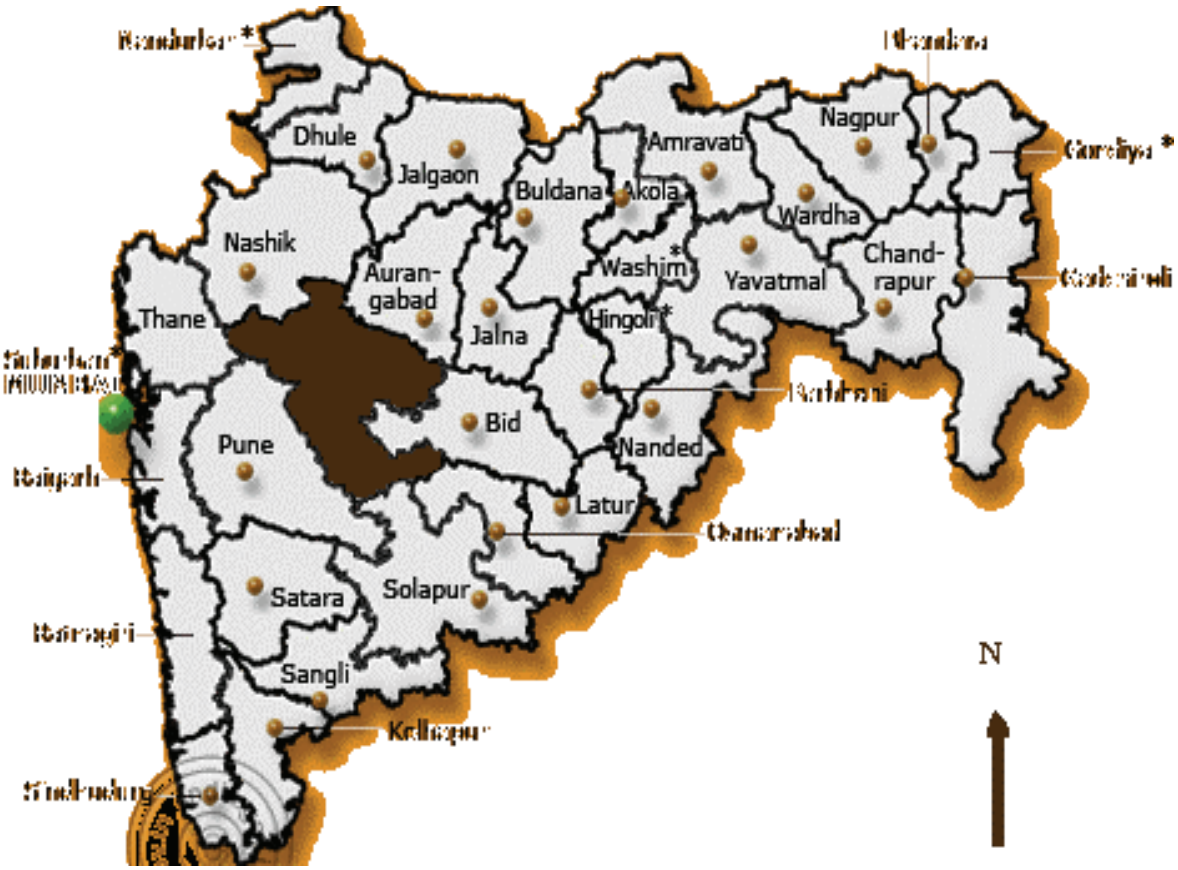


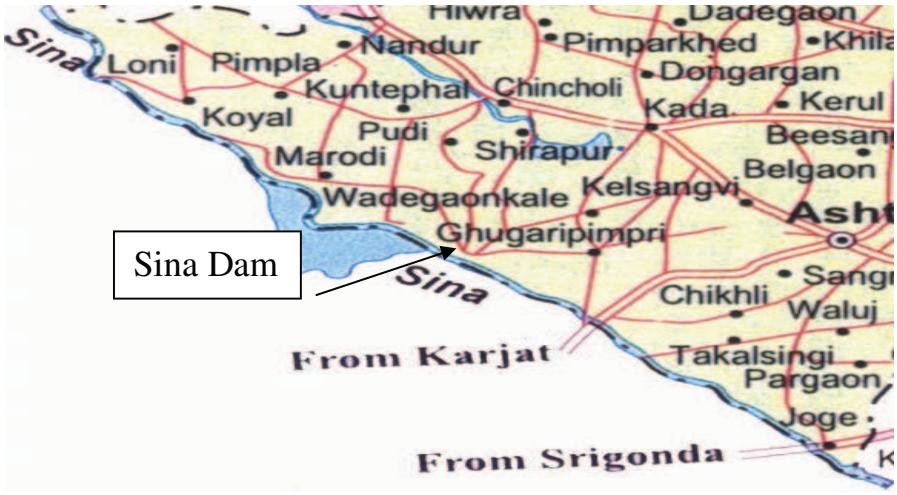
PLATE NO. 3

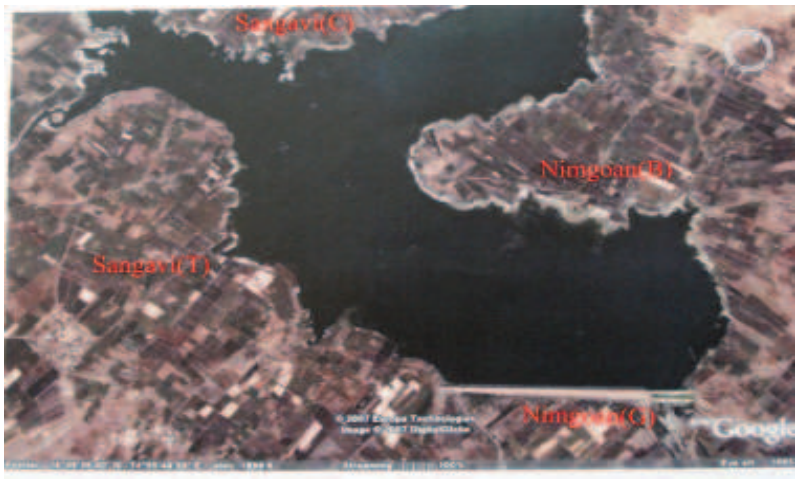
MAP OF AHMEDNAGAR DISTRICT SHOWING STUDY AREA

Sina Dam Situated on Sina River

PLATE NO. 4

MAP SHOWING STUDY AREA





Satellite picture showing Sina Dam

PLATE NO. 5

PHOTOGRAPH SHOWING SINA DAM

TOPOGRAPHY OF DAM

The Sina Dam selected for the present investigation lies in the Eastern side of Western Maharashtra on east of Ahmednagar city. It is situated at about 450 meters of sea level located at 74^0 551 (E) longitude and 18^0 501 (N) Latitude. It is an irrigation project on river Sina in Karjat Tehsil; river Sina is tributaries of river Bhima in Krishna basin. It is an earthen dam near village Nimgaon Gangarda.

The general climate of the District is typically monsoonic type with three season's winter, summer and rainy. The summer season start from mid of February to May. The winter season start from mid of November and to February. The rainy season start from June to October.

It is agriculturally well developed area. The land scope of Tahsil is dotted with many man made reservoirs. These reservoirs were constructed for irrigation purpose, however in the passing of the time the water use pattern has changed from agricultural to domestic purpose, such as washing, bathing and cleaning etc. The local fisherman started the fishing activities in the reservoirs. Increased human activities over the recent past years are imposing greater stress on these ecosystems.

The topographical setting of Sina dam is as follows

1)	Name of River	Bhima left tributaries, Name Sina.
2)	Geographical location map	No.-47J/1314 and N/2.
3)	Original catchments area	1584 Sq/Km.
4)	Annual rain fall	562 mm.
5)	Total length of dam	1271 meter
6)	Maximum height of dam	22.90 meter
7)	Mean water depth	13.5 meter
8)	Surface area at F.S.L.	1391 Hector
9)	Command area for irrigation	2500 Hector

10) Nature of Dam Deep

The location of the Sina Dam in map of India, Maharashtra, Ahmednagar District and Karjat Tal. Shown in plate no. 1, 2, 3. Four sampling stations were selected at the dam based on different characteristics. The selected sampling stations are

1) **Sampling station I – Nimgoan (G)** located on east side of dam
2) **Sampling station II – Sangavi (T)** located on west side of water reservoir
3) **Sampling station III – Sangavi(C)** located on south side of water reservoir
4) **Sampling station IV –Nimgoan (B)** located north side of water reservoir as shown in plate no .4.

The reservoir is surrounded by hills on North and South which is covered by weeds and grass on which the domestic animals graze, adding the excreta in the area which gets decomposed and during rainy season it comes under water spread area.