Pond ecosystems support economic prosperity, social well-being, and environmental sustainability by providing a variety of ecosystem services, especially in developing agricultural economies. However, the unchecked development, changes in land use, and limited conservation efforts pose significant threats to the biodiversity of these pond ecosystems.

In the present study a total 404 water sheets were surveyed for their fisheries, aquaculture status and potential out of which, 264 water sheets only have ongoing aquaculture practices. The excel sheet showing the number of Ponds in each district is kept in Appendix I. The result indicates good Ichthyofaunal diversity at the Narmada, Dahod and Panchmahal districts due to the nearby Dams, Reservoirs and Riverine fisheries. Whereas, the Kheda, Nadiad, Anand and Vadodara districts show decrease species diversity due to their development. Many of the water sheets which previously occurred are now vanished of made dumping site or the Land is used for construction, decreasing the number of water sheets in the study area. Hence, this gives an insight about the number of water sheets decreasing due to urbanization and modernization, which directly impacts on the habitat destruction, pollution, etc. leading to the decrease in diversity of the Freshwater ecosystem.

Aquaculture is rapidly growing and expanding sector. plays a crucial role in economic development, particularly in rural and coastal communities, by providing employment opportunities and enhancing food security. With its potential for growth and contributions to the global food supply, aquaculture is set to become a cornerstone of sustainable agricultural practices. Mainly the Indian Major Carps were used for aquaculture but due to the increasing demand, some of the Siluriformes (*Pangasius pangasius*), Exotic and Minor carps are developing as a potential for aquaculture. The stagnant and polluted ponds have now become a breeding ground for vectors of various diseases.

During the study, a total of 42 species are recorded from the different freshwater resources belonging to 11 orders, 19 families, and 35 genera. Among them, Cypriniformes dominated by more number of families and species, followed by Siluriformes, and subsequently other orders and families. The Fish fact sheets for each species is prepared and is in Appendix II. Out of 42, 11 species sequence data was obtained and is included in the fact sheet along with Sequence barcode. The Phylogenetic analysis was carried out to find the relatedness amongst the species.

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Fish are susceptible to a variety of diseases because they might harbor a variety of infections and parasites. Viral infections, bacteria, fungus, protozoa, water moulds, and other pathogens can cause fish diseases. Disease is mostly caused by environmental factors such as high temperatures and poor water conditions, as well as the handling or introduction of fresh fish from another pond, which accelerates the spread of the fungus.

The total incidence and abundance of the ectoparasite were calculated, which concluded the higher occurrence of *Argulus*, with *Lernaea* at second position. The prevalence of parasite between Aquaculture and Ornamental fish was calculated which resulted the easy spread and higher intensity in the Ornamental fishes. The fish parasite could multiply quickly in poor water quality parameters, harming fish and often resulting in significant morbidity in a short period. Fish farmers and aquarium shop owners could face financial losses due to Argulosis. Other than these there are certain pathogens as Bacteria, Virus and fungus causing significant diseases like the Tail and Fin rot, Gill rot, SVC and White spot disease, respectively. The major reasons for this disease occurring is due to bad water conditions.

FUTURE ASPECTS

- The basic scientific insights needed for planning and management of ponds is inadequate. Therefore, it is imperative to explore all available technological options for restoration conservation & management of ponds as per site specific conditions keeping in view vital role played by ponds in water conservation, climate change adaptation and biodiversity habitat.
- Rural farmers often lack knowledge of aquaculture and health management, leading to limited chances for skill development and efficient disease response.
- The government must take a more active role in resolving this issue. It is feasible to identify pond and farm level risk factors for disease outbreaks and design management methods using epidemiological methodologies. Better management practices (BMPs) should be straightforward, science-based, cost-effective, and contextually relevant for farmers to accept and apply them. Disease prevention and control techniques must be prioritized.

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