SAWA PGD Fellow	:	*Muhammad Golam Mustafa*
Institution	:	*IWFM, BUET*
Designation	:	
Title	:	*Changes of Aquatic Habitat and fisheries biodiversity at two small scale water resources projects in Narail district*
Email	:	*mustafa_imscu@yahoo.com*

1. Background

A general concern in Bangladesh is the adverse environmental impacts of flood control and drainage (FCD) projects, which is also highlighted in the National Water Management Plan. Construction of flood control schemes resulted in adverse impacts on capture fisheries because of the obstruction in fish migration routes between rivers, beels and wetlands. This study was undertaken to assess and identify the spatial and temporal changes of fishery habitat, fish biodiversity, and the interaction of the problem with the water development projects. Two selected water resources projects (Hawaikhali and Siapagla) in Narail District of the south-western part of Bangladesh were selected. The main focus was to identify the landuse / land type changes with water resources project intervention regarding fisheries and agriculture.

2. Objectives of the Study

The objectives of the study are:

- To analyse the change of aquatic habitats in the study area
- To analyse the fisheries bio-diversity change in the study area
- To identify the impact of water development projects on aquatic habitats and fisheries biodiversity

3. Study area

The study area was selected on the basis of existing water use among agriculture, fisheries and the aquatic ecosystem of SWAIWRMP. Two project areas: a completed subproject, namely, Siapagla FCD subproject and an ongoing sub-project named Hawaikhali sub-project were selected as study area for fisheries biodiversity analysis, productivity analysis and analysis of impact on fishing communities.

4. Methodology

The research work was done based on both, primary and secondary data. The study started with a field reconnaissance. Sample survey and direct field sampling of fish were done to generate primary data. FGDs, Unstructured/semi-structured interviews as conversation, KII, Case study/case stories, primary photographic documents etc. were also used. Three field visits were made to the study area for primary data collection through PRA, market surveys, field sampling as well as for secondary data collection.

5. Research findings

The study covered the habitats and fisheries biodiversity changes and the impact of water resources project intervention on overall ecosystems in the two project sites. The major findings are given below:

- The fisheries' habitats were adversely affected by project interventions as confirmed through observation, secondary data and PRA.
- Water resource project interventions are now found to have negative impacts on fisheries ecosystem by directly affecting fish habitats as well as indirectly creating conditions suitable for detrimental fishing practices.
- In a period of over a decade of operation of a small scale project (i.e., Siapagla) the loss was estimated to be greater than 50% (based on TAXA_S) while Shannon_H index was reduced by more than 30%. The Shannon_H for the previous two decades had reduced by less than 5%. The present fisheries biodiversity status based on primary fish sampling seemed more severe.

- The species' dominance indicator was poor for the completed Siapagla project than the Hawaikhali project under construction, though in both the cases there was a natural trend of dominance of some species. The cause for such dominance can be attributed to other environmental parameters. Shrimp is the dominant species.

- Fish biodiversity was found good in Hawaikhali project site where the natural condition exists till now. The fish habitat is also good in the Hawaikhali site. It is mainly due to more depth of beels and khals, and a longer seasonal water availability season.

The loss of bio-diversity resulted in lesser optimum density of fisheries leading to much reduction of productivity. Indiscriminate fishing practice by the rich to maximize profit resulted in bio-diversity loss and consequent further reduction of productivity. The fishing communities were severely affected by the loss of production as well as productivity. Lack of access to free fisheries' resources have resulted in shifting of profession to marginalized landless agricultural workers / wage labourers.

6. Recommendations

- Establishment of Fish Sanctuary: Some deepest parts of the beel should be claimed for sanctuary establishment and additional management should be taken up after sanctuary declaration. It should be ensured in pre-project design as an essential component. In that case, 10% of the dry season water area can be declared as fish sanctuary.

- Restoration of Fish Habitats: In case of already changed ecosystem, habitat restoration is of utmost importance. The present study investigated that around 5% areas in fully implemented projects are suitable for fish sanctuary development.

- Stocking of Fish Fingerlings: It is recommended that in areas already deteriorated in terms of fish diversity, open water indigenous fish species can be stocked to enhance diversity and productivity.

- Motivation and Co-Management: It would be better if a fisheries' sub-committee is formed in the WMCA, which would be responsible for the fisheries' management. Campaigning and publicity also can play important roles.