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Designation :

Title : *Assessment of Environmental Parameters in Relation to Different Agro-Water Management Practices in South-West Coastal Region of Bangladesh*

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Salinization of productive agricultural lands in southwestern coastal Bangladesh and their reclamation are being given distinct importance from the local people as well as policy makers. Salinization has been established as the prime cause of environmental degradation in the region and there is an urgency to find out a water management practice which is economically beneficial, socially acceptable and environmentally sustainable.

Keeping these viewpoints, this study was undertaken to evaluate the present statuses of different agro-water management practices in Dumuria Upazila, to carry out laboratory analyses of selected soil and water quality parameters of agricultural fields, and to assess the environmental consequences of those farming practices. Four different types of agro-water management practices (AWMPs) with three ghers under each practice were selected for investigation.

Several important soil and water quality parameters (temperature, salinity, pH, EC, TDS, DO, HCO₃⁻, Ca²⁺, Mg²⁺, Cl⁻, Na⁺, K⁺, SO₄²⁻, NO₃⁻, etc.) during the pre- and post-boro season of 2009-10 were analyzed to calculate the mean soil and water quality change indicators (MSQI, MWQI). Besides these, management parameters, such as cropping pattern, irrigation, water exchange, use of fertilizer, use of pesticide, number of years of boro cultivation, vegetation on gher dykes, etc., and economics of production were considered for evaluation of best practices among different AWMPs using multicriteria analysis (MCA). The highest deterioration of soil quality was found in the Type-3 AWMP and the lowest in the Type-2 AWMP. In case of water quality, the order of deterioration was found to be: Type-3 AWMP > Type-4 AWMP > Type-2 AWMP > Type-1 AWMP.

The degree of correlation of economic parameters with quality and management parameters was used to give weightage of parameters in MCA – a strong relation ($P < 0.01$) was given a high weightage and a moderate relation ($0.01 < P < 0.10$) was given a low weightage. Thus the Type-2 AWMP got the highest total average score and appeared to be the best AWMP. This was due to the community management approach for controlling saline water into the ghers, use of more organic fertilizer, use of IPM techniques, less cropping intensity, less deterioration of soil and water quality, higher economic return, etc.

So, from this study it can be said that the communal approach in water management for HYV boro rice cultivation with a crop rotation of golda-bagda-white fish is the best AWMP among the current practices in the study area.