DEVELOPMENT OF LOCALLY ENGINEERED LOW-COST RECIRCULATING AQUACULTURE SYSTEM (RAS) IN BANGLADESH

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Abstract

The Recirculating Aquaculture System (RAS) is a healthy method of producing fish in which fish are continuously grown in the same water at high densities in regulated environments. The method guarantees every environmental factor that attests to a fish-friendly atmosphere and a high level of culture system, which would create a new export market for various local species. Bangladesh hence has a significant demand for aquaculture mechanization and intensification through RAS. The RAS system must be affordable, easy to use, and efficient. The usage of regional resources in a certain fish culture, the surrounding environment, and fish pricing must all be taken into account in the design. Testing of local species is therefore necessary for the creation of an effective RAS. One of the most important ways to maximize water reuse and increase fish output in Bangladesh is to establish and test low-cost RAS utilizing local resources. In addition to these, using solar power to reduce energy costs would be a wise move. For this reason, the goal of the current research project is to create a locally manufactured RAS through the fabrication of crucial components for the intensive cultivation of high-value species utilizing resources that are readily available and indigenous technology. For the purpose of cultivating commercial fish species, a project is developed to create, modify, and validate a locally engineered RAS.

To ascertain the current state of RAS in Bangladesh, a KII was carried out with various RAS entrepreneurs, importers, equipment makers, and service providers. Among the various important concerns, some of the more significant ones were improper RAS design, insufficient technical expertise, a shortage of experienced labour, equipment selection, water flow rate computation, species selection, excessive operating costs, etc. In order to lower the RAS's operating costs, an engineering design and technical specifications were created based on the findings. The water recirculation system was designed using an underground gravity flow mechanism. The water recirculation system was designed using an underground gravity flow mechanism. Low-cost tanks with a sloping bottom were designed and built. A total of twelve FRP tanks and twelve triple tanks with PVC supports, each with a capacity of 3.5 cubic meter, were built. To get rid of the majority of the solid particles in the water, a low-cost vortex filter was added to the system. It was noted that the material used in Moveable Bed Reactors (MBBRs) manufactured locally is effective in removing ammonia from water. An oxygen cone constructed locally proved successful in raising the inflow water's oxygen content. When compared to traditional RAS, it was found that locally designed, low-cost RAS is efficient in raising fish using less energy.

Keywords: indoor fish culture, intensive aquaculture, recirculating aquaculture, energy