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**Effect of rice-fish (Tilapia) integration on nutrient dynamics and biodiversity of rice (*Oryza sativa*) field**

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**Abstract**

This experiment aimed to examine the impact of rice-fish integration on the nutrient dynamics and biodiversity of rice fields, using *Oryza sativa* (rice) and *Oreochromis niloticus* (Tilapia). The study included four fish stocking densities as treatments (T1-T4). Stocking density of fish in T1, T2 and T3 were 30, 60 and 90 respectively while T4 was the control treatment where fish was absent. Each treatment, with three replications, was randomly allocated into twelve experimental plots (4×4m<sup>2</sup>) using a complete randomized block design. Two-week-old paddy seedlings were planted in the space of 25cm × 25cm. The initial mean weight and length of the fish were 10.87g and 8.65cm, respectively. Fish were fed using a commercial diet at 2% of body weight per day, and the experiment was lasted for 105 days. The early stage of rice field was covered with mesh to protect fish from predators. Soil and water quality parameters in the rice field were measured monthly. The Shannon diversity index was applied to assess biodiversity. The results showed that fish integration significantly impacted soil pH (p<0.05), which was within the accepted range (pH 6.0-7.2) for rice in all treatments. Electrical conductivity, organic matter content, soil phosphate, and potassium were significantly improved in fish integrated plots (p<0.05) compared to the control, while the density of earthworms was reduced (p<0.05) by the integration. However, the density of snails was significantly increased (p<0.05) in all treatment groups compared to the control. Water pH, dissolved oxygen content, and alkalinity were statistically similar among all treatments. Paddy yield was improved (p<0.05) in all treatments compared to the control, with the highest yield (6.58 tons) was recorded in T3. The biodiversity of the experimental plots T1 (3.06), T2 (3.07), and T3 (3.09) were significantly higher than control treatment (2.14). In conclusion, findings revealed that the integration of Tilapia with rice improves soil quality, rice yield, and biodiversity in rice fields.

**Keywords:** Biodiversity, Rice-fish integration, Soil quality, Tilapia

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