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## RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

**Title:** Nitrogen and Phosphorous Budget Analysis of Carp Based Polyculture Ponds in Chitwan, Nepal

**Author(s):** S. Gurung, M.K. Shrestha, and N.P. Pandit

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**Abstract:** An experiment was conducted in 12 earthen ponds of 200 m<sup>2</sup> at Kathar VDC, Chitwan, Nepal for 270 days to analyze the productivity and nutrient budget in some carp based polyculture systems. The experiment was conducted in a completely randomized design with four treatments in triplicate each: a) Carps only or control (7000 fish/ha) (T<sub>1</sub>); b) Carps (7000/ha) + tilapia (3000/ha) (T<sub>2</sub>); c) Carps (7000/ha) + tilapia (3000/ha) + sahar (500/ha) (T<sub>3</sub>); and d) Carps (7000/ha) + tilapia (3000/ha) + sahar (1000/ha) (T<sub>4</sub>). Silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Aristichthys nobilis*), common carp (*Cyprinus carpio*), grass carp (*Ctenopharyngodon idella*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*) of mean stocking size 3.0, 4.2, 10.0, 18.8, 10.5, 2.2 g, respectively were stocked in all ponds at the ratio of 4:2:1:1:1:1. The mean stocking size of Nile tilapia (*Oreochromis niloticus*) and sahar (*Tor putitora*) were 9.7 and 3.4 g, respectively. The ponds were fertilized weekly with urea and di-ammonium phosphate @ 4 g N and 1 g P/m<sup>2</sup>/day. Fish were fed with locally made pellet feed (20% CP) once in an alternate day at @ 2% body weight. At harvest, the extrapolated fish yield ranged from 1.5 to 1.7 t/ha/year in different treatments, without significant differences among treatments (P>0.05). Inclusion of sahar in Nile tilapia ponds decreased recruits by 63 to 72%. There were no significant differences in water quality parameters among treatments, except dissolved oxygen concentration, which was significantly lower in T<sub>1</sub> and T<sub>3</sub> than T<sub>2</sub> and T<sub>4</sub> (p<0.05). Both nitrogen and phosphorous were gained from fish species and lost from

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soil and water. There were no significant differences in nitrogen and phosphorous contents of all inputs and outputs among treatments. The unaccounted nitrogen and phosphorous loss ranged from 9.8-17.1% and 51.2-64.4%, respectively. The nitrogen and phosphorous required for producing 1 kg fish ranged from 337.5-375.9 g and 130.3-150.9 g, without significant difference among treatments. The nitrogen and phosphorous discharged for producing 1 kg fish ranged from 1.59-4.35 g and 1.6-9.3 g, respectively.

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