

## ABSTRACT

Performance of Indian major carps (IMC), viz., catla (*Catla catla*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*) was evaluated with stocking densities (St.D) of 20 000, 35 000 and 50 000 fingerlings ha<sup>-1</sup> under different management practices (MP). Different MPs included the culture of IMC (a) without water exchange and supplementary aeration (MP-I), (b) with water exchange and without supplementary aeration (MP-II) and (c) with water exchange and supplementary aeration (MP-III). Fishes were fed pelleted feed containing 35% crude protein in all the three different MPs. pH of pond water was maintained within its ideal range through intermittent application of lime. In MP-II and MP-III, concentration of total ammonia nitrogen (TAN) was maintained within its critical limit through water exchange. Problem of environmental pollution during water exchange was avoided by discharging the effluent into the nearby agricultural crop field. Significant decrease in TAN and feed conversion ratio along with substantial increase in production for St.D-3.5 and St.D-5.0 of MP-II compared to that of MP-I confirmed the effectiveness of water exchange on water quality and fish growth. Values of profit, net present value (NPV), profitability index (PI) and internal rate of return (IRR) were also found significantly higher in MP-II over MP-I for St.D-3.5 and St.D-5.0. In MP-III, provision of supplementary aeration was made to ensure minimum dissolved oxygen (DO) level of 4.0 mg L<sup>-1</sup> in all the treatments. Increased total productions of 80% in St.D-2.0, 115% in St.D-3.5 and 117% in St.D-5.0 of MP-III over MP-II confirmed the significant positive impact of aeration. Significant increase in profit, NPV, PI and IRR and decrease in payback period in MP-III compared to MP-I and MP-II showed the effectiveness of aeration from economic point of view. Maximum profit of about Rs 726 000 ha<sup>-1</sup> yr<sup>-1</sup> was recorded in St.D-5.0 of MP-III. A pond of 0.30 ha area has been identified as a desirable pond size for earning livelihood of a marginal fish farmer with a monthly income of above Rs 12 000. Feed cost and sale price are found as the most important sensitive variables in intensive IMC culture system.

**Keywords:** *Indian major carp, stocking density, water quality, water exchange, supplementary aeration, fish production, economic analysis, sensitivity analysis*