



Water quality, fertility, fish culture carrying capacity of Riam Kanan Reservoir, South Kalimantan Province

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Abstract. Fish cultivation in Riam Kanan Reservoir has well developed based on the floating fish cage production development in the last few years. However, this development, if not controlled, will exceed the reservoir carrying capacity and can result problems in relation with degradation of water quality and its trophic status. This study was aimed at analyzing the water quality condition, the trophic status, and the fish cage culture carrying capacity in Riam Kanan reservoir. This study was carried out for 5 months, from May to September 2019. It applied field survey method to gather the water quality data. Water sample sites were purposely selected as many as 7 stations, and water quality measurements were conducted 3 times at 2-month interval. There were 16 parameters measured, temperature, transparency, turbidity, TDS, TSS, pH, DO, TP, TN, NH₃-N, free NH₃, BOD, COD, NO₃, NO₂, and chlorophyll-*a*. Results revealed that water quality of Riam Kanan Reservoir was categorized as moderately polluted with mesotrophic fertility status. The capacity of total phosphorus load was 137.3 ton yr⁻¹. Riam Kanan Reservoir has recently an excessive load of TP as much as 89.3 ton yr⁻¹ that is equivalent to excessive fish production of 5,030 ton yr⁻¹. The recommended fish culture production is 3,925 ton yr⁻¹ or equivalent to 1,869 plots of floating fish cage.

Key words: water quality status, trophic status, fish production, floating fish cage.

Introduction. Riam Kanan Reservoir is the largest reservoir in South Kalimantan Province that has multifunctions, such as hydropower plant, irrigation, source of standard water, tourism object, water transportation media, fisheries, and aquaculture (RDBPW 1995; SCBR 2016a, 2016b, 2016c). Riam Kanan Reservoir is one of the fish culture center using the floating fish cage system. Fish culture production in this area contributes 40% of total floating fish cage production in Banjar Regency (SCBR 2019b).

In line with need development for human food, fish culture has developed fast including fish culture using the floating fish cage (FFC) system. Fish production from FFC system in Banjar Regency has significantly increased from 1,116 ton in 2006 to 11,364.8 ton in 2018 (SCBR 2007, 2019b).

The development of floating fish cage culture in Riam Kanan Reservoir has given positive impact to business opportunity and job opportunity for people around the reservoir (Soendjoto et al 2009; SCBR 2009). Floating fish cage culture business in Riam Kanan Reservoir is source of income for 425 fisheries households with revenue-cost (R/C) ratio of 1.12 meaning that the business is feasible (Nur et al 2020a, b). Besides positive impact, the FFC culture development is also potential to give negative impact on the aquatic environment since the waste produced will rise. FFC culture yields some wastes, such as uneaten feed, feces, and metabolites that are potential to contaminate the aquatic environment (Shakouri 2003; Yusuf et al 2011). Pollution can occur if the fish culture exceeds the carrying capacity of the aquatic environment. Problems of excessive carrying capacity also happen on Fangbian Reservoir, China, causing increase in total nitrogen (TN) and total phosphorus (TP) as much as 2.3 and 9.6 times, respectively, above the standard criteria so that they are considered as main contribution of the