

An analysis of capture fisheries resource depletion in Cirata Reservoir, West Java, Indonesia

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Abstract. Anna Z. 2018. *An analysis of capture fisheries resource depletion in Cirata Reservoir, West Java, Indonesia. Biodiversitas 19: 927-935.* Fisheries in public waters such as the Cirata Reservoir in West Java, Indonesia are potential economic resources that should not be ignored. They play an important role in food security for the surrounding communities. Unfortunately, natural capture fisheries in Cirata Reservoir have received less attention in the past than aquaculture which dominates economic activity in the waters. Recently, the condition of the dam has deteriorated as a result of major aquaculture activity with extensive use of artificial feedstock; an increase in industrial and domestic waste entering the waters; and open access fisheries management that has allegedly caused depletion of the natural fish resources of the waters. From time to time there have been observed declines in the natural capture fisheries production. The research reported in this paper aimed to estimate the extent of this depletion and associated economic depreciation of capture fish resources in the Cirata Reservoir. Bio-economic methods were used to calculate the potential sustainable utilization of the resources. The analytical model of Logistic Gordon-Schaefer (GS) and Fox models provided the framework for the analysis. The fish depletion was calculated by comparing the potential sustainable utilization and the value of the actual utilization, based on quarterly data for the years 2011 up to 2016. Depreciation was calculated in terms of unit rent loss as a result of the depletion. The analysis showed that depletion of fish resources occurred in certain quarters between years of 2011 to 2016. The value of the total depletion over this period for the GS model amounted to 835.13 tons with an estimated value for depreciation of IDR 5.93 Billion, or IDR 84.71 Billion in Present Value term. For Fox Model, the depletion reaches 1421.35 Ton, with a value of IDR 10.09 Billion, or 144.17 Billion in Present Value term. This value represents the economic loss due to depletion of the fisheries resource in Cirata Reservoir. The policy implication of this fish depletion is that there is a need for better management of the aquatic habitat, by reducing water pollution load, and by regulation of capture fisheries through input/output restrictions based on the conceptual tools of Maximum Sustainable Yield (MSY) and Maximum Economic Yield (MEY).

Keywords: Bio-economy, Cirata Reservoir fisheries, CYP, depletion, depreciation, Fox, Gompertz, Gordon-Schaefer, MEY, MSY

INTRODUCTION

Among the wide variety of aquatic habitats sustaining fish resources in Indonesia, artificial lakes and dams have particularly important economic potential for communities in West Java. Although the original construction of these reservoirs was for diverse socio-economic purposes such as generation of electricity, irrigation of agricultural lands, recreation, etc., the subsequent use of reservoirs, especially in West Jawa, has often been for the development of fisheries; natural capture fisheries, as well as aquaculture. The Cirata Reservoir in West Java, Indonesia is a particular example of this.

In general, it is rather uncommon for dam fisheries to provide a high economic contribution to local economics and to become the foundation of livelihoods for surrounding communities. This is more clearly observed in the case of natural capture fisheries rather than in aquaculture (Dirican 2014). Aquaculture, involving a fairly expensive investment, is a less desirable option for local communities, who have limited financial capacity. Rather, aquaculture is a more attractive option for investors from big cities who view the surrounding communities only as sources of labor in their aquaculture ventures. The natural

capture fishery is often the preferred option for communities around lakes/dams, because, in addition to representing a more modest financial investment, natural fisheries can also be a foundation for food security in the communities who often cannot afford to buy other foodstuffs. Thus, natural fishery activities are not only carried out for commercial purposes, but also for subsistence (Kyomuhendo 2002; Petr 2003; Trasande et al. 2010).

Fisheries such as in Cirata do not usually receive the attention and management care that aquaculture receives, because it is often perceived not to contribute as much to the wider economy as does aquaculture. Often local fisheries have to face negative externalities from various activities both on water and on land. This includes habitat destruction arising from pollution: by feedstock residues from the aquaculture industry; by wastes from industry in the vicinity; and by domestic waste. Another aspect that receives less attention than it deserves, is the management of the natural fishery activity itself. The unregulated management of the fishery often results in the waters being over-fished, and the fish-stock in the reservoirs being depleted beyond sustainable self-replacement levels.

To overcome these problems, structured research is needed regarding the condition of fishery resources in the