

# Water Quality and Loading of Pollutants from Shrimp Ponds during Harvesting

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**Abstract:** Shrimp aquaculture is an important source of revenue for the state of Sarawak, Malaysia. However, there were concerns on the impact of shrimp farming on the mangrove ecosystem due to the discharge of shrimp pond water to the surrounding environment and potential self-pollution through the intake of surrounding water for the shrimp ponds. Therefore, the objectives of this study were to determine the water quality of the harvesting pond water and quantify the pollutants loadings. Samplings were conducted in three ponds and three channels near the pond outflow in a commercial shrimp farm during complete draining of water at harvest. Results indicated that TSS and Chl-a were high in both the ponds and channels. Total ammonia-nitrogen was the predominant form of the inorganic nitrogen and the mean values in both the ponds and channels were more than 1 mg/L which exceeded the maximum recommended for fish. Therefore, the water quality of the ponds and channel indicate that pond effluent should not be discharged directly into the surrounding environment but treated and nutrients recovered. Loads of total suspended solids, BOD<sub>5</sub>, inorganic nitrogen, ammonia nitrogen, soluble reactive phosphorus and Chl-a of the effluent were quantified.

**Key words:** Shrimp aquaculture, household wastewater, water quality, river.

## 1. Introduction

Asia is the world's most populated place and as incomes increase, global demand of protein also increases [1]. Fisheries products are the world's most important source of protein but about two third of the major marine fisheries are fully exploited, overexploited, or depleted [2]. Therefore, aquaculture including shrimp culture is developing rapidly to meet

the demand. Furthermore, shrimp culture is an important aquaculture industry as it is a large foreign exchange earner for developing countries such as Malaysia [3]. Due to the relatively clean water and extensive coastline and high world market demand, Sarawak has developed into an important state for shrimp culture in Malaysia. However, there were concerns on the impact of shrimp farming on the mangrove ecosystems as intensive shrimp aquaculture has been reported to contribute nutrients and organic matter to coastal environment through regular water exchange and during full harvesting [4, 5]. A study of river sediment indicated that the station near shrimp farm recorded the highest organic carbon, phosphorus, nitrogen and oxygen demand [6]. Other than environmental degradation, polluted water could eventually lead to shrimp mortalities which occur when wastewater discharged is re-used as occurred in Taiwan [7] and other parts of Asia [5]. Due to the

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