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**A Comparison of Resources Usage for Two White-Leg Shrimp (*Penaeus vannamei*) Farming Systems (Earthen Pond System and Round Tank System)**

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**Abstract**

Shrimp farming plays an important role in providing nutritious food and generating livelihoods for many millions of people worldwide. Asia is the biggest producer of shrimp contributing nearly 80% of the global shrimp aquaculture production. Black tiger shrimp (*Penaeus monodon*) is the main brackish water aquaculture species in Sri Lanka before 2018. White-leg shrimp (*Penaeus vannamei*) was a new species that was introduced in 2018 expecting a rapid increase in production in the country. Shrimp farming is classified into several categories: extensive, semi-intensive, intensive, and super-intensive based on the intensity of management practices such as stocking density, supply of feed and fertilizer, and management of water qualities. The round tank system is round-shaped and is a type of lined pond that uses an impermeable geomembrane for the retention of water. It belongs to the super-intensive category. The earthen pond is a water body that is basically enclosed by the earth. It belongs to the intensive category. The purpose of this study was to assess the amounts of land, water, and energy required per ton of harvested shrimp in two different production systems and identify the most sustainable system that is used minimum natural resources. The round tank system is located in the Erukkalampiddy area in the Mannar district, Sri Lanka. The earthen pond system is located in the Maikkulama area in the Puttalam district, Sri Lanka. Data on water usage, electricity usage, land area usage, and weight of harvested shrimp were collected during two cycles of production from August 2021 to May 2022. The t-tests were performed to compare resource usages. Land usage of the earthen pond system (950.00 m<sup>2</sup>/t shrimp, 1266.67 m<sup>2</sup>/t shrimp) is significantly greater than the round tank system (190.77 m<sup>2</sup>/t shrimp, 139.33 m<sup>2</sup>/t shrimp). Water usage of the earthen pond system (950.00 m<sup>3</sup>/t shrimp, 1266.67 m<sup>3</sup>/t shrimp) is significantly greater than the round tank system (190.77 m<sup>3</sup>/t shrimp, 139.33 m<sup>3</sup>/t shrimp). Energy usage of the round tank system (473.84 kWh/t shrimp, 591.46 kWh/t shrimp) is significantly greater than the earthen pond system (119.91 kWh/t shrimp, 154.78 kWh/t shrimp). It concludes that less land and water resources and high energy usage are required for a round tank system compared to an earthen pond system. Although establishing a round tank system will need more capital, compared to that of an earthen pond system, it is evident that the round tanksystem is more environmentally sustainable.

**Keywords:** Shrimp farming, Round tank system, Earthen pond system, White-leg shrimp (*Penaeus vannamei*)