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The Zambian aquaculture supply chain: cages or ponds for sustainable growth?

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Abstract

A value chain analysis (including an environmental assessment component) of the Zambian aquaculture supply chain was performed to appraise the existing types of aquaculture systems, towards informing future development investments. The main types of culturing systems are land-based ponds and lake-based cages. The former type is represented by a vast majority of small-scale operations and a few large ones, while the latter is mainly represented by a handful of large scale operations, producing the bulk of aquaculture output. We performed a comparative LCA across system types and sizes, to determine their relative environmental impacts per unit of output (1 t of whole fish at farm gate). It was found that large lake-based cage systems more environmentally efficient than large extensive systems and the under-managed small pond systems, but less than well-managed small pond ones. Nonetheless, due to the sheer volume of their output, large cage systems are the main contributors to the impacts of the average produced tonne, despite the larger impacts of extensive and under-managed systems. In respond to the Zambian government's goal of expanding aquaculture production, in an environmentally respectful way, it could be suggested to improve the management of semi-subsistence small-scale pond systems, to match that of the commercial pond systems. Moreover, large lake-based systems are quite efficient, but their proliferation is constrained by lakeshore space and higher input demand than land-based systems.

Keywords: *cages; growth; ponds; supply chain; tilapia; Zambia*

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