



Tropentag, October 5-7, 2011, Bonn

“Development on the margin”

Life Cycle Assessment (LCA) of Different Fish Production Systems

BINIAM SAMUEL FITWI, CARSTEN SCHULZ

University of Kiel, Institute of Animal Breeding and Husbandry, Marine Aquaculture, Germany

Abstract

Concerns about the sustainability of aquaculture prompt efforts to develop tools to evaluate its eminent environmental impacts. Classical environmental assessments provide only a very narrow view of the overall environmental impacts of culture fish production, which also requires energy, fish feed, transportation, package materials and chemicals. Life Cycle Assessment (LCA) has been used to assess the potential impacts of aquaculture production through material and energy flows throughout the product's life cycle. The analysis was made in order to examine the contribution of the different production phases to the total environmental impacts and to compare the different production systems of typical trout production. The product studied was cultivated ungutted rainbow trout, and the functional unit was one tonne of ungutted rainbow trout at farm gate.

Inventory analysis was carried out according to ISO 14040: 1997 and ISO 14044:2006 standard. Intensive trout production consumed substantial amount of electricity during the grow-out cycle, and results of the contribution analysis reveal that the consumption of electricity is an important hot-spot in the life cycle of this system. The environmental performance of both extensive and intensive trout production was strongly influenced with the provision of feed, accounting for over 90 % and 68 % of impact categories considered, respectively. In general, however, the importance of feed as a hot-spot decreased as the direct energy inputs in the culture system increased. Further study is needed to identify alternative to reduce impacts of hot spots in the life cycle of the product.

Keywords: Aquaculture, Environmental Analysis, Life Cycle Assessment, sustainable development