FEASIBILITY OF SHRIMP AND TILAPIA POLY-CULTURE IN THE NORTH-WEST OF MEXICO WITH SPECIAL REFERENCE TO AN ECONOMIC STUDY OF A HYPOTHETICAL POLYCULTURE FARM

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Abstract

It has been suggested that poly-culture of tilapia and shrimp is a more stable production system compared to mono-culture of shrimp, which has recently been adversely affected by disease and pricing problems. The north-west of Mexico has good conditions for shrimp culture, which has developed rapidly from 8,000 tons in 1992 to 45,000 in 2002. Although shrimp aquaculture production in Mexico has recently increased annually, the industry has not escaped the problems caused by a general decline in world shrimp prices and the introduction of white spot syndrome. Farms have managed these problems by aiming for better prices through shrimp products with added value (principally larger harvest size sold as fresh processed shrimp), but have inevitably been operating with a lower sales income. To tackle disease problems farms have improved management practices to improve the culture environment and avoid periods of increased disease susceptibility. Tilapia-shrimp poly-culture has been proposed as a further practice that could help shrimp farms in Mexico.

The shrimp culture environment in north-west Mexico is tropical to sub-tropical, temperatures range from 16-36 degrees centigrade and salinity is generally full strength sea water 34ppt. Depending on the situation of the farm salinity can range between the extremes of 15 ppt during the rainy season (July-September) to 60 ppt or higher at the end of the dry season (May-June). These conditions indicate that a salinity tolerate strain such as the red hybrid with an *Oreochromis mossambicus* genetic component is required for poly-culture in the northwest Mexico. Tilapia culture in Mexico is dominated by fresh water production and no seed suppliers produce salinity tolerant red hybrids in large volumes. The feasibility of poly-culture would therefore depend on a change in strain by the tilapia seed producers, basically the purchase of new broodstock lines. This situation is feasible if the demand exists to cover the added costs to the seed producer.

In the present study, an economic analysis was made to assess a hypothetical 100 hectare semi-intensive shrimp farm, typical of Sinaloa, Mexico. Capital, operation costs, and revenues for the shrimp farm were obtained from primary sources in Sinaloa and adjusted to include tilapia in a poly-culture system. Tilapia data was obtained from CRSP reports from

Thailand, Philippines and Mexico. Added costs for poly-culture were minimal and included a nursery/post harvest tilapia facility and equipment for moving live fish. One annual growing cycle of 6 months was considered with respective shrimp and tilapia stocking densities of 15 and 0.5 organisms m^2, survivals of 60 and 70% and feed conversion ratios of 1.8 and 1.69. Feed was a major cost for both shrimp and tilapia contributing 20.9% and 55.4% respectively of production costs. The model showed that although, the inclusion of tilapia to give a poly-culture system could be achieved with few extra costs, the added revenue from tilapia sales equaled just 23% of the farms total revenue. Therefore, revenue from shrimp sales was far more important to the farms income. A sensitivity analysis of the model to changes in shrimp price (as in the world market) and reduced survival (shrimp disease problems) confirmed the importance of shrimp sales to the farms profitability and showed that tilapia incomes were not sufficient to maintain the farms profitability when income was reduced from shrimp sales.