TILAPIA PRODUCTION SYSTEMS IN CAGAYAN VALLEY: AN ANALYSIS OF PROFITABILITY AND TECHNICAL EFFICIENCY

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ABSTRACT

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This study evaluated the profitability and technical efficiency of tilapia hatchery, fishpond and floating net cage production systems in Cagayan Valley. Farm level data obtained from a survey of 380 people engaged in tilapia culture were used in the analysis.

Assessment of the farm budgets showed that the amount of capital investment per hectare of operation were PhP 97,328 for hatchery; PhP115,294 for fishpond culture; and PhP547,631 for floating net cage farming.

Financial analysis revealed that tilapia production in Cagayan Valley is highly profitable. The annual net incomes were computed to be PhP551,574, PhP211,121 and PhP1,817,167, respectively.

The calculated discounted profitability measures indicate the high investment potentials of the various tilapia production systems with benefit-cost ratios of 3.04, 1.54 and 1.40 for hatchery, fishpond and floating net cage systems, respectively. The internal rates of return were estimated in excess of 50 percent for all systems.

Production efficiency was also analyzed using the Cobb-Douglas production function model. Results showed that the four variables found to have significant effect on yield were broodfish size, stocking density, feeds, and labor. According to the present practice, tilapia farmers in Cagayan Valley are not utilizing these variables or inputs at their profit-optimizing levels. Marginal analysis shows that the yield from hatchery systems could be maximized if the broodfish size is reduced to about 154 grams per breeder. In the case of fishpond operation, farmers should reduce stocking density, although the optimum rate could not be calculated due to negative marginal productivity. On the other hand, feed utilization should be increased from the current level of 1.73 to 2.19 kg/m^2 per culture period, as well as labor use from 16.90 to 45.40 mandays/ha. per culture period. For fish cage operation, the estimated optimum rates for feeds and labor per culture period should be increased to 18.63 kg/m^2 and 113.40 mandays/ha., respectively.

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INTRODUCTION

The Aquaculture Industry: An Overview

Aquaculture literally means water cultivation. It comes from the Latin word *aqua* (which means *water*) and English word *culture,* and is defined as the cultivation of the natural produce of water as fish or shellfish (Britannica, 2001). Aquaculture is characterized as a technique of raising, not hunting or gathering, and therefore is more efficient in the use of time and effort.

Aquaculture can be undertaken on marginal land or land poorly suited for agriculture, and it utilizes fish which are efficient converters of feeds and of low-quality plant materials and wastes. It is the fastest-growing sectors in world food production.

The importance of aquaculture, in that it feeds a large percentage of the world's population and provide economic security for society, is increasingly well understood.

From an economic perspective, the expansion of aquaculture has been at least strong. Over the period 1985-1995, the value of production almost tripled, from US $14.2 thousand million to US $42.3 thousand million (Charles, 2002). Between 1990 and 1995, world aquaculture production expanded at an average annual rate of 11 percent (McGinn, 2001). Aquaculture contributes an average of 23 percent to aquatic production, and freshwater finfish make up 46 percent (Shelton 2002). The United Nations Food and Agriculture Organization (FAO) estimates that under favorable conditions, aquaculture could supply the world