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Rapid Economic Evaluation Tools

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Abstract

A demonstration of the first prototype of a rapid decision economic evaluation tool is presented. We performed an economic evaluation of two tilapia production technologies in Honduras as described by CRSP researchers: 1) chemical fertilization (CF) and 2) fertilization followed by supplemental feed (FSF). The demonstration's initial results agree with the Honduran results in that the FSF treatment has a higher net income than the CF treatment. In addition, results from our prototype program indicate that the FSF treatment is associated with a lower risk of losing money in the short run.

Introduction

Tilapia researchers could use a rapid decision economic evaluation tool to help examine the economic consequences of both experimental results and the design of experiments. We are in the process of developing such a tool and have produced a very preliminary first prototype of the software. The software will allow one to examine not only mean response of tilapia production systems as reflected in economic budgets but also the risk associated with them. A demonstration of some of the economic results, based on published work comparing two tilapia production technologies in Honduras, is shown.

Methods and Materials

Relevant literature on tilapia research activities performed in Honduras has been identified. Published research results have assisted in identifying key production, industry, and economic variables and in establishing a baseline production state to initiate the computer simulations. Interviews and consultations with tilapia experts with experience in Central America (T. Popma, B. Green, D. Teichert-Coddington, and T. Hanson), and particularly Honduras, have assisted in the identification of key component variables and the development of the decision tools.

We are currently developing the decision tool through the use of the software programs Microsoft Excel and @RISK to analyze risk consequences of the application of research results. In addition, we are investigating other software options such as SIMTOOLS. It is desirable that we use software that is readily available, affordable, and easy to use. We foresee a need for two distinct computer tools. The first computer tool will help researchers evaluate possible research outcomes *ex ante* an experiment, which may help in the experimental design phase. With the second tool, the researcher will be able to evaluate the economic consequences of *ex post* results of different experimental treatments.

We present results of the first prototype version of the software. It is important to point out that many improvements are anticipated, especially after in-country field validation. Results presented here will show some of the potential uses a rapid decision economic evaluation tool may provide. The degree to which the new tool will be integrated with POND© simulation software is now also under consideration.

For the purposes of illustrating initial results of the prototype, we used information contained in Green et al. (1994), in which two tilapia production technologies are compared across small- to medium-scale farms. The two technologies are chemical

Table 1. Mean, maximum, and minimum values of select financial variables of two tilapia technology production systems in Honduras based on Green et al. (1994). ($US1 = 5.40 Lps. [Lempiras], 1991)

Financial Variable	Technologies					
	Fertilizer + Feed			*Chemical Fertilization*		
	Min.	Mean	Max.	Min.	Mean	Max.
Variable Cost (Lps.)	2,713	2,773	2,836	2,303	2,469	2,601
Income above Variable Costs (Lps.)	220	1,141	2036	–307	323	1,017
Net Income (Lps.)	–473	447	1,342	–1,000	–371	324

Table 2. Mean, standard deviation, and probability of short-run losses of two tilapia production systems in Honduras based on Green et al. (1994). ($US1 = 5.40 Lps. [Lempiras], 1991)

Treatment/ Financial Variable	Mean	Standard Deviation	Probability of Obtaining Negative Value of Financial Variable (%)
FERTILIZER + FEED			
Income above Variable Costs (Lps.)	1,141	370	0
Net Income (Lps.)	447	370	10
CHEMICAL FERTILIZATION			
Income above Variable Costs (Lps.)	323	260	10
Net Income (Lps.)	–371	260	90

fertilization (CF) and fertilization followed by supplemental feed (FSF).

RESULTS

Results of the first run of the software prototype are presented in Tables 1 and 2. Table 1 presents the range of variation of income above variable costs and net income for the CF and FSF tilapia production systems presented in Green et al. (1994). Our initial results qualitatively agree with the original report in that the FSF treatment yields higher income above variable costs than the CF treatment. Quantitative differences in our results are a consequence of assumptions used in the software prototype. As we continue developing the prototype we expect these results to converge.

Table 2 presents the mean, standard deviation, and the probability of incurring losses from the examined technologies. This is an additional benefit of this methodology, as it allows us to examine not only mean response but also the risk of the production systems. In the initial results presented here, the FSF treatment not only has a higher mean response but also reduces the probability of losing money in the short run.

Refinements to the decision tool may change these results. For example, the incentive for supplemental feeding may be mitigated by availability or quality of feed. These results are presented only to demonstrate the technique's capabilities. In addition, this technique could be adapted for aquaculture under different conditions in other locations.

ANTICIPATED BENEFITS

The decision tool will be beneficial to aquaculture researchers and extension agents in judging economic incentives to adopt PD/A CRSP technologies. Of particular importance will be an appreciation for the additional risk that new technologies often encompass. This technique will not only provide economic estimates of the most likely outcomes for new users of PD/A CRSP technologies but also the likelihood and size of negative outcomes. Use by researchers *ex ante*, as they are developing treatments for investigation, has the potential of refining the new technology to address the source of economic risk. Also, new techniques could be categorized by extension agents as low-, medium-, or high-risk to let the potential new user appreciate possible future economic outcomes.

LITERATURE CITED

Green, B.W., D.R. Teichert-Coddington, and T.R. Hanson, 1994. Development of Semi-Intensive Aquacultural Technologies in Honduras. Research and Development Series, Number 39. International Center for Aquatic Environments, Auburn University, Auburn, Alabama, 48 pp.

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