

Staff Paper Series

AQUACULTURE SYSTEMS UNDER PRICE AND YIELD RISK

BY

**Stephen G. Holiman, Eric M. Thunberg,
and Richard N. Weldon**

Staff Paper SP91-18

April, 1991



FOOD AND RESOURCE ECONOMICS DEPARTMENT

Institute of Food and Agricultural Sciences

University of Florida

Gainesville, Florida 32611

**AQUACULTURE SYSTEMS UNDER PRICE
AND YIELD RISK**

BY

**Stephen G. Holiman, Eric M. Thunberg,
and Richard N. Weldon**

Staff Paper SP91-18

April, 1991

**Paper presented at Shellfish Farmers Association Clam and Oyster Farming Workshop IV,
Harbor Branch Oceanographic Institute, Fort Pierce, Florida, April 19-21, 1991.**

ECONOMIC ANALYSIS OF HARD CLAM AQUACULTURE SYSTEMS UNDER PRICE AND YIELD RISK

ABSTRACT

Hard clam aquaculture in Florida is a growing industry and continues to attract new investors. However, growth in the industry is hampered by inadequate information on the economic costs and returns of hard clam aquaculture investment and uncertainty regarding state submerged lands leasing policy. A Florida Sea Grant project has been funded to investigate these factors. The paper provides a general overview of that project and describes the data needs for project completion.

Keywords: hard clams, economics, risk, aquaculture, production

ECONOMIC ANALYSIS OF HARD CLAM AQUACULTURE SYSTEMS UNDER PRICE AND YIELD RISK

Introduction

Hard clam aquaculture in Florida, an industry virtually nonexistent as recently as 1985, has experienced rapid growth in recent years. Between 1987 and 1989 the number of active clam producers rose from 13 to 41 growers while sales increased from \$431,000 to \$1,031,000. Interest in clam aquaculture has remained high and additional new entrants and investment opportunities are likely in the future.

Impediments to further growth of the industry, however, have been identified through meetings with representatives of the hard clam aquaculture industry. While sufficient documentation of biological requirements and production techniques exists, current and prospective participants have indicated that they lack adequate economic cost and return information to make informed decisions. This issue has recently been addressed through the publication of a commercial hard clam economics manual. The manual, however, relies on general environmental and economic conditions that are representative of the South Atlantic region. Consequently, the production systems examined in the manual lack information specific to Florida conditions. The manual also does not address the inherent variability in clam prices and yields and thus is unable to provide an accurate assessment of the riskiness of clam aquaculture investment.

A second potential impediment to industry growth is the availability of suitable lease sites. Conflict has arisen over the use of public resources by private individuals. At issue

appears to be adequate compensation for private use of a public resource. The State's response to the questions of whether to allow leasing and what to charge has been to increase fees, redefine leases and alter the terms and conditions for obtaining and holding a lease. These changes have created an atmosphere of uncertainty in which active and prospective industry participants are potentially discouraged from making production and investment decisions.

In order to facilitate continued growth in the Florida hard clam industry these issues need to be addressed. Active and prospective growers and investors require information specific to Florida on the economic potential of specific production technologies and levels of integration. Investors and lenders require risk and return information in order to compare the merits of hard clam aquaculture to other investment opportunities. State policy makers need to know the industry can be expected to react to an atmosphere of regulatory uncertainty and how this affects the long term future of marine aquaculture in Florida.

Objectives

To address these issues a project has been designed in which a typical Florida hard clam production system will be modeled and examined with reference to the key areas of concern previously mentioned. Specific objectives of this project are:

1. To quantify the effects of price and yield risk on hard clam aquaculture profitability, choice of input mix, and organization of the firm.

Rationale: An informed investment decision relies not only on information about anticipated average returns but also on assessments of the variability of returns as product prices and yields fluctuate. The risk of operating in an environment of unknown product prices and yields influences scale of operation choices by clam producers and an understanding of the dynamics of producer response to this risk is important to prospective investors and lenders. The quantification of these effects is a necessary component in providing this information.

2. To quantify the potential economic costs and returns to risk reducing inputs.

Rationale: The utilization of specific inputs or the adoption of specific production processes and management procedures may allow the clam producers to reduce the variability of yields. Through the identification of the critical sources of risk in clam production and the quantification of their effects on clam profitability, prospective clam aquaculture investors will be assisted in designing a production system which reduces their investment risk. Active clam producers will also find this information useful in making input, labor and equipment decisions.

3. To quantify the effects on private investment strategies under conditions of uncertain leasing policy.

Rationale: Current dissatisfaction with both the availability of public lands for leasing and the determination of appropriate lease fees has created uncertainty over the tenure arrangements for these leases which, in turn, translate into altered investment strategies for clam production. The proposed research will quantify the economic effects on private investment strategies under conditions of uncertain leasing policy.

Beneficiaries

The information generated by this project is expected to be of use to current and prospective producers, potential investors and lenders, and State policy makers. Information on the economic return potential of various risk reducing inputs helps current producers make decisions to improve their production process thereby strengthening their economic potential.

Prospective growers will have access to more detailed information on the potential of various input combinations and levels of integration, thereby allowing them to make better informed decisions on what level of integration and which combination of production inputs is best suited to their particular situation.

Prospective growers as well as current producers who wish to expand their operations will be better prepared to obtain loans and financial backing through the use of the project results to compare the earnings potential of hard clam production with other investment opportunities. Lenders will be better able to assess the riskiness of loan requests and the likelihood of loan repayment.

Finally, State policy makers will have the opportunity to examine the effects of inconsistent short term legislation on the long term expectations and growth activities of the hard clam industry.

Data Requirements

In order to develop an accurate portrayal of hard clam production in Florida, correct and realistic information is required from active producers in the industry. While certain types of information such as input requirements and production costs can be constructed from research station data, there can be no substitute for actual field data. At a minimum, though, what is required from current producers to make the model a realistic portrayal of industry conditions are production records. Specifically needed are such things as seed quantities, mortality rates, periodic weight and size samplings and numbers of clams harvested. Final values used in the model will be an industry average representing a typical firm. The usefulness of the project results will be wholly dependent upon obtaining correct and complete information from individuals who currently are actively producing marketable clams.

Personnel

Co-Principal Investigators

Eric M. Thunberg
Assistant Professor
1170 McCarty Hall
University of Florida
Gainesville, FL 32611
(904)392-5054

Richard N. Weldon
Assistant Professor
1179 McCarty Hall
University of Florida
Gainesville, FL 32611
(904)392-1848

Stephen G. Holiman
Research Assistant
1170 McCarty Hall
University of Florida
Gainesville, FL 32611
(904)392-5054

Associate Investigators

Charles M. Adams
Associate Professor
Food and Resource Economics
1170 McCarty Hall
University of Florida
Gainesville, FL 32611
(904)392-5054

David E. Vaughan
Associate Scientist
Harbor Branch Oceanographic Institute
5600 Dixie Highway
Fort Pierce, FL 34946
(407)465-2446

