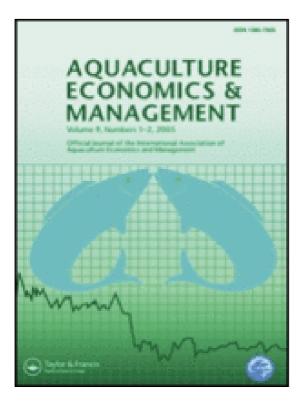


Economic Analysis of Offshore Aquaculture in Korea: A Financial Evaluation based on Rock Bream (*Oplegnathus fasciatus*) Production

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- Concerns & Problems of Coastal Aquaculture Production
- Objective of Study

II. Economic Analysis of Offshore Aquaculture

- Analytical Data, Method, and Results

III. Conclusion & Policy Implication



1. Introduction

Strengthening market competitions with imported farmed products

Many Concerns on Coastal (Inshore) Aquaculture Production Raising Restructure of Aquaculture Industry Need to establish the New Policy for Aquaculture Industry

NFRD

Farmer's conflicts around utilization of fish farms

Accelerating Environmental pollution in farming grounds

Lowering productivity

Reduction in farming incomes

1. Introduction

Interest is growing on Offshore Aquaculture Production

- Protecting environmental negative impacts and large-scale production system
- Establishing a new farm's utilization system
- Reorganizing aquaculture industry => Restructure fish farms
- Industrializing Offshore Aquaculture
 - Need to review on technical feasibility, institutional revision, economic analysis, etc.
 - Environmental gains may be offset by higher investment costs and greater risk



1. Introduction

A Pilot Project on Offshore Aquaculture Production in Jeju, Korea

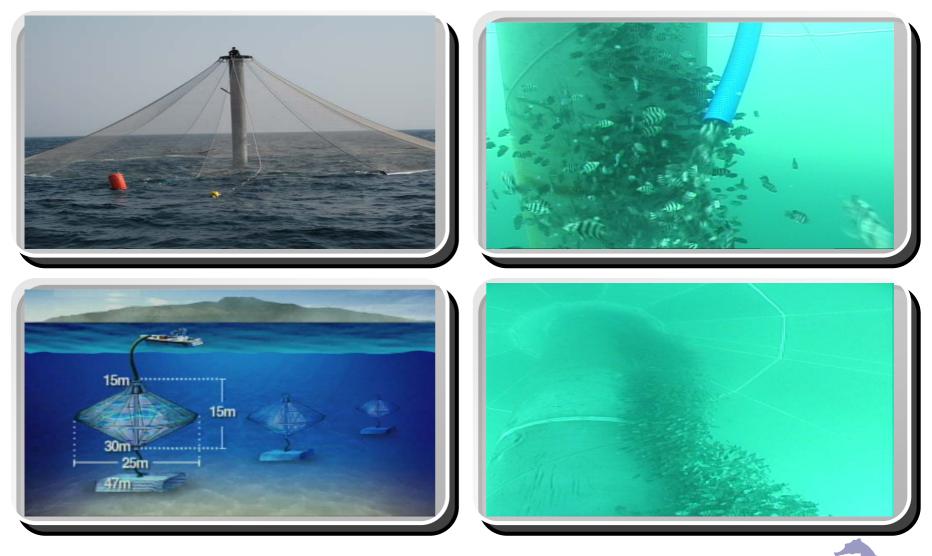
- Offshore pilot farming has started since 2005, targeting Rock bream
- The offshore cage system : the SeaStation 3000[™] (3 cages)
- The economic analysis with first-year data was accomplished

Developing Offshore Aquaculture

- Cages and target species has increased : 9 cages, targeting seabream, mackerel, etc.
- The economic analysis with second-year data (2005-2006) is under working



Offshore Aquaculture Cage





Objective of Study

- Aimed to evaluate the Economic Viability of Offshore Aquaculture, Pilot Project in Jeju Island, Korea
- Objective of Economic Analysis on Offshore Aquaculture Policy Project is to investigate its Economic Viability and to analyze Profitability according to changes of costs and returns



Providing **Policy Information** and **Implications** for Development of Offshore Aquaculture through the Economic Analysis

Analytical Method

Analyzing with biological and economic data from the actual performance

- A total of 400,000 fingerlings were stocked and 108 tons were produced
- Operating costs : fingerling (12%), feed(17%), labor(35%), depreciation (13%)
- Initial Investment costs : US\$673,208, including cages, nets, and diver equipments, etc.

Utilizing Monte Carlo model for Analyzing Offshore Farming

- Analyzing productivity and profitability (NPV & IRR) up to a 10-year time horizon
 Considering uncertainty on variables via Monte Carlo simulations
- Key parameters : survival rate, FCR, market weight, price



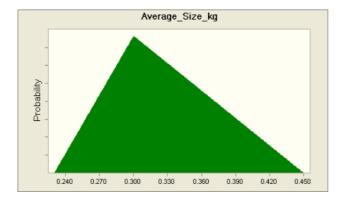
Parameter	Value	
Time to Market	17 months	
Initial Stocking	400,000 fingerlings	
Survival Rate	90%	
Feed Conversion Ratio (FCR)	1.35	
Average Market Size	300g	

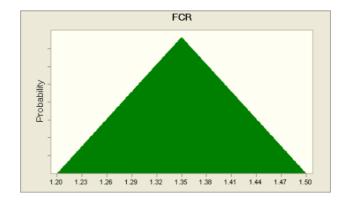
<Table. 2> Assumed uncertainty levels for variables

Variable	Mean	Minimum	Maximum
Survival Rate	<mark>90</mark> %	85%	9 5%
FCR	1.35	1.2	1.5
Market Size	0.3kg	0.23kg	0.45kg
Market Price	US\$20	US\$17	US\$25

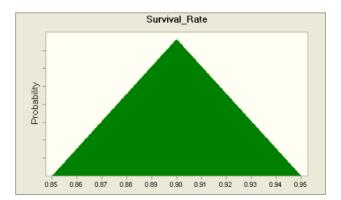


*Triangular Distributions were assumed (Taha, 1989; Valerrama and Engel, 2001)













<Table. 3> Economic Results of the Offshore Rock Bream Culture

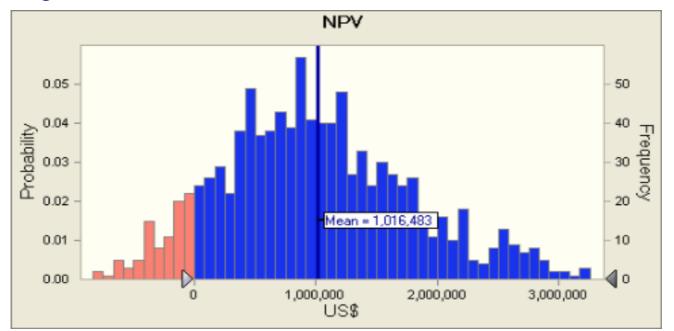
	Mean	Minimum	Maximum
NPV	US\$1,016,483	US\$-828,482	US\$4,000,911
IRR	21.8%	-	49.4%

NPV is calculated with 7.5% discount rate for a 10-year period

Uncertainty on parameters (survival rate, FCR, market price, etc.) are considered via Monte Carlo simulations

NFRD

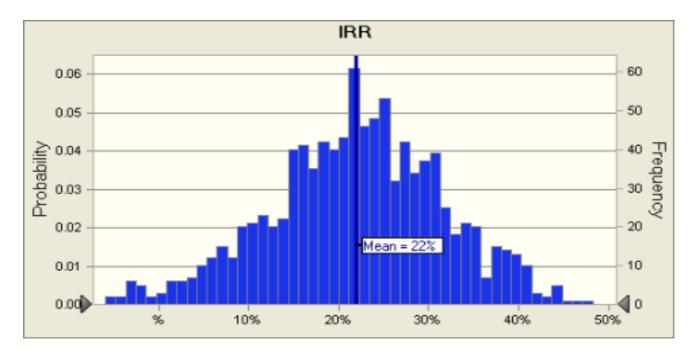
<Fig. 1> A Result of NPV



*Certainty Level is 90.8% from US\$0.00 to +Infinity

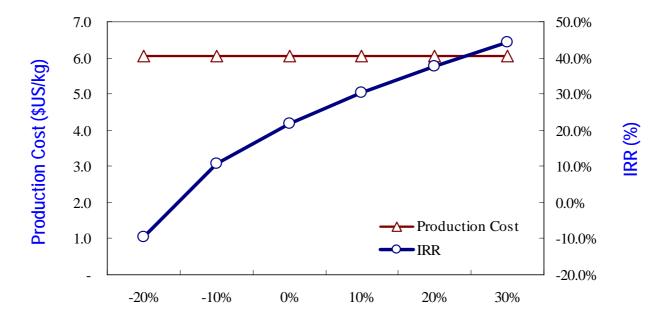


<Fig. 2> A Result of IRR





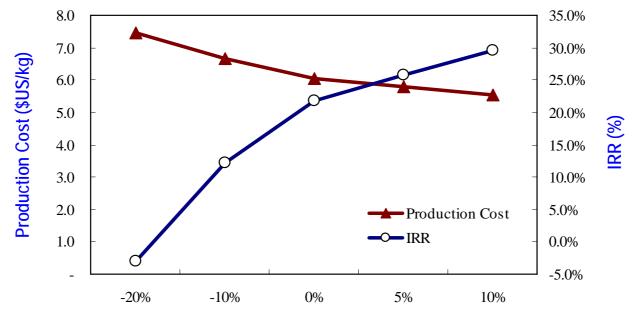
<Fig. 3> Results of Sensitivity Analysis on Market Prices



Market Price (% of Baseline)



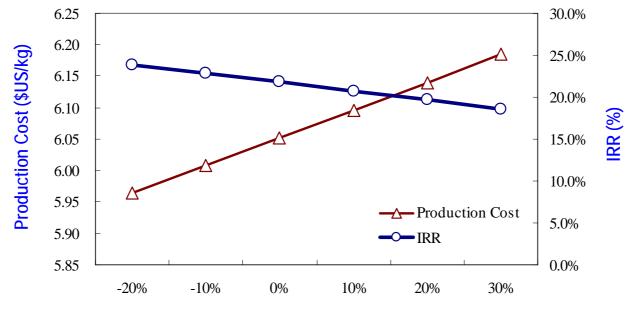
<Fig. 4> Results of Sensitivity Analysis on Survival Rates



Survival Rate (% of Baseline)



<Fig. 5> Results of Sensitivity Analysis on Feed Costs



Feed Costs (% of Baseline)



Conclusion & Policy Implications

Under ideal condition, offshore culture might be low risk and highly profitable

Reducing operating costs and farming period, and improving survival rates could make more profitable

Concerns on lowering profitability by reductions in price and survival rate

- Need to review carefully on installing sites and target species for the development of offshore culture
- More detailed analysis by Region for development
 - Need independent analysis of offshore cultures for expanding to the other regions
 - Need to investigate impacts on the marine environment and to compare to inshore cultures



Thank you for kind attention

*Any Questions on the Presentation,

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