

memorandum

DATE: April 16, 1986

REPLY TO
ATTN OF: Frank Pope, Evaluation Coordinator
USAID/Panama

SUBJECT: PES number 86/3
Managed Fish Production, 525-0216

TO: SER/MO/PM/P

PD. AAT-440
ISN = 45206

5250216

XD. AAT-440-A
ISN = 45207

Attached please find subject PES and attachments for distribution.

Part II consists of four pages; the project logical framework, and the subject economic study.

Please advise receipt by signing and dating the attached photocopy of this memorandum and return via pouch.

Your attention to this request is appreciated.

APR 29 3 11 PM '86
PERFORMANCE

memorandum

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Table 34. Value of Operator's Labor by Year and Enterprise

Year	Hogs		Chickens		Cattle		Ducks	
	Man-days	\$ ¹	Man-days	\$ ¹	Man-days	\$ ¹	Man-days	\$ ¹
1	44.5	95.68	48	103.20	61	131.15	37	79.55
2	101	217.15	108.5	233.28	134	288.10	86	184.90
3	121.5	261.22	135	290.25	158	339.70	114	245.10
4	129	277.35	135	290.25	158	339.70	114	245.10
5	93.5	201.02	108.5	233.28	134	288.10	86	184.90
6	129	277.35	135	290.25	158	339.70	114	245.10
7	121.5	261.22	135	290.25	158	339.70	114	245.10
8	101	217.15	108.5	233.28	134	288.10	86	184.90
9	121.5	261.22	135	290.25	158	339.70	114	245.10
10	129	277.35	135	290.25	158	339.70	114	245.10
11	93.5	201.02	108.5	233.28	134	288.10	86	184.90
12	129	277.35	135	290.25	158	339.70	114	245.10
13	121.5	261.22	135	290.25	158	339.70	114	245.10
14	101	217.15	108.5	233.28	134	288.10	86	184.90
15	121.5	261.22	135	290.25	158	339.70	114	245.10
16	129	277.35	135	290.25	158	339.70	114	245.10
17	93.5	201.02	108.5	233.28	134	228.10	86	184.90
18	129	277.35	135	290.25	158	399.70	114	245.10
19	121.5	261.22	135	290.25	158	399.70	114	245.10
20	101	217.15	108.5	233.28	134	288.10	86	184.90

¹\$2.15 per man-day.

Table 35. Rates of Return

Alternative	Without Operator's Labor		With Operator's Labor	
	B/. 0.40/lb	B/. 0.60/lb	B/. 0.40/lb	B/. 0.60/lb
<u>Fish Only</u>				
Fish-Chicken	14	24	6	16
Fish-Hogs	13	22	6	15
Fish-Ducks	23	38	17	31
Fish-Cattle	9	16	-1	7
<u>Integrated</u>				
Fish-Chicken	10	14	-23	-15
Fish-Hogs	6	11	1	7
Fish-Ducks	8	20	-12	3
Fish-Cattle	2	5	-2	1
<u>Livestock Only</u>				
Chickens	5	-	neg. returns	-
Hogs	-6	-	-7	-
Ducks	neg. returns	-	neg. returns	-
Cattle	-4	-	-10	-

CLASSIFICATION
PROJECT EVALUATION SUMMARY (PES) -- PART I

Report Symbol U-447

1. PROJECT TITLE Managed Fish Production			2. PROJECT NUMBER 525-0216	3. MISSION/AID/W OFFICE USAID/Panama
4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) <u>86/3</u>				
<input type="checkbox"/> REGULAR EVALUATION <input checked="" type="checkbox"/> SPECIAL EVALUATION				
5. KEY PROJECT IMPLEMENTATION DATES		6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent FY <u>81</u>	B. Final Obligation Expected FY <u>85</u>	C. Final Input Delivery FY <u>85</u>	A. Total \$ <u>1,142,000</u> B. U.S. \$ <u>1,142,000</u>	From (month/yr.) <u>June 1981</u> To (month/yr.) <u>January 1985</u>
			Date of Evaluation Review <u>January 14, 1986</u>	

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., program, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Continue to monitor activity at the control ponds in order to maintain the data base.	R. Pretto DINAAC	NA
2. Update the studies of: 1) program effectiveness; 2) consumption impact; 3) economic and financial viability in order to gain clearer conclusions.	R. Pretto DINAAC	12/88

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A. Continue Project Without Change

B. Change Project Design and/or
 Change Implementation Plan

C. Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

Donald Drga, Project Officer, AGR
 Celso Carbonell, Loan Officer, ODR
 Juan Belt, Mission Economist, ODP
 Frank Pope, Evaluation Coordinator, ODR

12. Mission/AID/W Office Director Approval

Signature: *Ronald D. Levin*

Typed Name: Ronald D. Levin

Date: 2/22/86

Managed Fish Production
Economic Analysis
Engle & Hatch
PES Part II

13. Summary

On September 12, 1980, the \$992,000 Managed Fish Production Grant Agreement was signed by USAID/Panama and the Government of Panama (GOP). On January 6, 1984 the PACD was extended to December 31, 1984 and the grant increased to \$1,142,000. The project supplemented GOP resources committed to fish farming research in order to implement a limited scale field test of fish pond technology. The purpose of this pilot project was to ascertain the viability of developing a full scale program as a means of improving the nutritional status of the rural poor. The implementing agency was the Dirección Nacional de Acuicultura (DINAAC) with technical support from the Auburn University Department of Fisheries and Allied Aquacultures.

In order to measure the achievement of purpose the project planned three studies: 1) a program effectiveness study to evaluate the social and administrative feasibility of the program; 2) a consumption impact study, and 3) an economic and financial analysis from the standpoint of participating families. The first two studies were completed in 1983 and 1984. The economic and financial study was first done under contract in August 1984 by a local firm. Although the research was complete and the financial work sound, the economic analysis was considered weak and no clear conclusions were obtainable. Following that study and using baseline data collected in the field, two more economic analyses were performed, one by Upton Hatch of Auburn University and the other by Carole Ruth Engle, a consultant under contract with the Interamerican Development Bank. Both studies were reviewed and commented on by mission personnel. Once again the conclusions of the analyses were not clear, and the Mission remained with doubts on their validity. Finally, in September 1985 Hatch and Engle, who were both working at Auburn University, produced the study summarized in this PES.

The findings of this and other studies indicate marginal economic benefits and complex administrative and social constraints to achieving technical self-sufficiency. No further USAID/Panama assistance in this specific area of aquaculture is planned at this time.

14. Methodology

The report is cumbersome, and thus it is difficult to review in detail. However, the general approach used to measure the returns to fish culture is correct. Analysis is performed using four combinations of fish with livestock (cattle, swine, chickens, ducks) and fish alone. The text goes into step by step detail of the methodology and data sources used.

Observations

In table 35, the results of the economic analysis are summarized. The net returns to livestock production are shown to be negative, and this is likely incorrect as these are activities in which farmers are presently engaged. Another flaw in the analysis is that it excludes technical assistance costs.

15. External Factors

The Panama Aquaculture Project was very complex. It involved placing a technology (aquaculture) in an area without any history or experience in the use of that technology. The project required a high degree of integration and coordination on the part of local people in the development and utilization of resources. For example, managing swine production so there is a continued availability of manure for the fish ponds, regulating harvest to guarantee the most efficient utilization of the fish stock and the natural food available in the pond, and managing water supply and storage to provide irrigation for vegetable gardens require considerable experience and understanding. Expecting the people in most of the villages in the project area to learn aquaculture technology, to integrate it with high intensity chicken or swine production and to learn to do this so they realize a high return on investment within two years is not realistic.

Economic analysis under optimum conditions is complex. Under the conditions of this project it was impossible. Determining meaningful costs and returns from the start-up phase of a complex, highly integrated rural development--food production project in a resource poor area should not have been attempted in an evaluation context. Records on start-up costs and returns provide good baseline information, but poor information for determining economic success or failure.

In 1983 the central provinces were seriously affected by the worst drought in 75 years. This lowered output in all livestock operations and weakened the validity of the data base.

16. Inputs

The study examines ponds under regular operating conditions and assumes the timely and complete provision of required inputs.

17. Outputs

Not discussed in the study.

18. Purpose

The purpose of this project - to verify the need for and feasibility of implementing a large scale managed fish program oriented toward increasing the nutritional status of poor rural families through the direct consumption of fish - was not established. At least two or three more years of research and extension work needs to be conducted basically for improving the production of the ponds and refining analysis techniques.

19. Goal/SubGoal

The sector goal is to improve the nutritional status of the rural poor. The specific program goal which will help to attain the sector goal is to expand the number and increase the productivity of fresh water fishponds in poor rural communities of Panama to directly provide an additional source of high-quality protein to community members. This study does not address goal achievement.

20. Beneficiaries

The study is focussed towards the analysis of economic benefit to individual families in resource poor rural communities.

The study broadens the original scope of the project purpose by examining the economic and financial benefits of integrating fish production with other livestock activities. This implies a goal of increasing overall farm income to produce a cash surplus which can be applied to the purchase of basic commodities. It also requires a slightly higher standard of living than the severely poor who were originally targetted by the project.

21. Unplanned Effects

Not discussed in the study.

22. Lessons Learned

The principal conclusion drawn from the study is that the integration of fish farming as a supplement to other livestock activities is a viable means of increasing net income, or as the study states, to lower the per pound cost of animal protein produced.

Fish production alone is only viable if the value of fish is relatively high (60 cents per pound), and if technical assistance is excluded as a cost.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: 1980 to FY 1983
From FY 1980 to FY 1983
Total U.S. Funding \$992,000
Date Prepared: September 1980

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

Project Title & Number: MANAGED FISH PRODUCTION 525-0216

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>Sector Goal:</p> <p>To improve the nutritional status of the rural poor.</p> <p>Program Goal:</p> <p>To establish a network of fresh-water fishponds in poor rural communities throughout Panama.</p>	<p>Measures of Goal Achievement:</p> <p>Within 5 years of projection completion 20,000 persons will increase their daily animal protein intake by 5 to 10 grams.</p> <p>Within 5 years of project completion 200 new continuous harvest fishponds are in operation throughout Panama.</p>	<p>Nutrition Surveys</p> <p>DINAAC Records</p>	<p>Assumptions for achieving goal targets:</p> <ol style="list-style-type: none"> 1. Protein intake increases as a result of managed fish production. 2. Other conditions affecting nutritional status of rural Panamanians do not negate positive impact of increase animal protein consumption. 1. Project findings justify implementation of a large scale managed fish production program. 2. Demonstration Ponds and extension activities result in "spin-off" ponds. 3. The GOP can finance a large scale activity -- perhaps with IDB fundings. 4. MIDA extension agents are not diverted entirely to other activities.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared: _____

Project Title & Number: MANAGED FISH PRODUCTION 525-0216

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose:</p> <p>To verify the need for and feasibility of a large scale managed fish production program</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <ol style="list-style-type: none"> 1. Information required for the decision has been collected and analyzed. 2. Protein deficiencies are observed. 3. Fish production is cost efficient and within the budgetary constraints of most rural Panamanian families. 4. MIDA extension (technology transfer agents) can effectively disseminate information on fish production to Panamanian campesinos. 	<p>Project Studies</p>	<p>Assumptions for achieving purpose:</p> <ol style="list-style-type: none"> 1. Results of studies can be extrapolated to other areas of Panama.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
From FY _____ to FY _____
Total U. S. Funding _____
Date Prepared: _____

AID 1920-26 (7-71)
SUPPLEMENT I

Project Title & Number: MANAGED FISH PRODUCTION 525-0216

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS			MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	Magnitude of Outputs:				Assumptions for achieving outputs:
	Year 1	Year 2 (Cumulative)	Year 3		
1. Demonstration Pond projects implemented	5	20	20	DINAAC and USAID/PANAMA records	1. Grant and counterpart funds are made available on a timely basis.
2. Hatchery expanded					
(a) Hatchery Ponds Built	40	40	40		2. Construction costs will not evaluate more than 10-15% per year.
(b) Laboratory equipped		1	1		
3. Project Studies completed					3. Adequate coordination is maintained between project studies team and regular DINAAC personnel including technology transfer agents.
(a) Consumption impact			1		
(b) Economic/financial			1		
(c) Program effectiveness			1		
4. Technical Assistance					
(Person-months technical assistance provided)	16	30	48		
5. Training (people trained)					
(a) In-country (short-term)	9	32	32		
(b) External (long-term)		1	1		
6. Technology transfer uni-operational	x	x	x		

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: MANAGED FISH PRODUCTION 525-0216

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS				MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs:	Implementation Target (Type and Quantity)					Assumptions for providing inputs:
<u>AID</u>	Year 1	Year 2	Year 3	Total		
1. Construction						
a. demonstration ponds	22,500	67,500	0	90,000		
b. hatchery ponds	95,000	0	0	95,000		
2. Equipment and materials						
a. vehicles (8)	98,000	0	0	98,000		
b. hatchery equipment		35,000		35,000		
c. other	14,000	13,000	14,000	51,000		
3. Technical Assistance (48 p-m)	137,500	184,000	90,500	422,000		
4. Training	6,000	27,000	20,000	53,000		
5. Project Studies Personnel	34,500	71,500	34,500	140,500		
6. Other	0	15,000	5,000	20,000		
<u>GOP</u>						
1. Construction						
a. demonstration ponds	5,000	15,000	0	20,000		
b. hatchery ponds	75,000	0	0	75,000		
2. Equipment and Materials						
a. hatchery equipment		50,000		50,000		
b. other	5,000	11,500	8,500	24,000		
3. Personnel	51,000	148,000	97,000	286,000		
4. Training	3,000	3,000	4,000	10,000		
5. Vehicle O & M	32,000	56,000	42,000	130,000		

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Auburn University

Auburn University, Alabama 36849-4201

College of Agriculture

Department of Fisheries
and Allied Aquacultures

International Center
for Aquaculture

October 23, 1985

Arrived
Oct 28, 1985
DDM.

Telephone (205) 826-4786
Telex 5106002392

United States of America

Donald Drga
USAID Mission
c/o American Embassy
Panama City, Panama

Dear Don:

Enclosed you will find a copy of the Engle/Hatch report dealing with the Economic Analysis of Integrated Agro-Aquaculture Systems in Panama.

In our view this report more accurately portrays the economic facts of life of this AID supported project than any of the earlier reports. If you would like to have additional copies of the report we will be pleased to make them available to you. If we do not hear from you about this we will presume that you will duplicate copies needed in the USAID.

Again, we really do appreciate your support on this project and perhaps I might have opportunity to meet you or some other AID Mission post in the future.

Sincerely yours,

D. D. Moss (aja)

D. D. Moss
Associate Director

DDM/aja

Enclosure: as stated

XD-AAT-940-A
15N = 45207

5250216

ECONOMIC ANALYSIS OF THE AGRO-AQUACULTURE MODULES
OF THE A.I.D.

"MANAGED FISH PRODUCTION PROJECT: PANAMA"

Carole Ruth Engle
Consultant

Inter-American Development Bank
Project No. BID/BNP/MIDA-Panama
No. 98-IC-PN

ECONOMIC ANALYSIS OF THE AGRO-AQUACULTURE MODULES
OF THE A.I.D.

"MANAGED FISH PRODUCTION PROJECT: PANAMA"

Since 1976, the Government of Panama has promoted the construction of freshwater fish ponds in many of the poor, rural areas of Panama. These areas are characterized by chronic malnutrition and deficiencies of certain essential amino acids that are normally obtained through consumption of animal protein (Agency for International Development 1979).

In 1980, the United States Agency for International Development initiated a project designed to develop a simple fish culture system emphasizing farmer self-sufficiency in fish seed production for either home consumption or sale (Lovshin and Pretto 1983). In order to minimize production costs and to maximize benefits to the community, the ponds were integrated with other types of livestock and agricultural enterprises (Schwartz et al. 1984).

Economic activity is based on the relatively unlimited desires and necessities of human beings. The resources available to satisfy these desires and needs are limited; these limited resources can be combined in different ways to produce a certain product. Different technologies exist to utilize resources to satisfy consumer wants and needs (Leftwich 1976).

The primary goal of economic activity is to provide the highest standard of living that the economy's resource base can provide (Leftwich 1976). This implies that technologies must be selected that

properly allocate scarce resources to achieve the greatest satisfaction of consumer wants and needs.

The basic human need among the target population was identified in this project as a need for a source of low-cost animal protein. A secondary consideration was the desire for increased cash income. The technology proposed for meeting these needs was the integration of fish ponds with other livestock enterprises coupled with on-farm production of tilapia seed.

Selection of Appropriate Economic Analyses for Project Evaluation

Economic analysis is often divided into microeconomic and macroeconomic analysis. Microeconomic analysis deals with the activity of individual economic units, in this case, the farm unit. Macroeconomic analysis deals with the economic system as a whole on either a regional or national level. In this case, the project's impact on the national economy, its contributions to socio-economic development, etc., are analyzed (McCoy 1974).

On the farm level, it is the farmer or group of farmers who make the decision whether or not to adopt a new technology or to abandon it. The farmer needs an adequate incentive in order to continue a project. The incentives in most agricultural projects of a subsistence nature include produce for home consumption by the family and increased income from the sale of produce (Gittinger 1983).

A production process is judged profitable or economically feasible if returns from the product exceed its cost of production (McCoy 1978). The principal analytical technique for assessing economic feasibility at

the farm level is budget analysis (McCoy 1978). Budget or costs and returns analysis involves evaluation of the resources utilized in production of a given commodity with costs charged to each resource. The annual enterprise budget presents a static image of the profitability of the enterprise at the farm level (McCoy 1978). The budget can be utilized as a tool for analyzing and comparing the financial viability of different productive activities under consideration from the farmer's point of view.

On the macroeconomic level, the impact of the project on the regional or national level is analyzed. Projects are generally designed according to development goals established by host governments and international funding agencies. For government-funded investment projects, therefore, the primary goal of evaluation is to compare the project with other projects designed to achieve the same developmental goal.

In the case of the A.I.D. "Managed Fish Production Project in Panama," the analysis should determine whether or not the agro-aquaculture modules were the best means of producing low-cost animal protein, providing additional income and increasing the welfare of the people in the targeted areas.

The analytical tool most often utilized to compare alternative government-funded projects is the rate of return on investment. This analysis is dynamic in the sense that it considers the stream of benefits and costs over the expected life of the project. Public officials generally utilize either socio-economic benefit-cost ratios and/or the social internal rate of return (Shang 1981) as measures of

project feasibility. It is important to note that development projects generally include indirect benefits in terms of sociological benefits and not merely cash income and expenditure (Gittinger 1983). The overall feasibility of an investment project must include: resource availability, environmental suitability, biological feasibility, market potential, economic feasibility and institutional feasibility. A weighted ranking system is often utilized for these factors to determine project feasibility (Shang 1981).

Clearly total project feasibility is complex to analyze with enormous data requirements. In the "Managed Fish Production Project," many of the modules have been in production less than a year. Horticultural activities are even more recent with a consequent reduction in data available. In such a short period of time, sociological and nutritional impact cannot be evaluated quantitatively, so as to calculate the social rate of return (Bruce 1976). Hence, conclusions on project feasibility at this point should be considered as tentative until sufficient data are available to properly evaluate returns to society.

The Analysis

To analyze the impact of integrating livestock with fish enterprises, each activity is first budgeted separately and then in association. In the case of fish, investment and production costs were estimated for fish alone by estimating the cost of collecting and transporting different types of manure to the fish pond. Investment and production costs were also budgeted for cattle, hog, chicken and duck

enterprises alone. Budgets were then prepared for the associations of cattle-fish, chicken-fish, duck-fish and hog-fish.

In addition to providing information on the respective profitabilities of the enterprises independently and in association with each other, this analysis provides the tools for calculating the cost of production of animal protein of each separate alternative.

On the macroeconomic level, financial and economic rates of return are calculated for the different livestock associations. Sensitivity analyses were also done to consider the impact of changes in the following variables: price of fish, number of hogs and ducks per hectare of water and application of a learning curve to both fish and hog production analyses.

The following data were collected directly from the projects: pond construction costs; hog, duck and cattle corral construction costs; fish, hog and duck production costs; and marketing costs and prices for fish, hogs and ducks. Investment, production and marketing costs for cattle and chicken were obtained through secondary data of the Department of Livestock Production of the Agriculture Development Ministry (MIDA 1983).

The average pond size and cost of the projects was used in all analyses. This eliminates the variation caused by varying pond construction costs for larger and smaller ponds.

It is important to note some inherent variation among the projects. The chicken and cattle enterprises were already established prior to construction of fish ponds. These were viable economic units independent of fish culture. The chickens were managed intensively for

commercial purposes and the cattle were managed also for commercial purposes on an extensive, range level of management. On the other hand, the hog and duck enterprises were initiated with the fish ponds. These production units were designed to accommodate fish production. Both ducks and hogs were managed on a semi-commercial scale but the lack of experience with these animals, the lack of established market channels and access to inputs introduced a bias when compared to the more traditional cattle and chicken enterprises.

Fish Alone

Capital Investment. Data were collected on expenses incurred during construction of the models. These data include costs of PVC pipe, materials and transportation of equipment and materials. Earth-moving costs were charged at B/.140.00 per tractor-hour. Labor utilized in construction was calculated in man-hours and later converted into man-days (by dividing by 8 hours daily work). This labor was supplied by the community in the majority of instances. In the economic analysis, a value of B/. 4.00 per man-day was utilized.

The average total area of water surface for the projects was 4,191 m², Table 1. The average total cost of pond construction was B / 2,970.05 with an average total cost per m² of B/. 0.70/m² and B/. 1.12/m² of grow-out. The average labor cost was B/. 135.08, earth-moving was B/. 1,932 and construction materials of B/. 594.60. This last item has an average estimated useful life of 20 years which results in an annual depreciation of B/. 29.73. Earth-moving contributed 50% of the total cost, labor 26%, materials 15% and

transportation 8%. Earth-moving costs were B/. 0.82 per cubic meter of earth moved. Earth-moving costs were recorded in machine-hours and included clearing the top soil, levelling and access roads.

A cinder block storage shed (12-15 m² area) was constructed at each project for storage of equipment and feed. The average total cost was B/. 448.43 with the cost of materials averaging B/. 364.70 and of labor, B . 83.73. The estimated useful life of the storage shed was estimated to be 20 years which results in an annual depreciation charge of B/. 51.73.

The management of the module system requires a seine for harvesting the brood, nursery, and pre-fattening ponds and to assist with the total harvests of the grow-out ponds. In the partial harvests, a 120-foot gill net is utilized. A 50-foot seine, 8-feet deep with 1/2-inch mesh would be sufficient for the small ponds and to finish the total harvests of the fattening pond. Other necessary equipment includes: dip nets, buckets and cages or live cars to hold the sexed fish. This equipment has a total cost of B/. 360.50 with an annual depreciation of B/. 66.02, Table 2.

The modular system of fish production includes on-farm tilapia seed production. Given that the farmer is primarily interested in grow-out and harvest, the analysis includes buying tilapia seed the first year. Broodstock are then selected from the first grow-out harvests to stock in the brood ponds. Future broodstock are obtained from the grow-out pond. The initial investment in tilapia stock is B/. 67.80, Table 2.

Production Costs. The pond is stocked with tilapias as the principal species, in polyculture with common carp, and the hybrid cross between the bighead and silver carp. The carp seed is purchased at the beginning of each production cycle at a cost of one cent per inch. With an average stocking size of 2 inches, each carp seed costs B/. 0.02, Table 3. The average transportation cost is B . 24.00 per trip.

The fish production cycle varied greatly between projects. The actual cycles were averaged to obtain the 18-month cycles utilized in the analysis. The first partial harvest was done at approximately 4 months after stocking the pond. Thereafter, the grow-out ponds were harvested monthly with gill nets. Annual costs were determined by multiplying the total costs per cycle by 0.67.

At the onset of each production cycle, the pond is fertilized with an inorganic fertilizer to stimulate the rapid development of natural food organisms in the pond. The fertilizer applied was 12-24-12 at a rate of 60 kg/ha.

Labor. In order to analyze the relative profitability of the fish production component alone, the value of the labor necessary to collect the manure and apply it to the pond was estimated. This analysis assumes that the livestock enterprise already exists on the farm but is not associated directly with the fish production unit.

Hog manure had the highest collection costs, B/. 182.48, Table 4. Duck and chicken manure costs were identical, B/. 136.88, with cattle manure costs being the lowest, B/. 117.00. Cattle manure was collected only 3 times per week whereas the other manures were collected daily.

The majority of the labor utilized in the modules was provided by the group that managed the project. Data on labor were recorded only during the construction phase and production labor was estimated.

In the 2-pond system, total annual labor was estimated to be 51.5 man-hours, Table 5, for fish production alone. In the 3-pond system, the labor is almost tripled because of sexing the fish to select males. In the 4-pond system, labor is greater yet, for the double sexing. The second sexing is less time consuming because a large percentage of males is selected in the first procedure.

Labor values were averaged to obtain a standardized value to compare the different types of livestock-fish associations. The low number of replicates of numbers of ponds per project precludes more rigorous analysis.

Yield and Return. Fish production data from the livestock-fish associations were utilized in the fish only budgets. The manure charged to the budgets was equivalent to the quantities of manure produced by the animals actually on the ponds in order to utilize that fish production data.

Fish production was calculated in units of kg/hectare/year in order to compare the different types of livestock-fish associations. The highest fish production, 3,460 kg/hectare/year was obtained in the duck-fish association. The lowest fish production, 1,699 kg/hectare/year, was produced in the cattle-fish association, while the hog-fish association produced 2,197 kg/hectare/year of fish. The

chicken-fish association resulted in fish production of 2,328 kg/hectare/year.

The value of the fish produced was estimated to be B/. 0.40 per pound. This is the actual sales price of the fish in the communities.

Fish produced with duck manure resulted in net returns to capital, land and management of B/. 529.10, Table 6. This was followed by B/. 264.42 with chicken manure, B/. 188.19 with hog manure and B/. 14.22 with cattle manure.

Hogs Alone

Capital Investment. The pigsties were constructed with concrete floors, cinder block walls, barbed wire and a zinc roof. A block storage shed (12-15 m²) was also constructed to store feed and equipment. The average total cost was B/. 1,159.92, Table 7.

Hog production requires several additional tools such as: picks, shovels, and a wheelbarrow to construct the pigsty. Their total cost is B/. 127.10 with an annual depreciation of B/. 125.50 (including the pigsty).

Production Costs. Hog production costs were analyzed based on a production unit of 20 animals. This was the average number of animals per average project size. Feeder pigs were purchased at an average weight of 30 pounds and an average price of B/. 1.205 per pound. Each feeder pig cost approximately B/. 36.15, Table 8.

The feeding regime varied greatly by project. Some projects fed starter, grower and fattening while other projects fed only grower and fattening. To standardize the analysis, the quantities of feed were

weighted according to the different prices in order to obtain a weighted average of the price of feed. This is the price applied in the analysis.

Theoretically, a hog production cycle is 120 days with 3 possible cycles of production per year. Nevertheless, the average hog production cycle of the hog-fish projects was 1.5 per year. This slow turnover was due to logistical problems of transportation and loan agreements. Per cycle production costs are multiplied by 1.5 to obtain annual costs.

Net returns to capital, land and management were B/ 175.70.

Cattle Alone

Capital Investment. The cattle corrals cost on the average, B/. 487.11, B/. 381.00 of which was the cost of materials for the concrete floor and B/. 106.00 for labor, Table 9. The estimated useful life was 5 years with an annual depreciation of B/. 76.22.

Cattle production also requires additional fencing and, in many instances, re-establishment of pasture. Total investment costs are B/. 1,520.11 with an annual depreciation of B/. 164.02, Table 9.

Production Costs. In the modular projects associated with cattle, the cattle enterprise was already established. For this reason, the only economic data collected were the construction and labor costs for the corral and collection of manure. The data included in the analysis are secondary and were obtained from the Departamento de Produccion Pecuaria of MIDA.

The analysis is based on a production unit of 20 head of cattle. This was the average number of cattle corraled at night to collect manure. Table 10 details the production costs.

The income from cattle production is based on a survival of 98%, an average weight of 900 pounds per head of cattle and a price of B/. 0.40 per pound, Table 10. Net returns to capital, land and management were B/. 791.90.

Ducks Alone

Capital Investment. The ducks were corraled in such a way as to have free access to a part of the pond. The duck corrals cost an average of B/. 610.30 with costs of materials B/. 540.30 and labor B/. 70.00, Table 11. The useful life was estimated to be 5 years with an annual depreciation of B/. 108.06.

Duck marketing required an investment in equipment that included a 55-gallon barrel for cleaning the ducks, tweezers for plucking, and a cooler for transporting processed ducks. Total cost was B/. 645.30 with an annual depreciation of B/. 122.56, Table 11.

Production Costs. The projects associated with ducks had an average of 150 ducks per project. This is the production unit utilized in the analysis.

Processing and marketing costs were B/. 772.66 per year, or B/. 0.91 per duck, Table 12. Stocking costs were only B/. 276.00 and feed costs were B/. 1,162.20. These costs are the actual costs recorded in the projects.

Duck production was 566.3 pounds per unit of 150 ducks. Mortality was 3.4% and average weight was 3.9 pounds per duck. The theoretical production cycle is 11 weeks. However, the projects achieved only 2 cycles per year. Net returns to capital, land and management were negative, B/. -345.90.

Chickens Alone

Capital Investment. Chicken production units were already functioning when the modules were built. Investment costs were estimated for a unit of 2,000 chickens. The projects with chickens had several units of this size and always had extra manure. Capital investment includes construction of the chicken house, well drilling, pump installation, reserve tanks, labor, feeders and waterers. Total investment cost is B/. 6,341.70 with annual depreciation of B/. 698.17. Table 13.

Production Costs. Chicken production costs were estimated from secondary data obtained from the Department of Livestock Production. Theoretically, 4 cycles of chicken could be produced per year. However, as the hogs and ducks only achieved half of what is theoretically possible, the chickens were also analyzed on the basis of 2 production cycles per year. Net returns to capital, land and management were B/. 858.14, Table 14.

Livestock-Fish Associations

Integration of livestock with fish provides certain economies of scale. The storage shed for animal feed can be used for hanging up

seines and other nets. The same buckets used for feeding swine can be used for harvesting fish. The hog manure is utilized as a fertilizer for fish production and the pond is a sanitary means of waste disposal of the manure. Cleaning the pigsty and fertilizing the fish pond is the same task in integrated systems and economizes labor. The integrated systems were analyzed as a whole to avoid subjective considerations in allocating use of capital items to different components of the system. These results are then compared directly to the analyses of the activities as independent enterprises.

Hog-Fish Association. The total investment cost of the integrated hog-fish system is B/. 4,417.22 with an annual depreciation of B/. 215.27, Table 15. Annual production costs are B/. 3,462.68 with net returns to capital, land and management of B/. 564.31.

Chicken-Fish Association. The total cash investment is B/. 9,969.70, Table 16, with an annual depreciation of B/. 812.18. The annual total costs are B/. 6,972.00 with net returns to capital, land and management of B/. 1,259.44, Table 16.

Cattle-Fish Association. The total cash investment is B/. 5,148.11 with an annual depreciation of B/. 278.03, Table 17. The total annual costs are B/. 6,191.12 with total net returns to capital, land and management of B/. 923.13, Table 17.

Duck-Fish Association. The cash investment was B/. 4,273.30 with annual depreciation of B/. 236.57, Table 18. The total annual costs are

B/. 2,119.86, Table 18. Net returns to capital, land and management are B/. 320.08.

Production Costs per Pound of Meat Produced. Given that the initial goal of the project was to produce animal protein at a low cost, the cost of production of the different types of meat produced was calculated for the alternatives considered. The quantity of meat produced in each integrated system was added to the fish production (all in live weight) and this number divided into the total annual cost for each respective system.

The costs per pound of meat varied between B/. 0.14/lb of fish (with duck manure) to B/. 1.75/lb of duck meat, Table 19. Fish meat produced without integrating animals always was cheaper than the other meats considered. Upon integrating the livestock operations with fish, the cost per pound of meat was lowered in every case. In the case of hogs, for example, pork production alone had a production cost of B/. 0.98 per pound but when fish were integrated with hogs, the cost dropped to B/. 0.74 per pound.

Summary of Budget Analysis. Budget analysis indicates the general profitability of a productive activity by comparing the average costs and returns in a given year. Comparing the different alternatives considered, the alternative "chicken-fish" yielded the highest net return to capital, land and management, B/. 1,259.44, Table 20. The least profitable was fish raised alone with cattle manure, B/. 14.22. Only one activity, duck production alone, was not profitable.

Internal Rate of Return

The internal rate of return is a useful tool for comparing the efficiency of the use of the capital invested by the government or international funding agency in different projects throughout the life of the projects. Financial and economic rates of return were analyzed for the 4 different types of livestock associations. For the financial analysis, interest was charged at the 9% level charged by the Agricultural Development Bank in the project.

Tables 21, 22, 23 and 24 present the stream of incremental net benefits for a 20-year period. In the first year, the first 6 months are devoted to construction. The fish and other animals are stocked on July 1. The only income would be from 2 partial harvests of fish (November and December) and one cycle each of ducks and chickens. Hogs and cattle would not be marketed until the second year.

The first total harvest of fish is December of the second year. Two harvests of hogs, ducks and chickens are achieved the second year and one of cattle. The feed for each cycle of hogs, ducks and chickens is purchased at one time to economize on transportation and is stored in the storage shed.

As labor is provided by the community, it is not charged in the financial analysis. Rather, the returns are returns to the management who also provide the labor. Table 25 details the labor charged in the economic analysis.

Sensitivity Analyses. The above analyses were made on raw data as recorded in the projects. The only exceptions were the chicken and cattle enterprises where estimates were utilized.

Sensitivity analyses were conducted with the variables of price, number of animals per hectare of water and number of cycles of hogs per year.

Fish were sold in the communities at B/. 0.40 per pound. Nevertheless, there are fish vendors who sell fish in the same communities at B/. 1.00 per pound. Without adequate market information, the equilibrium price of fresh fish is not known. However, in this analysis, a price of B/. 0.60 per pound was tested, Table 26.

A learning curve was also applied in which the number of hog cycles per year was gradually increased to 2 and a consequent increase in fish production was assumed. Fish production was assumed to increase by 15% the first four years to arrive at an annual average production of 4,500 kg/hectare/year, Table 27.

Utilizing data from the literature, tests were run with 112 hogs per hectare which, according to Hopkins et al. (1980) would produce 2,338 pounds of tilapia and carp on the average (for 2,657 m² of grow-out), Table 28. Cruz and Shehadeh (1980) analyzed the production of tilapia with duck manure from 750 ducks per hectare. The yield is translated into 5,207 pounds of fish per average project grow-out pond, Table 29.

Results of the Rate of Return Analyses. The "duck-fish" alternative yielded the highest rates of return followed by "chicken-fish," Table 30. Increasing the price of fish, of course, increased the rates of return, but it is interesting to note that the alternatives "duck-fish" and "hog-fish" were much more sensitive to changes in price than the other alternatives.

Application of the learning curve yielded increases in the rates of return, and increasing the numbers of hogs and ducks per hectare of water more than doubled the rates of return. Indications are that the "hog-fish" alternative was managed at an economically inefficient level and that the capital invested in infrastructure of pigsties was underutilized.

Conclusions

Of the animal protein alternatives considered, four of the five least cost sources involved fish production. Values ranged from B/. 0.14 to B/. 0.25 per pound for the three least-cost fish alternatives. Integration of fish production with other types of livestock production consistently lowered the cost per pound of animal protein production.

The budget analyses indicate that integrated systems in isolated rural areas are economically viable for the farmer. The chicken-fish alternative yielded highest net returns. Integration of fish culture with other livestock enterprises increased net returns in every instance. The "duck-fish" and "chicken-fish" alternatives also yielded the highest rates of return on investment.

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Table 1. Construction Costs and Surface Area of A.I.D. Modular Ponds by Project

Name of Project	Total Area (m ²)	Grow-out Area (m ²)	Construction Materiales (B/)	Earth Moving- (B/.)	Labor (B/. 4.00 per Man-Day)	Transportation (B/.)	Total (B/.)
Cascajal	3,690	2,500	626.12	1,400	112.50		
Chumical	2,580	1,980	957.65	1,800	184.50	400	2,538.62
Pedregoso	2,205	1,805	329.47	1,404	92.50	350	3,292.15
Los Higos	3,969	3,423	610.33	2,040	136.50	350	2,175.97
Guayabito	3,350	2,071	514.29	2,475	142.50	250	3,036.83
Espavecito	4,802	4,051	526.91	2,655	168.00	250	3,381.79
Remedios	16,675	4,118	564.72	2,940	219.00	400	3,749.91
Bayano	4,890	3,966	511.00	1,800	140.00	300	4,023.72
La Miel	3,314	2,655	727.93	1,920	105.00	400	2,851.00
Montañita	3,940	3,128	754.30	2,160	120.00	300	3,052.93
La Arena	2,075	1,845	712.36	1,040	99.00	300	3,334.30
Majarilla	9,209	3,010	542.05	3,400	127.50	300	2,151.36
Mata Palo	2,808	2,450	234.57	1,755	204.75	200	4,269.55
Las Trancas	3,317	3,029	564.63	1,600	120.00	300	2,494.32
El Barrero	2,180	1,900	544.35	1,760	106.00	400	2,684.63
La Pitaloza	2,000	1,478	664.44	1,600	100.00	200	2,610.35
Mogollon	2,604	2,000	730.05	2,240	136.50	500	2,864.44
Las Fuentes	4,310	3,570	621.50	1,908	126.12	400	3,306.55
Pino del Cobre	1,700	1,500	560.70	1,020	126.12	100	2,755.62
					126.12	150	1,856.82
Total	79,627	50,479	11,297.37	36,717	2,566.49	5,850	56,430.86
Average	4,191	2,657	594.60	1,932	135.08	308	2,970.05

Average Cost/m² Total = B/. 0.71/m²

Average Cost/m² Grow-out = B/. 1.12/m²

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Table 2. Investment Costs for Fish Production (Grow-out Area = 2,657 m²)

Item	Description	Unit	Cost/Unit B/.	Quantity	Total Cost B/.	Useful Life	Annual Depreciation B/.
<u>Ponds</u>							
Earth-moving		Tractor-hour	40.00	48.30	1,932.00		
Materials	pipes, PVC, acces.	total	595.00	1.00	595.00	20	29.75
Transportation		total	308.00	1.00	308.00		
Subtotal					2,835.00		
<u>Storage Shed</u>							
Materials	cement, wood, roofing	total	364.70	1.00	364.70	20	18.24
<u>Equipment</u>							
Seine	50 ft, 6 ft wide, 1/2-in mesh with bag	c/u	192.00	1.00	192.00	5	38.40
Gill net	120 ft long, 8 ft wide, 1 1/2-in mesh	c/u	125.00	1.00	125.00	8	15.62
Dip net	large	c/u	15.00	1.00	15.00	10	1.50
Buckets		c/u	3.00	2.00	6.00	1	6.00
Live cars		c/u	7.50	3.00	22.50	5	4.50
Subtotal					360.50		66.02
<u>Broodstock</u>							
Tilapia		c/u	0.02	3,390.00 ^{1/}	67.80		2/
TOTAL					3,628.00		114.01

¹ Stocked at the equivalent of 11,463 that the project averaged.

² Tilapia seed is an initial start-up cost. Broodstock are then selected from the females to be discarded after sexing. Hence, there is no depreciation.

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Table 3. Annual Costs of Seed and Inorganic Fertilizer for Fish Production

Item	Description	Unit	Cost/Unit B/.	Quantity	Cost/Cycle ¹ B/.	Yearly Cost B/.
<u>Seed</u>						
Common carp		c/u	0.02 ²	120 ³	2.40	
Hybrid carp	silver x bighead	c/u	0.02 ²	385 ⁴	7.70	
Transportation		trip	24.00	1	24.00	
Subtotal					34.10	22.73
<u>Fertilizer</u>						
Inorganic	12-24-12 (60 kg/ha)	cwt	17.125	0.55 ⁵	9.42	6.28
TOTAL					43.52	29.01

¹A production cycle is 18 months.

²The hatchery charges B/. 0.01 per inch of fingerling and distribute fingerlings of 2 inches in size.

³Stocked at the equivalent of 450/ha, the average stocking density in the projects.

⁴Stocked at the equivalent of 1,450/ha, the average stocking density in the projects.

⁵Total average water surface area (including brood, nursery and grow-out ponds) is 4,191 m² or 0.4191 ha fertilized at 60 kg/ha.

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Table 4. Yearly Quantity and Value of Manure Collection, Transportation and Application (Fish Production Alone)

Animal	Hours Daily hr	Hours Yearly hr	Man-Days ¹ No	Value of Man-Day W/ .	Total Value W/..
Hogs	1.00	365.00	45.62	4.00	182.48
Cattle	1.50	234.00 ²	29.25	4.00	117.00
Ducks	0.75	273.75	34.22	4.00	136.88
Chickens	0.75	273.75	34.22	4.00	136.88

¹A man-day is equivalent to 8 hours.

²Cattle manure is collected only 3 days per week.

Table 5. Yearly Value of Labor Utilized in Fish Production by Number of Ponds in System

System	Man-hours						Total	Man-Days	Value of Man-Day B/.	Total Cost B/.
	Brood		Nursery	Pre-Grow-out	Grow-out ¹					
	Stocking	Harvest	Harvest & Sexing	Harvest & Sexing	Partial Harvest	Total Harvest				
Two Ponds										
Per Cycle	0.5	6			2	20				
Yearly	1.5	18			18.67 ²	13.33	51.5	6.44	4.00	25.76
Three Ponds										
Per Cycle	0.5	6	32		2	20				
Yearly	1.5	18	96		18.67	13.33	147.5	18.44	4.00	73.76
Four Ponds										
Per Cycle	0.5	6	32	12	2	20				
Yearly	1.5	18	96	36	18.67	13.33	183.5	22.94	4.00	91.76

¹18-month cycle.

²Partial harvests are initiated the fourth month after stocking for 14 months at which time grow-out pond is totally harvested. $12[(2 \cdot 14) \div 18] = 18.67$

Table 6. Annual Net Returns to Capital, Land and Management for Fish Production Alone Fertilized with Different Manures (Grow-out Area = 2,657 m²)

Manure Source	Fish Production kg	Sales Price Fish B/./kg	Gross Returns B/.	Annual Fixed Costs B/.	Variable Costs			Total Annual Costs B/.	Net Returns to Capital, Land and Management B/.
					Seed B/.	Manure B/.	Total B/.		
Hogs	583.74	0.88	513.69	114.01	29.01	182.48	211.48	325.50	188.19
Cattle	311.67	0.88	274.25	114.01	29.01	117.00	146.01	260.02	14.22
Ducks	919.32	0.88	809.00	114.01	29.01	136.88	165.89	279.90	529.10
Chickens	618.55	0.88	544.32	114.01	29.01	136.88	165.89	279.90	264.42

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Table 7. Investment Costs for Hog Production (Unit of 20 Feeder Pigs)

Item	Description	Unit	Cost/Unit B/.	Quantity	Total Cost B/.	Useful Life yr	Annual Depreciation B/.
<u>Pigsty</u>							
Materials	barbed wire, concrete floor, cinder block walls	total	662.12	1	662.12	10	66.21
<u>Equipment</u>							
Buckets		c/u	3.00	2	6.00	1	6.00
Storage Shed	materials	total	364.70	1	364.70	20	18.24
Shovels		c/u	6.65	2	13.30	2	6.65
Picks		c/u	9.40	2	18.80	2	9.40
Wheelbarrow		c/u	95.00	1	95.00	5	19.00
TOTAL					1,159.92		125.50

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Table 8. Annual Costs and Returns for Hog Production (Unit of 20 Hogs, 1.5 Cycles per Year)

Item	Description	Unit	Cost/Unit B/.	Quantity	Total Cost B/.
<u>Returns</u>					
Hogs	Average weight of 115.9 lbs, average price Bl. 1.031/lb	hog	119.50	29.4 ¹	3,513.30
<u>Costs</u>					
Fixed					
	Annual Depreciation				125.50
Variable					
Feeder Pigs	Average weight of 30 lbs, average price of Bl. 1.205/lb	hog	36.15	30	1,084.50
Feed	Grower and fattening	cwt	12.50	135	1,687.50
Medication		hog	2.01	30	60.30
Transportation	For animals and feed	total			193.50
Taxes	Slaughtering and municipal	hog	4.42	30	132.60
Insurance		hog	2.00	30	60.00
Interest (9%)					58.20
Total Annual Costs					3,337.60
Annual Net Returns to Capital, Land and Management					175.70

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Table 9. Investment Costs for Cattle Production (Unit of 20 Stockers)

Item	Description	Unit	Cost/Unit B/.	Quantity	Total Cost B/.	Useful Life yr	Annual Depreciation B/.
<u>Fences (3 km)¹</u>							
Live stakes		c/u	0.25	1,200	300.00	-	-
Barbed wire		roll	31.25	12	375.00	5	75.00
Staples	50-pound box	box	32.00	2	64.00	5	12.80
Transportation ²		total			20.00	-	-
Subtotal					759.00	-	87.80
<u>Corral³</u>		total			381.00	5	76.22
<u>Pasture Improvement</u>							
Seed		cwt	6.00	60	360.00	-	-
Transportation		total			20.00	-	-
Subtotal					380.00	-	-
TOTAL					1,520.11		164.02

¹The majority of the farms had fences established. These costs are fence improvements.

²The farm is assumed to be 30 km from source of supply.

³Average construction costs in the projects.

Table 10. Annual Costs and Returns for Cattle Production (Unit of 20 Stockers)

Item	Description	Unit	Cost/Unit \$.	Quantity	Total Cost \$.
<u>Returns</u>					
Stockers		pound	0.40	17,100 ¹	6,840.00
<u>Costs</u>					
Fixed					164.02
Variable					
29	Stocker calves	c/u	250.00	20	5,000.00
	Deparasitization	total	-		100.00
	Mineralized salt	cwt	14.90	3.2	54.08
	Urea	gal	0.25	400	100.00
	Insurance	head	7.50	20	150.00
	Transportation	head	12.00	40	480.00
	Subtotal				5,884.08
Total Annual Costs					6,048.10
Annual Net Returns to Capital, Land and Management					791.90

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Table 11. Investment Costs of Duck Production (Unit of 150 Ducks)

Item	Description	Unit	Cost/Unit B/.	Quantity	Total Cost B/.	Useful Life yr	Annual Depreciation B/.
<u>Corral</u>							
Materials		total	540.30	1	540.30	5	108.06
<u>Marketing</u>							
Drum	55 gallon	c/u	10.00	2	20.00	4	5.00
Tweezers		total	10.00	1	10.00	5	2.00
Cooler		c/u	75.00	1	75.00	10	7.50
TOTAL					645.30		122.56

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Table 12. Annual Costs and Returns from Duck Production (Unit of 150 Ducks, 2 Cycles per Year)

Item	Description	Unit	Cost/Unit R/ .	Quantity	Total Cost R/ .
<u>Returns</u>					
Ducks		lb	1.44	1,132.6 ¹	1,630.94
<u>Costs</u>					
Fixed					
	Annual Depreciation				122.56
Variable					
	Ducklings	c/u	0.92	300	276.00
	Feed	cwt	14.90	78	1,162.20
	Marketing	total	136.33	2	272.66
	Transportation				109.72
	Interest				33.70
Total Annual Costs					1,976.84
Annual Net Returns to Capital, Land and Management					-345.90

¹300 ducks with 96.8% survival at an average weight of 3.9 pounds per duck.

Table 13. Investment Costs for Chicken Production (Unit of 2,000 Chickens)

Item	Description	Unit	Cost/Unit B/.	Quantity	Total Cost B/.	Useful Life yr	Annual Depreciation B/.
Construction	chicken house				3,871.70	10	387.17
Well and Pump		c/u	1,800.00	1	1,800.00	10	180.00
Reserve Tanks					300.00	10	30.00
Waterers	gallon automatic	c/u	3.00	20	60.00	2	30.00
					280.00	5	56.00
Feeders					30.00	2	15.00
TOTAL					6,341.70		698.17

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Table 14. Annual Costs and Returns to Chicken Production (unit of 2,000 chickens, two cycles per year)

Item	Unit	Cost/Unit B/.	Quantity	Total Value or Cost B/.
Returns				
Chickens	lb	0.53	14,504 ¹	7,687.12
Costs				
Fixed				698.17
Variables				
Chicks	each	0.24	4,000	960.00
Vaccinations				
Chicken Pox	bottle	2.75	8	22.00
New Castle	bottle	2.35	8	18.80
Deparasitation	lb	4.50	4	18.00
Vitamins	packet	2.85	8	22.80
Feed				
Starter	cwt	15.35	100	1,535.00
Finisher	cwt	14.55	220	3,201.00
Maintenance	total			11.21
Bedding	sack	0.25	200	50.00
Disinfectant	bottle	1.00	16	16.00
Cloth	yard	0.50	200	100.00
Transportation				176.00
Total Variable Costs				6,130.81
Total Annual Costs				6,828.98
Annual Net Returns to Capital, Land and Management				853.14

¹ Average weight of 3.7 pounds

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Table 15. Annual Costs and Returns for Hog-Fish Production

Item	Total Value or Cost B/.	Annual Depreciation B/.
Annual Returns		
Fish	513.69	
Hogs	3,513.30	
Total Annual Returns	4,026.99	
Costs		
Fixed		
Pond	2,835.00	29.75
Storage Shed	364.70	18.24
Broodstock	67.80	-
Pigsty	662.12	66.21
Equipment	487.60	101.07
Subtotal	4,417.22	215.27
Variable		
Fish Seed	22.73	
Feeder Pigs	1,084.50	
Fertilizer	6.28	
Feed	1,687.50	
Medication	60.30	
Insurance	60.00	
Transportation	193.50	
Taxes	132.60	
Subtotal	3,247.41	
Total Annual Costs	3,462.68	
Annual Net Returns to Capital, Land and Management	564.31	

Table 16. Annual Costs and Returns for Chicken-Fish Production

Item	Total Value or Cost B/.	Annual Depreciation B/.
<u>Annual Returns</u>		
Fish	544.32	
Chicken	7,687.12	
To 1 Annual Returns	8,231.44	
<u>Costs</u>		
Fixed		
Ponds	2,835.00	29.75
Storage Shed	364.70	18.24
Equipment	730.50	167.02
Broodstock	67.80	-
Chicken House	3,871.50	387.17
Pump, Well, Tank	2,100.00	210.00
Subtotal	9,969.70	812.18
Variable		
Fish Seed	22.73	
Chicks	960.00	
Fertilizer	6.28	
Animal Health	81.60	
Feed	4,736.00	
Transportation	176.00	
Maintenance	177.21	
Subtotal	6,159.82	
Total Annual Costs	6,972.00	
Annual Net Returns to Capital, Land and Management	1,259.44	

Table 17. Annual Costs and Returns for Cattle-Fish Production

Item	Total Value or Cost B/.	Annual Depreciation B/.
<u>Annual Returns</u>		
Fish	274.25	
Cattle	6,840.00	
Total Annual Returns	7,114.25	
<u>Costs</u>		
Fixed		
Ponds	2,825.00	29.75
Storage Shed	364.70	18.24
Equipment	360.50	66.02
Broodstock	67.80	-
Corral	381.11	76.22
Fencing	759.00	87.80
Pasture Improvement	380.00	-
Subtotal	5,148.11	278.03
Variable		
Fish Seed	22.73	
Fertilizer	6.28	
Stockers	5,000.00	
Supplemental Feed	254.08	
Insurance	150.00	
Transportation	480.00	
Subtotal	5,913.09	
Total Annual Costs	6,191.12	
Annual Net Returns to Capital, Land and Management	923.13	

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Table 18. Annual Costs and Returns for Duck-Fish Production

Item	Total Value or Cost B/.	Annual Depreciation B/.
<u>Annual Returns</u>		
Fish	809.00	
Ducks	1,630.94	
Total Annual Returns	2,439.94	
<u>Costs</u>		
Fixed		
Ponds	2,835.00	29.75
Storage Shed	364.70	18.24
Equipment	465.50	80.52
Broodstock	67.80	-
Corral	540.30	108.06
Subtotal	4,273.30	236.57
Variable		
Fish Seed	22.73	
Ducklings	276.00	
Fertilizer	6.28	
Feed	1,162.20	
Marketing	272.66	
Transportation	109.72	
Interest	33.70	
Subtotal	1,823.29	
Total Annual Costs	2,119.86	
Annual Net Returns to Capital, Land and Management	320.08	

Table 19. Per Pound Production Costs of Animal Protein (Live Weight)

Alternative	Annual Production Costs B/.	Live Weight of Animals lb	Cost Per Pound Meat Produced B./lb
1. Fish Alone (duck manure)	279.90	2,022.50	0.14
2. Fish Alone (chicken manure)	279.90	1,360.81	0.21
3. Fish Alone (hog manure)	325.50	1,284.23	0.25
4. Fish-Cattle Fish Cattle Total	6,191.12	685.67 17,100.00 17,785.67	0.35
5. Cattle	6,048.10	17,100.00	0.35
6. Fish Alone (cattle manure)	260.02	685.67	0.38
7. Fish-Chickens Fish Chickens Total	6,983.21	1,360.81 14,504.00 15,864.81	0.44
8. Chicken	6,840.29	14,504.00	0.47
9. Fish-Ducks Fish Ducks Total	2,119.86	2,022.50 1,132.60 3,155.10	0.67
10. Fish-Hogs Fish Hogs Total	3,462.68	1,284.23 3,407.46 4,691.59	0.74
11. Hogs	3,337.60	3,407.46	0.98
12. Duck	1,976.84	1,132.60	1.75

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Table 20. Summary of Net Returns to Capital, Land and Management

Alternative	Net Returns to Capital, Land and Management £/.
1. Fish-Chicken	1,259.44
2. Fish-Cattle	923.13
3. Chicken	858.14
4. Cattle	791.90
5. Fish-Hogs	564.31
6. Fish Alone (duck manure)	529.10
7. Fish-Ducks	320.08
8. Fish Alone (chicken manure)	264.42
9. Fish Alone (hog manure)	188.19
10. Hogs	175.70
11. Fish Alone (cattle manure)	14.22
12. Ducks	-345.90

Table 21. Flow of Incremental Net Benefits for Fish-Hogs Module

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Financial Rate of Return							
Fixed Costs							
Ponds	2835.00	0.00	0.00	0.00	0.00	0.00	0.00
Storage Shed	364.70	0.00	0.00	0.00	0.00	0.00	0.00
Equipment	487.60	6.00	6.00	6.00	6.00	220.50	6.00
Pigsty	662.12	0.00	0.00	0.00	0.00	0.00	0.00
Broodstock	67.80	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	4417.22	6.00	6.00	6.00	6.00	220.50	6.00
Contingency (10%)	441.72	0.60	0.60	0.60	0.60	22.05	0.60
Total	4858.94	6.60	6.60	6.60	6.60	242.55	6.60
Variable Costs:							
Fish Seed	34.10	0.00	34.10	34.10	0.00	34.10	34.10
Feeder Pigs	723.00	1446.00	723.00	1446.00	723.00	1446.00	723.00
Fertilizer	9.42	0.00	9.42	9.42	0.00	9.42	9.42
Feed	1125.00	2250.00	1125.00	2250.00	1125.00	2250.00	1125.00
Medication	30.15	60.30	60.30	60.30	60.30	60.30	60.30
Insurance	40.00	80.00	40.00	80.00	40.00	80.00	40.00
Transportation	65.00	250.00	125.00	250.00	125.00	250.00	125.00
Interest	0.00	77.60	38.80	77.60	38.80	77.60	38.80
Taxes	0.00	176.80	88.40	176.80	88.40	176.80	88.40
Total	2026.67	4340.70	2244.02	4384.22	2200.50	4384.22	2244.02
Total Cost	6885.61	4347.30	2250.62	4390.82	2207.10	4626.77	2250.62
Total Return	110.88	5344.88	2732.52	5124.72	3002.68	5124.72	2782.52
Net Returns to Capital, Land and Management	(6774.73)	997.58	521.90	733.90	795.58	497.95	531.90
Economic Rate of Return							
Interest	182.40	390.66	201.96	394.58	198.05	394.58	201.96
Labor							
Construction	311.78	0.00	0.00	0.00	0.00	0.00	0.00
Operating	77.50	155.00	155.00	155.00	155.00	155.00	155.00
Total	571.68	545.66	345.96	549.58	358.05	549.58	356.96
Interest	0.00	77.60	38.80	77.60	38.80	77.60	38.80
Taxes	0.00	176.80	88.40	176.80	88.40	176.80	88.40
Net Returns to Capital and Land	(7346.41)	706.32	302.14	438.72	569.74	202.77	302.14

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Table 21 (Cont.)

Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
0.00	0.00	0.00	710.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	131.00	6.00	362.60	6.00	6.00	6.00	6.00	220.50
0.00	0.00	0.00	662.12	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	131.00	6.00	1734.72	6.00	6.00	6.00	6.00	220.00
0.60	13.10	0.60	173.47	0.60	0.60	0.60	0.60	22.00
6.60	144.10	6.60	1908.19	6.60	6.60	6.60	6.60	242.55
0.00	34.10	34.10	0.00	34.10	34.10	0.00	34.10	34.10
1446.00	723.00	1446.00	723.00	1446.00	723.00	1446.00	723.00	1446.00
0.00	9.42	9.42	0.00	9.42	9.42	0.00	9.42	9.42
2250.00	1125.00	2250.00	1125.00	2250.00	1125.00	2250.00	1125.00	2250.00
60.30	60.30	60.30	60.30	60.30	60.30	60.30	60.30	60.30
80.00	40.00	80.00	40.00	80.00	40.00	80.00	40.00	80.00
250.00	125.00	250.00	125.00	250.00	125.00	250.00	125.00	250.00
77.60	38.80	77.60	38.80	77.60	38.80	77.60	38.80	77.60
176.80	88.40	176.80	88.40	176.80	88.40	176.80	88.40	176.80
4340.70	2244.02	4384.22	2200.50	4384.22	2244.02	4340.70	2244.02	4384.22
4347.30	2388.12	4390.82	4108.69	4390.82	2250.62	4347.30	2250.62	4626.77
5344.88	2782.52	5124.72	3002.68	5124.72	2782.52	5344.88	2782.52	5124.72
997.58	394.40	733.90	(1106.01)	733.90	531.90	997.58	531.90	497.95
390.66	201.96	394.58	198.05	394.58	201.96	390.66	201.96	394.58
0.00	0.00	0.00	228.05	0.00	0.00	0.00	0.00	0.00
155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00
545.66	356.96	549.58	581.10	549.58	356.96	545.66	356.96	549.58
77.60	38.80	77.60	38.80	77.60	38.80	77.60	38.80	77.60
176.80	88.40	176.80	88.40	176.80	88.40	176.80	88.40	176.80
706.32	164.64	438.72	(1559.91)	438.72	302.14	706.32	302.14	202.77

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Table 21 (Cont.)

Year 17	Year 18	Year 19	Year 20	Residual Value
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
131.00	6.00	6.00	6.00	62.50
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	67.80
131.00	6.00	6.00	6.00	0.00
13.10	0.60	0.60	0.60	0.00
144.10	6.60	6.60	6.60	0.00
0.00	34.10	34.10	0.00	0.00
723.00	1446.00	723.00	1446.00	557.25
0.00	9.42	9.42	0.00	0.00
1125.00	2250.00	1125.00	2250.00	877.50
60.30	60.30	60.30	60.30	0.00
40.00	80.00	40.00	80.00	0.00
125.00	250.00	125.00	250.00	0.00
38.80	77.60	38.80	77.60	0.00
88.40	176.80	88.40	176.80	0.00
2200.50	4384.22	2244.02	4340.70	0.00
2344.60	4390.82	2250.62	4347.30	0.00
3002.68	5124.72	2782.52	6909.93	0.00
658.08	733.90	531.90	2562.63	0.00
196.05	394.58	201.96	390.66	0.00
0.00	0.00	0.00	0.00	0.00
155.00	155.00	155.00	155.00	0.00
353.05	549.58	356.96	545.66	0.00
38.80	77.60	38.80	77.60	0.00
88.40	176.80	88.40	176.80	0.00
432.24	438.72	302.14	2271.37	0.00

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Table 22. Flow of Incremental Net Benefits for Fish-Chicken Module

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<u>Financial Rate of Return</u>							
<u>Fixed Costs</u>							
Pond	2835.00	0.00	0.00	0.00	0.00	0.00	0.00
Storage Shed	364.70	0.00	0.00	0.00	0.00	0.00	0.00
Equipment	730.50	6.00	96.00	6.00	96.00	500.50	96.00
Chicken House	3871.70	0.00	0.00	0.00	0.00	0.00	0.00
Broodstock	67.80	0.00	0.00	0.00	0.00	0.00	0.00
Pump, Tanks	2100.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	9969.70	6.00	96.00	6.00	96.00	500.50	96.00
Contingency (10%)	996.97	0.60	9.60	0.60	9.60	50.05	9.60
Total	10966.67	6.60	105.60	6.60	105.60	550.55	105.60
<u>Variable Costs</u>							
Fish Seed	34.10	0.00	34.10	34.10	0.00	34.10	34.10
Chicks	480.00	960.00	960.00	960.00	960.00	960.00	960.00
Fertilizer	9.42	0.00	9.42	9.42	0.00	9.42	9.42
Feed	2368.00	4735.00	4735.00	4735.00	4735.00	4735.00	4735.00
Vaccinations	40.80	81.60	81.60	81.60	81.60	81.60	81.60
Transportation	88.00	176.00	176.00	176.00	176.00	176.00	176.00
Cleaning	83.00	166.00	166.00	166.00	166.00	166.00	166.00
Maintenance	11.21	11.21	11.21	11.21	11.21	11.21	11.21
Total	3114.53	6129.81	6173.33	6173.33	6129.81	6173.33	6173.33
Total Cost	14081.20	6136.41	6278.93	6179.93	6235.41	6723.88	5278.93
Total Return	3960.20	8386.96	3153.68	8153.68	8386.96	8153.68	8153.68
Net Returns to Capital, Land and Management	(10121.00)	2250.55	1874.75	1973.75	2151.55	1429.80	1874.75
<u>Economic Rate of Return</u>							
Interest	280.26	551.68	555.60	555.60	551.63	555.60	555.60
Labor							
Construction	334.81	0.00	0.00	0.00	0.00	0.00	0.00
Operation	77.50	155.00	155.00	155.00	155.00	155.00	155.00
Total	692.57	706.68	710.60	710.60	706.68	710.60	710.60
Net Returns to Capital and Land (10813.57)	1543.87	1164.15	1263.15	1444.87	719.20	1164.15	

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Table 22 (Cont.)

Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
0.00	0.00	0.00	710.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	221.00	6.00	605.50	6.00	96.00	6.00	96.00	500.50
0.00	0.00	0.00	3871.70	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	2100.00	0.00	0.00	0.00	0.00	0.00
6.00	221.00	6.00	7287.20	6.00	96.00	6.00	96.00	500.50
0.60	22.10	0.60	728.72	0.60	9.60	0.60	9.60	50.05
6.60	243.10	6.60	8015.92	6.60	105.60	6.60	105.60	550.55
0.00	34.10	34.10	0.00	34.10	34.10	0.00	34.10	34.10
960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
0.00	9.42	9.42	0.00	9.42	9.42	0.00	9.42	9.42
4735.00	4735.00	4735.00	4735.00	4735.00	4735.00	4735.00	4735.00	4735.00
81.60	81.60	81.60	81.60	81.60	81.60	81.60	81.60	81.60
176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00	176.00
166.00	166.00	166.00	166.00	166.00	166.00	166.00	166.00	166.00
11.21	11.21	11.21	11.21	11.21	11.21	11.21	11.21	11.21
6129.81	6173.33	6173.33	6129.81	6173.33	6173.33	6129.81	6173.33	6173.33
6136.41	6416.43	6179.93	14145.73	6179.93	6278.93	6136.41	6278.93	6723.88
8386.96	8153.68	8153.68	8336.96	8153.68	8153.68	8386.96	8158.68	8153.68
2258.55	1737.25	1978.75	(5758.77)	1973.75	1874.75	2250.55	1874.75	1429.80
551.68	555.60	555.60	551.68	555.60	555.60	551.68	555.60	555.60
0.00	0.00	0.00	251.08	0.00	0.00	0.00	0.00	0.00
155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00
706.68	710.60	710.60	957.76	710.60	710.60	706.68	710.60	710.60
1543.87	1026.65	1263.15	(6716.53)	1263.15	1164.15	1543.87	1164.15	719.20

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Table 22 (Cont.)

Year 17	Year 18	Year 19	Year 20	Residual Value
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
221.00	6.00	96.00	6.00	0.00
0.00	0.00	0.00	0.00	62.50
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	67.80
221.00	6.00	96.00	6.00	0.00
22.10	0.60	9.60	0.60	0.00
243.10	6.60	105.60	6.60	0.00
0.00	34.10	34.10	0.00	0.00
960.00	960.00	960.00	960.00	0.00
0.00	9.42	9.42	0.00	0.00
4735.00	4735.00	4735.00	4735.00	0.00
81.60	81.60	81.60	81.60	0.00
176.00	176.00	176.00	176.00	0.00
166.00	166.00	166.00	166.00	0.00
11.21	11.21	11.21	11.21	0.00
6129.81	6173.33	6173.33	6129.81	0.00
6372.91	6179.93	6278.93	6136.1	0.00
8386.96	8153.68	8153.68	8517.26	0.00
2014.05	1973.75	1874.75	2380.85	0.00
551.68	555.60	555.60	551.68	0.00
0.00	0.00	0.00	0.00	0.00
155.00	155.00	155.00	155.00	0.00
706.68	710.60	710.60	706.68	0.00
1307.37	1263.15	1164.15	1674.17	0.00

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Table 23. Flow of Incremental Net Benefits for Fish-Cattle Module

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Financial Rate of Return							
Fixed Costs							
Pond	2835.00	0.00	0.00	0.00	0.00	0.00	0.00
Storage Shed	364.70	0.00	0.00	0.00	0.00	0.00	0.00
Equipment	360.50	6.00	6.00	6.00	6.00	220.50	6.00
Corral	381.11	0.00	0.00	0.00	0.00	381.11	0.00
Broodstock	67.80	0.00	0.00	0.00	0.00	0.00	0.00
Fencing	759.00	0.00	0.00	0.00	0.00	0.00	0.00
Pasture Improvement	380.00	0.00	0.00	0.00	0.00	459.00	0.00
Subtotal	5148.11	6.00	6.00	6.00	6.00	0.00	0.00
Contingency (10%)	514.81	0.60	0.60	0.60	0.60	1060.61	6.00
Total	5662.92	6.60	6.60	6.60	6.60	1060.61	6.00
Variable Costs							
Fish Seed	34.10	0.00	34.10	34.10	0.00	34.10	34.10
Stockers	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00
Fertilizer	9.42	0.00	9.42	9.42	0.00	9.42	9.42
Feed	254.08	254.08	254.08	254.08	254.08	254.08	254.08
Insurance	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Transportation	240.00	480.00	480.00	480.00	480.00	480.00	480.00
Total	5687.60	5884.08	5927.60	5927.60	5884.08	5927.60	5927.60
Total Cost	11350.52	5890.68	5934.20	5934.20	5890.68	7094.27	5934.20
Total Return	85.12	7624.97	7454.73	7454.73	7624.97	7454.73	7454.73
Net Returns to Capital, Land and Management	(11265.40)	1734.29	1520.53	1520.53	1734.29	360.46	1520.53
Economic Rate of Return							
Interest (9%)							
Labor	511.88	529.57	533.48	533.48	529.57	533.48	533.48
Construction	996.81	0.00	0.00	0.00	0.00	298.00	0.00
Operation	90.38	180.76	180.76	180.76	180.76	180.76	180.76
Total	1599.07	710.33	714.24	714.24	710.33	1012.24	714.24
Net Returns to Capital and Land (12864.47)		1023.96	806.29	806.29	1023.96	(651.78)	806.29

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Table 23 (Cont.)

Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
0.00	0.00	0.00	710.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	131.00	6.00	235.50	6.00	6.00	6.00	6.00	220.50
0.00	0.00	0.00	381.11	0.00	0.00	0.00	0.00	381.11
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	459.00	0.00	0.00	0.00	0.00	459.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	131.00	6.00	1785.61	6.00	6.00	6.00	6.00	1060.61
0.60	13.10	0.60	178.56	0.60	0.60	0.60	0.60	106.06
6.60	144.10	6.60	1964.17	6.60	6.60	6.60	6.60	1166.67
0.00	34.10	34.10	0.00	34.10	34.10	0.00	34.10	34.10
5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00	5000.00
0.00	9.42	9.42	0.00	9.42	9.42	0.00	9.42	9.42
254.08	254.08	254.08	254.08	254.08	254.08	254.08	254.08	254.08
150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00
5884.08	5927.60	5927.60	5884.08	5927.60	5927.60	5884.08	5927.60	5927.60
5890.68	6071.70	5934.20	7848.25	5934.20	5934.20	5890.68	5934.20	7094.27
7624.97	7454.73	7454.73	7624.97	7454.73	7454.73	7624.97	7454.73	7454.73
1734.29	1383.03	1520.53	(223.28)	1520.53	1520.53	1734.29	1520.53	360.46
529.57	533.48	533.48	529.57	533.48	533.48	529.57	533.48	533.48
0.00	0.00	0.00	433.08	0.00	0.00	0.00	0.00	298.00
180.76	180.76	180.76	180.76	180.76	180.76	180.76	180.76	180.76
710.33	714.24	714.24	1143.41	714.24	714.24	710.33	714.24	1012.24
1023.96	668.79	806.29	(1366.69)	806.29	806.29	1023.96	806.29	(651.78)

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Table 23 (Cont.)

Year 17	Year 18	Year 19	Year 20	Residual Value
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
131.00	6.00	6.00	6.00	0.00
0.00	0.00	0.00	0.00	62.50
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	67.80
0.00	0.00	0.00	0.00	0.00
131.00	6.00	6.00	6.00	285.00
13.10	0.60	0.60	0.60	0.00
144.10	6.60	6.60	6.60	0.00
0.00	34.10	34.10	0.00	0.00
5000.00	5000.00	5000.00	5000.00	0.00
0.00	9.42	9.42	0.00	0.00
254.08	254.08	254.08	254.08	0.00
150.00	150.00	150.00	150.00	0.00
480.00	480.00	480.00	480.00	0.00
5884.08	5927.60	5927.60	5884.08	0.00
6028.18	5934.20	5934.20	5890.68	0.00
7624.97	7454.73	7454.73	8040.27	0.00
1596.79	1520.53	1520.53	2149.59	0.00
529.57	533.48	533.48	529.57	0.00
0.00	0.00	0.00	0.00	0.00
180.76	180.76	180.76	180.76	0.00
710.33	714.24	714.24	710.33	0.00
886.46	806.29	806.29	1439.26	0.00

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Table 24. Flow of Incremental Net Benefits for Fish-Duck Module

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<u>Financial Rate of Return</u>							
<u>Fixed Costs</u>							
Ponds	2835.00	0.00	0.00	0.00	0.00	0.00	0.00
Storage Shed	364.70	0.00	0.00	0.00	0.00	0.00	0.00
Equipment	465.50	6.00	6.00	6.00	26.00	0.00	0.00
Corral	540.30	0.00	0.00	0.00	0.00	230.50	6.00
Broodstock	67.80	0.00	0.00	0.00	0.00	540.30	0.00
Subtotal	4273.30	6.00	6.00	6.00	0.00	0.00	0.00
Contingency (10%)	427.33	0.60	0.60	0.60	26.00	770.80	6.00
Total	4700.63	6.60	6.60	6.60	2.60	77.08	0.60
<u>Variable Costs</u>							
Fish Seed	34.10	0.00	34.10	34.10	0.00	34.10	34.10
Ducklings ¹	148.50	297.00	148.50	297.00	148.50	297.00	148.50
Fertilizer	9.42	0.00	9.42	9.42	0.00	9.42	9.42
Feed ¹	600.60	1201.20	600.60	1201.20	600.60	1201.20	600.60
Marketing ¹	161.19	322.38	161.19	322.38	161.19	322.38	161.19
Total	953.81	1820.58	953.81	1864.10	910.29	1864.10	953.81
Total Cost	5654.44	1827.18	960.41	1870.70	938.89	2711.98	960.41
Total Return	988.83	2671.10	2324.38	2324.38	2671.10	2324.38	2324.38
Net Returns to Capital, Land and Management	(4665.61)	843.92	1363.97	453.68	1732.21	(387.60)	1363.97
<u>Economic Rate of Return</u>							
Interest (9%)	85.84	163.85	85.84	167.77	81.93	167.77	85.84
<u>Labor</u>							
Construction	298.81	0.00	0.00	0.00	0.00	80.00	0.00
Operation	54.69	109.38	109.38	109.38	109.38	109.38	109.38
Total	439.34	273.23	195.22	277.15	191.31	357.15	195.22
Net Returns to Capital and Land	(5104.95)	570.69	1168.75	176.53	1540.90	(744.75)	1168.75

¹Includes transportation.

Table 24 (Cont.)

Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
0.00	0.00	0.00	710.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.00	151.00	6.00	320.50	6.00	26.00	6.00	6.00	0.00
0.00	0.00	0.00	540.30	0.00	0.00	0.00	0.00	230.50
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	540.30
6.00	151.00	6.00	1570.80	6.00	26.00	6.00	0.00	0.00
0.60	15.10	0.60	157.08	0.60	2.60	0.60	6.00	770.80
6.60	166.10	6.60	1727.88	6.60	28.60	6.60	0.60	77.08
							6.60	847.88
0.00	34.10	34.10	0.00	34.10	34.10	0.00	34.10	34.10
297.00	148.50	297.00	148.50	297.00	148.50	297.00	148.50	297.00
0.00	9.42	9.42	0.00	9.42	9.42	0.00	9.42	9.42
1201.20	600.60	1201.20	600.60	1201.20	600.60	1201.20	600.60	1201.20
322.38	161.19	322.38	161.19	322.38	161.19	322.38	161.19	322.38
1820.58	953.81	1864.10	910.29	1864.10	953.81	1820.58	953.81	1864.10
1827.18	1119.91	1870.70	2638.17	1870.70	982.41	1827.18	960.41	2711.98
2671.10	2324.38	2324.38	2671.10	2324.38	2324.38	2671.10	2324.38	2324.38
843.92	1204.47	453.68	32.93	453.68	1341.97	843.92	1368.97	(387.60)
163.85	85.84	167.77	81.93	167.77	85.84	163.85	85.84	167.77
0.00	0.00	0.00	215.08	0.00	0.00	0.00	0.00	80.00
109.38	109.38	109.38	109.38	109.38	109.38	109.38	109.38	109.38
273.23	195.22	277.15	406.39	277.15	195.22	273.23	195.22	357.15
570.69	1009.25	176.53	(373.46)	176.58	1146.75	570.69	1168.75	(744.75)

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Table 24 (Cont.)

Year 17	Year 18	Year 19	Year 20	Residual Value
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
145.00	6.00	6.00	6.00	62.50
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	67.80
145.00	6.00	6.00	6.00	0.00
14.50	0.60	0.60	0.60	0.00
159.50	6.60	6.60	6.60	0.00
0.00	34.10	34.10	0.00	0.00
148.50	297.00	148.50	297.00	0.00
0.00	9.42	9.42	0.00	0.00
600.60	1201.20	600.60	1201.20	0.00
161.19	322.38	161.19	322.38	0.00
910.29	1864.10	953.81	1820.58	0.00
1069.79	1870.70	960.41	1827.18	0.00
2671.10	2324.33	2324.38	2801.40	0.00
1601.31	453.68	1363.97	974.22	0.00
81.93	167.77	85.84	163.85	0.00
0.00	0.00	0.00	0.00	0.00
109.38	109.38	109.38	109.38	0.00
191.31	277.15	195.22	273.23	0.00
410.00	176.53	1168.75	700.99	0.00

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Table 25. Annual Value of Labor

Activity	Total Value B .
<u>Constructions</u>	
Pond	135.08
Storage Shed	83.73
Corral--Cattle	106.00
Corral--Ducks	80.00
Pigsty--Hogs	92.97
Chicken House	116.00
Fences--Cattle	192.00
Pasture Improvement--Cattle	480.00
<u>Operation</u>	
Fish	63.76
Hogs	91.25
Cattle	117.00
Ducks	45.62
Chickens	91.25

Table 26. Total Returns to Associated Systems at Selling Price of $\$. 0.60/lb$ Fish by Year

Year	Fish-Cattle			Fish-Hogs			Fish-Chickens			Fish-Ducks		
	Fish	Cattle	Total	Fish	Hogs	Total	Fish	Chickens	Total	Fish	Ducks	Total
1	127.70	-	127.70	165.12	-	165.12	174.96	3843.56	4018.52	260.04	815.47	1075.51
2	766.20	7114.25	7880.45	990.72	4684.40	5675.12	1049.76	7687.12	8736.88	1560.24	1630.94	3191.18
3	510.80	"	7625.05	660.48	2342.20	3002.68	699.84	"	8386.96	1040.16	"	2671.10
4	510.80	"	7625.05	660.48	4684.40	5344.88	699.84	"	8386.96	1040.16	"	2671.10
5	766.20	"	7880.45	990.72	2342.20	3332.92	1049.76	"	8736.88	1560.24	"	3191.18
6	510.80	"	7625.05	660.48	4684.40	5344.88	699.84	"	8386.96	1040.16	"	2671.10
7	510.80	"	7625.05	660.48	2342.20	3002.68	699.84	"	8386.96	1040.16	"	2671.10
8	766.20	"	7880.45	990.72	4684.40	5675.12	1049.76	"	8736.88	1560.24	"	3191.18
9	510.80	"	7625.05	660.48	2342.20	3002.68	699.84	"	8386.96	1040.16	"	2671.10
10	510.80	"	7625.05	660.48	4684.40	5344.88	699.84	"	8386.96	1040.16	"	2671.10
11	766.20	"	7880.45	990.72	2342.20	3332.92	1049.76	"	8736.88	1560.24	"	3191.18
12	510.80	"	7625.05	660.48	4684.40	5344.88	699.84	"	8386.96	1040.16	"	2671.10
13	510.80	"	7625.05	660.48	2342.20	3002.68	699.84	"	8386.96	1040.16	"	2671.10
14	766.20	"	7880.45	990.72	4684.40	5675.12	1049.76	"	8736.88	1560.24	"	3191.18
15	510.80	"	7625.05	660.48	2342.20	3002.68	699.84	"	8386.96	1040.16	"	2671.10
16	510.80	"	7625.05	660.48	4684.40	5344.88	699.84	"	8386.96	1040.16	"	2671.10
17	766.20	"	7880.45	990.72	2342.20	3332.92	1049.76	"	8736.88	1560.24	"	3191.18
18	510.80	"	7625.05	660.48	4684.40	5344.88	699.84	"	8386.96	1040.16	"	2671.10
19	510.80	"	7625.05	660.48	2342.20	3002.68	699.84	"	8386.96	1040.16	"	2671.10
20	766.20	"	7880.45	990.72	4684.40	5675.12	1049.76	"	8736.88	1560.24	"	3191.18

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Table 27. Total Returns to Fish-Hog Module at Fish Selling Price of B. . 0.40/lb with Application of Learning Curve

Year	Hog Income B .	Fish Income		Total Income B .
		lbs No.	Value B .	
1	2,342.06	275.20	110.08	2,452.14
2	4,684.12	1,898.88	759.55	5,443.67
3	4,824.64	1,455.81	582.32	5,406.96
4	4,969.38	1,674.18	669.67	5,639.05
5	5,118.46	2,887.96	1,155.18	6,273.64
6	5,118.46	2,214.10	885.64	6,004.10
7	5,118.46	2,214.10	885.64	6,004.10
8	5,118.46	3,321.11	1,328.44	6,446.90
9	5,118.46	2,214.10	885.64	6,004.10
10	5,118.46	2,214.10	885.64	6,004.10
11	5,118.46	3,321.11	1,328.44	6,446.90
12	5,118.46	2,214.10	885.64	6,004.10
13	5,118.46	2,214.10	885.64	6,004.10
14	5,118.46	3,321.11	1,328.44	6,446.90
15	5,118.46	2,214.10	885.64	6,004.10
16	5,118.46	2,214.10	885.64	6,004.10
17	5,118.46	3,321.11	1,328.44	6,446.90
18	5,118.46	2,214.10	885.64	6,004.10
19	5,118.46	2,214.10	885.64	6,004.10
20	5,118.46	3,321.11	1,328.44	6,446.90

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Table 28. Changes in Incremental Net Benefits Flow by Increasing Number of Hogs to 112 per Hectare

Item	Year			
	1 B/.	2 B/.	3 B/.	Etc.
Feeder Pigs	1,084.50	2,169.00	1,084.50	...
Feed	1,687.50	3,375.00	1,687.50	...
Medication	45.30	90.60	90.60	...
Insurance	60.00	120.00	60.00	...
Transportation	97.50	375.00	187.50	...
Taxes	0.00	265.20	132.60	...
Total Cost	7,877.26	6,401.40	3,292.82	...
Total Return	200.40	8,142.96	4,271.88	...
Net Returns to Capital, Land and Management	-7,676.86	1,741.56	979.06	...

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Table 29. Changes in Flow of Incremental Net Benefits by Increasing Number of Ducks to 750 per Hectare

Item	Year			
	1 B/.	2 B/.	3 B/.	Etc.
Ducklings	184.00	368.00	368.00	...
Feed	767.35	1,534.70	1,534.70	...
Marketing	174.98	349.96	349.96	...
Transportation	73.00	146.00	146.00	...
Total Cost	5,943.48	2,405.26	2,448.78	...
Total Return	1,528.56	4,842.72	3,949.92	...
Net Returns to Capital, Land and Management	-4,414.92	2,437.46	1,501.14	...

Table 30. Financial and Economic Rates of Return for the Alternatives Considered

Alternative	Financial Rate of Return	Economic Rate of Return
<u>Fish-Chicken</u>		
1. B/. 0.40/lb fish	14.03	4.03
2. B/. 0.60/lb fish	17.24	7.97
<u>Fish-Ducks</u>		
3. B/. 0.40/lb fish	17.05	9.27
4. B/. 0.60/lb fish	26.97	19.04
5. 750 ducks/ha	37.40	26.50
<u>Fish-Cattle</u>		
6. B/. 0.40/lb fish	10.39	-0.95
7. B/. 0.60/lb fish	12.64	1.98
<u>Fish-Hogs</u>		
8. B/. 0.40/lb fish	7.46	0.43
9. B/. 0.60/lb fish	12.48	6.55
10. Learning curve	36.40	24.42
11. 112 hogs/ha (1.5 cycles per year)	16.27	8.47

YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1972.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$235.50	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$171.00	\$6.00	\$6.00	\$60.25
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.19
\$177.75	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$122.05	\$13.10	\$0.00	\$0.00	\$0.00
\$235.05	\$6.60	\$6.60	\$6.60	\$6.60	\$242.55	\$114.10	\$0.60	\$6.60	\$6.60	\$0.00
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$0.00
\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$0.00
\$0.00	\$54.04	\$54.04	\$6.60	\$54.04	\$287.75	\$141.10	\$51.64	\$54.04	\$0.00	\$0.00
\$846.84	\$564.56	\$564.56	\$846.84	\$564.56	\$564.56	\$346.84	\$564.56	\$564.56	\$2706.87	\$0.00
\$587.79	\$510.52	\$510.52	\$840.24	\$510.52	\$274.57	\$702.74	\$510.52	\$510.52	\$2900.27	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$354.51	\$220.27	\$220.27	\$606.96	\$220.27	(415.60)	\$0.00	\$220.27	\$220.27	\$206.00	\$0.00

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TABLE 22 - FLOW OF INCREMENTAL NET BENEFITS FOR FISH-HOGS MODULE, FISH ONLY

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
LAND	\$2035.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$360.50	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00
BROODSTOCK	\$67.80	\$0.00	\$0.00	\$0.00	\$0.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
CONTINGENCY (10%)	\$67.80	\$0.00	\$0.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00
SUB-TOTAL	\$3790.80	\$6.60	\$6.60	\$6.60	\$6.60	\$222.05	\$6.60	\$6.60	\$133.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
FERTILIZER	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42
INTEREST WORKING CAP.	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92
SUB-TOTAL	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44
TOTAL COST	\$4030.24	\$6.60	\$54.04	\$54.04	\$6.60	\$209.99	\$54.04	\$6.60	\$191.54	\$54.04
GROSS RETURNS	\$110.08	\$726.48	\$532.80	\$532.80	\$799.20	\$532.80	\$532.80	\$799.20	\$532.80	\$532.80
NET RETURNS TO CAPITAL, LAND, AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$3920.16)	\$719.88	\$478.76	\$478.76	\$792.60	\$322.81	\$478.76	\$792.60	\$341.26	\$478.76
NET RETURNS TO CAPITAL AND LAND	\$190.68	\$719.88	\$261.22	\$261.22	\$201.02	\$34.54	\$217.54	\$217.15	\$261.22	\$277.35
NET RETURNS TO CAPITAL AND LAND (INCLUDES TRANSPORT)	\$190.68	\$502.73	\$217.54	\$201.41	\$391.58	(\$34.54)	\$217.54	\$575.45	\$80.04	\$201.41

YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1932.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$235.50	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$131.00	\$6.00	\$6.00	\$6.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$220.50	\$0.00	\$6.00	\$6.00	\$6.00	\$60.25
\$175.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67.80
\$23.55	\$0.60	\$0.60	\$0.60	\$0.60	\$220.50	\$131.00	\$6.00	\$6.00	\$6.00	\$0.00
					\$22.05	\$13.10	\$0.60	\$0.60	\$0.60	\$0.00
\$259.05	\$6.60	\$6.60	\$6.60	\$6.60	\$242.55	\$144.10	\$6.60	\$6.60	\$6.60	\$0.00
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$0.00
\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$0.00
\$259.05	\$54.04	\$54.04	\$6.60	\$54.04	\$289.99	\$144.10	\$54.04	\$54.04	\$6.60	\$0.00
\$799.20	\$532.80	\$532.80	\$799.20	\$532.80	\$532.80	\$799.20	\$532.80	\$532.80	\$2859.25	\$0.00
\$540.15	\$478.76	\$478.76	\$792.60	\$478.76	\$242.81	\$655.10	\$478.76	\$478.76	\$2852.65	\$0.00
\$0.00			\$11.17	\$11.17	\$11.17	\$201.08	\$277.35	\$261.22	\$217.15	\$0.00
\$329.13	\$201.41	\$217.54	\$975.45	\$217.54	(\$34.54)	\$454.08	\$201.41	\$217.54	\$2535.50	\$0.00

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TABLE 23. FLOW OF INCREMENTAL NET BENEFITS FOR FISH-DUCK MODULE,
FISH ONLY.

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
FUND	\$2835.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$360.50	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00
BROODSTOCK	\$67.80	\$0.00	\$0.00	\$0.00	\$0.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
SUBTOTAL	\$362.80	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
CONTINGENCY (10%)	\$362.80	\$0.60	\$0.60	\$0.60	\$0.60	\$22.05	\$0.60	\$0.60	\$13.10	\$0.60
SUBTOTAL	\$3990.80	\$6.60	\$6.60	\$6.60	\$6.60	\$242.55	\$6.60	\$6.60	\$144.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
FERTILIZER	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42
INTEREST WORKING CAP.	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92
SUBTOTAL	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44
TOTAL COST	\$4038.24	\$6.60	\$54.04	\$54.04	\$6.60	\$289.97	\$54.04	\$6.60	\$191.54	\$54.04
GROSS RETURNS	\$173.36	\$1144.20	\$839.04	\$839.04	\$1258.56	\$839.04	\$839.04	\$1258.56	\$839.04	\$839.04
NET RETURNS TO CAPITAL, LAND, AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$3864.88)	\$1137.60	\$785.00	\$785.00	\$1251.96	\$549.05	\$785.00	\$1251.96	\$647.50	\$785.00
OPERATOR'S LABOR	177.55	\$184.50	\$175.10	\$175.10	\$191.20	\$245.10	\$215.10	\$104.20	\$215.10	\$245.10
NET RETURNS TO CAPITAL AND LAND	(\$3944.43)	\$952.70	\$539.90	\$539.90	\$1067.06	\$303.95	\$539.90	\$1067.06	\$402.40	\$539.90
I/INCLUDES TRANSPORT										

YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1732.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$235.50	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$131.00	\$6.00	\$6.00	\$6.00	\$60.25
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67.80
\$235.50	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$131.00	\$6.00	\$6.00	\$6.00	\$0.00
\$25.55	\$0.60	\$0.60	\$0.60	\$0.60	\$22.05	\$13.10	\$0.60	\$0.60	\$0.60	\$0.00
\$257.05	\$6.60	\$6.60	\$6.60	\$6.60	\$242.55	\$144.10	\$6.60	\$6.60	\$6.60	\$0.00
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$0.00
\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$0.00
\$257.05	\$54.04	\$54.04	\$6.60	\$54.04	\$289.99	\$144.10	\$54.04	\$54.04	\$6.60	\$0.00
\$1258.56	\$839.04	\$839.04	\$1258.56	\$839.04	\$839.04	\$1258.56	\$839.04	\$839.04	\$3318.61	\$0.00
\$999.51	\$785.00	\$785.01	\$1251.96	\$785.00	\$549.08	\$1114.46	\$785.00	\$785.00	\$3312.01	\$0.00
\$184.70	\$115.10	\$115.10	\$184.70	\$115.10	\$115.10	\$184.70	\$115.10	\$115.10	\$184.70	\$0.00
\$814.61	\$539.70	\$539.71	\$1067.06	\$539.70	\$303.75	\$729.56	\$539.70	\$539.70	\$1127.11	\$0.00

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TABLE 24 - FLOW OF INCREMENTAL NET BENEFITS FOR FISH CATTLE MODULE,
FISH ONLY

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIELD COSTS										
FUND	\$2025.00	\$0.00	10.00	10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	10.00	10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$360.50	\$0.00	10.00	10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
BRIDGE COST	177.30	10.00	10.00	10.00	10.00	1220.50	\$0.00	\$0.00	\$151.00	\$0.00
CONSTRUCTION	100.00	10.00	10.00	10.00	10.00	10.00	\$0.00	\$0.00	10.00	10.00
CONTINGENCY (10%)	\$362.00	10.00	10.00	10.00	10.00	\$22.05	\$0.60	\$0.60	\$13.10	\$0.60
SUBTOTAL	\$3990.00	\$0.00	\$40.00	\$40.00	\$0.00	\$42.55	\$0.60	\$0.60	\$144.10	\$0.60
VARIABLE COSTS										
FISH SEED	\$34.10	10.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
FERTILIZER	\$7.42	10.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42
MINORST WORKING CAP.	\$5.92	10.00	\$5.92	\$5.92	\$0.00	\$5.92	\$5.92	\$0.00	\$5.92	\$5.92
SUBTOTAL	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44
TOTAL COST	\$4037.24	\$0.00	\$84.04	\$84.04	\$0.00	\$207.99	\$54.04	\$0.60	\$191.54	\$54.04
GROSS RETURNS	\$86.53	\$570.98	\$418.72	\$418.72	\$628.08	\$418.72	\$418.72	\$628.08	\$418.72	\$418.72
NET RETURNS TO CAPITAL, LAND, AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$3951.71)	\$564.36	\$364.68	\$364.68	\$621.48	\$128.73	\$364.68	\$621.48	\$227.18	\$364.68
NET RETURNS TO CAPITAL AND LAND	(\$4002.06)	\$276.26	\$24.90	\$24.98	\$333.38	(\$210.77)	\$24.70	\$333.38	(\$112.52)	\$24.98

1/INCLUDES TRANSPORT

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YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1932.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$235.50	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$131.00	\$6.00	\$6.00	\$6.00	\$60.25
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67.80
\$25.50	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$131.00	\$6.00	\$6.00	\$6.00	\$0.00
\$25.50	\$6.00	\$6.00	\$6.00	\$6.00	\$22.05	\$13.10	\$6.60	\$6.60	\$6.60	\$0.00
\$257.00	\$6.60	\$6.60	\$6.60	\$6.60	\$242.55	\$144.10	\$6.60	\$6.60	\$6.60	\$0.00
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$3.92	\$3.92	\$0.00	\$0.00
\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$47.44	\$47.44	\$0.00	\$0.00
\$257.00	\$54.04	\$54.04	\$6.60	\$54.04	\$289.99	\$144.10	\$54.04	\$54.04	\$6.60	\$0.00
\$628.08	\$418.72	\$418.72	\$628.08	\$418.72	\$418.72	\$628.08	\$418.72	\$418.72	\$2688.13	\$0.00
\$369.03	\$364.68	\$364.68	\$621.48	\$364.68	\$128.73	\$483.98	\$364.68	\$364.68	\$2681.53	\$0.00
\$339.10	\$339.70	\$339.70	\$339.70	\$339.70	\$339.70	\$288.10	\$339.70	\$339.70	\$288.10	\$0.00
\$24.98	\$24.98	\$24.98	\$333.38	\$24.98	(\$210.97)	\$195.88	\$24.98	\$24.98	\$2393.43	\$0.00

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TABLE 25. FLOW OF INCREMENTAL NET BENEFITS FOR FISH-CHICKEN MODULE.

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
FUND	\$2835.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$730.50	\$6.00	\$76.00	\$6.00	\$76.00	\$500.50	\$76.00	\$6.00	\$0.00	\$0.00
CHICKEN HOUSE	\$3871.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$221.00	\$6.00
BROODSTOCK	\$67.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
FUNDS, TANKS	\$2100.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$9969.70	\$6.00	\$76.00	\$6.00	\$76.00	\$500.50	\$76.00	\$6.00	\$0.00	\$0.00
CONTINGENCY (10%)	\$996.97	\$0.60	\$7.60	\$0.60	\$7.60	\$50.05	\$7.60	\$0.60	\$22.10	\$6.00
TOTAL	\$10966.67	\$6.60	\$105.60	\$6.60	\$105.60	\$550.55	\$105.60	\$6.60	\$243.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
CHICKS	\$480.00	\$760.00	\$760.00	\$760.00	\$760.00	\$760.00	\$760.00	\$0.00	\$760.00	\$760.00
FERTILIZER	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42
FEED	\$2368.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00
VACCINATIONS	\$40.80	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60
TRANSPORTATION	\$88.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00
SANITATION	\$83.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00
MAINTENANCE	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21
INTEREST WORKING CAP.	\$280.31	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68
TOTAL	\$3394.84	\$6681.49	\$6728.93	\$6728.93	\$6681.49	\$6728.93	\$6728.93	\$6681.49	\$6728.93	\$6728.93
TOTAL COST	\$14361.51	\$6688.09	\$6834.53	\$6735.53	\$6787.09	\$7279.48	\$6834.53	\$6688.09	\$6972.03	\$6735.53
GROSS RETURN:	\$3266.2	\$3156.2	\$3156.2	\$3156.2	\$3266.2	\$3156.2	\$3156.2	\$3156.2	\$3266.2	\$3156.2
NET RETURN TO CAPITAL, LAND AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$11401.31)	\$1760.00	(\$443.10)	(\$344.80)	(\$1746.00)	(\$888.05)	(\$443.10)	(\$1845.87)	(\$1277.60)	(\$344.10)
OPERATOR'S LABOR										
FISH	\$103.20	\$233.28	\$290.25	\$290.25	\$233.28	\$290.25	\$290.25	\$233.28	\$290.25	\$290.25
CHICKENS	\$785.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00
NET RETURNS TO CAPITAL AND LAND	(\$11289.51)	(\$34.45)	(\$443.10)	(\$344.80)	(\$56.41)	(\$888.05)	(\$443.10)	\$42.59	(\$580.60)	(\$344.10)

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TABLE 25. FLOW OF INCREMENTAL NET BENEFITS FOR FISH-CHICKEN MODULE.

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
FUND	\$2835.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$730.50	\$6.00	\$76.00	\$6.00	\$76.00	\$6.00	\$76.00	\$6.00	\$76.00	\$6.00
CHICKEN HOUSE	\$3871.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
BROODSTOCK	\$67.80	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
FUNDS, TANKS	\$2100.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$9969.70	\$6.00	\$96.00	\$6.00	\$96.00	\$6.00	\$96.00	\$6.00	\$96.00	\$6.00
CONTINGENCY (10%)	\$996.97	\$0.60	\$9.60	\$0.60	\$9.60	\$0.60	\$9.60	\$0.60	\$9.60	\$0.60
TOTAL	\$10966.67	\$6.60	\$105.60	\$6.60	\$105.60	\$550.55	\$105.60	\$6.60	\$243.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
CHICKS	\$480.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00
FERTILIZER	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42
FEED	\$2368.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00
VACCINATIONS	\$40.80	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60
TRANSPORTATION	\$88.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00
SANITATION	\$83.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00
MAINTENANCE	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21
INTEREST WORKING CAP.	\$280.31	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68
TOTAL	\$3394.84	\$6681.49	\$6728.93	\$6728.93	\$6681.49	\$6728.93	\$6728.93	\$6681.49	\$6728.93	\$6728.93
TOTAL COST	\$14361.51	\$6688.09	\$6834.53	\$6735.53	\$6787.09	\$7279.48	\$6834.53	\$6688.09	\$6972.03	\$6735.53
GROSS RETURNS	\$1220.00	\$3156.00	\$3156.00	\$3156.00	\$3156.00	\$3156.00	\$3156.00	\$3156.00	\$3156.00	\$3156.00
NET RETURNS TO CAPITAL, LAND AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$1940.51)	\$1760.00	\$1417.15	\$1516.15	\$1746.00	\$1726.20	\$1417.15	\$1845.87	\$1279.65	\$1516.15
OPERATOR'S LABOR										
FISH	\$103.20	\$233.28	\$290.25	\$290.25	\$233.28	\$290.25	\$290.25	\$233.28	\$290.25	\$290.25
CHICKENS	\$785.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00
NET RETURNS TO CAPITAL AND LAND	(\$11289.51)	(\$34.45)	(\$443.10)	(\$344.80)	(\$56.41)	(\$888.05)	(\$443.10)	\$42.59	(\$580.60)	(\$344.10)

TABLE 26. FLOW OF INCREMENTAL NET BENEFITS FOR FISH-HOG MODULE.

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
FUND	\$2035.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
STORAGE SHED	\$264.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$487.60	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
PIGSTY	\$662.12	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
BROODSTOCK	\$67.89	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBSIDY	\$417.22	\$0.00	\$0.00	\$0.00	\$0.00	\$220.50	\$6.00	\$0.00	\$0.00	\$0.00
CONTINGENCY (10%)	\$441.72	\$0.60	\$0.60	\$0.60	\$0.60	\$22.05	\$0.60	\$0.60	\$13.10	\$0.60
TOTAL	\$4058.94	\$6.60	\$6.60	\$6.60	\$6.60	\$242.55	\$6.60	\$6.60	\$144.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
FEEDER PIGS	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00
FERTILIZER	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$1446.00
FEED	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00
MEDICATIONS	\$30.15	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30
CROP INSURANCE	\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00
TRANSPORTATION	\$65.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00
INTEREST WORKING CAP.	\$182.40	\$367.77	\$190.51	\$371.68	\$186.60	\$371.68	\$190.51	\$367.77	\$190.51	\$371.68
TAXES	\$0.00	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80
TOTAL	\$2209.67	\$4630.87	\$2395.73	\$4678.30	\$2318.30	\$4678.30	\$2395.73	\$4630.37	\$2395.73	\$4678.30
TOTAL COST	\$7068.01	\$4637.47	\$2402.33	\$4684.90	\$2354.90	\$4920.85	\$2402.33	\$4637.47	\$2539.83	\$4684.90
GROSS RETURNS	\$110.88	\$5416.21	\$2878.06	\$5221.06	\$3147.19	\$5221.06	\$2878.06	\$5487.39	\$2878.06	\$5221.06
NET RETURNS TO CAPITAL AND LAND AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	\$452.19	\$110.11	\$47.33	\$536.16	\$828.89	\$110.11	\$47.33	\$536.16	\$828.89	\$536.16
OPERATOR'S LABOR										
FISH	\$95.68	\$217.15	\$261.22	\$277.35	\$201.02	\$277.35	\$261.22	\$217.15	\$261.22	\$277.35
HOGS	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00
NET RETURNS TO CAPITAL AND LAND	(\$7068.81)	\$529.59	\$199.31	\$226.81	\$575.27	(\$9.20)	\$199.31	\$602.77	\$61.81	\$226.81

YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$362.60	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$131.00	\$6.00	\$6.00	\$6.00	\$0.00
\$662.12	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.00	\$6.00	\$6.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$1024.72	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$131.00	\$6.00	\$6.00	\$6.00	\$0.00
\$102.47	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$13.10	\$0.60	\$0.60	\$0.60	\$0.00
\$1127.19	\$6.60	\$6.60	\$6.60	\$6.60	\$242.53	\$144.10	\$6.60	\$6.60	\$6.60	\$0.00
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$0.00
\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$0.00
\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00	\$0.00
\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$0.00
\$186.60	\$371.68	\$186.60	\$371.68	\$186.60	\$371.68	\$186.60	\$371.68	\$186.60	\$371.68	\$0.00
\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$0.00
\$2348.30	\$4678.30	\$2348.30	\$4678.30	\$2348.30	\$4678.30	\$2348.30	\$4678.30	\$2348.30	\$4678.30	\$0.00
\$3475.49	\$6950.98	\$3475.49	\$6950.98	\$3475.49	\$6950.98	\$3475.49	\$6950.98	\$3475.49	\$6950.98	\$0.00
\$3147.19	\$6294.38	\$3147.19	\$6294.38	\$3147.19	\$6294.38	\$3147.19	\$6294.38	\$3147.19	\$6294.38	\$0.00
\$331.70	\$663.40	\$331.70	\$663.40	\$331.70	\$663.40	\$331.70	\$663.40	\$331.70	\$663.40	\$0.00
\$201.02	\$277.35	\$201.02	\$277.35	\$201.02	\$277.35	\$201.02	\$277.35	\$201.02	\$277.35	\$0.00
\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$0.00
\$345.32	\$690.64	\$345.32	\$690.64	\$345.32	\$690.64	\$345.32	\$690.64	\$345.32	\$690.64	\$0.00

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26. FLOW OF INCREMENTAL NET BENEFITS FOR FISH-106 MODULE.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
INITIAL RATE										
FIXED COSTS										
FUND	\$2835.00	10.00	10.00	10.00	\$0.00	10.00	\$0.00	\$0.00	\$0.00	10.00
STORAGE SHED	\$264.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$487.60	\$6.00	\$6.00	\$6.00	\$6.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
PIGSTY	\$662.12	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
BROODSTOCK	\$67.89	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
CUSTOMER	\$417.21	\$0.00	\$0.00	\$0.00	\$0.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
CONTINGENCY (10%)	\$441.72	\$0.60	\$0.60	\$0.60	\$0.60	\$22.05	\$0.60	\$0.60	\$13.10	\$0.60
TOTAL	\$4050.94	\$6.60	\$6.60	\$6.60	\$0.60	\$242.55	\$6.60	\$6.60	\$144.10	\$6.60
RECURRING COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
FEEDER PIGS	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00	\$723.00	\$1446.00
FERTILIZER	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42
FEED	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00	\$1125.00	\$2250.00
MEDICATIONS	\$30.15	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30	\$60.30
CROP INSURANCE	\$40.00	\$80.00	\$80.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00	\$40.00	\$80.00
TRANSPORTATION	\$65.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00	\$125.00	\$250.00
DESI WORKING CAP.	\$182.40	\$267.77	\$170.51	\$371.68	\$186.60	\$271.68	\$190.51	\$361.77	\$190.51	\$371.68
TAXES	\$0.00	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80	\$88.40	\$176.80
TOTAL	\$2209.07	\$4630.87	\$2395.73	\$4678.50	\$2348.50	\$4678.50	\$2395.73	\$4630.87	\$2395.73	\$4678.50
NET COST	\$7068.01	\$4637.47	\$2402.33	\$4684.90	\$2354.90	\$4920.05	\$2402.33	\$4637.47	\$2539.03	\$4684.90
NET RETURNS	\$110.00	\$5416.21	\$2078.06	\$5221.06	\$3147.19	\$5211.00	\$2078.06	\$5407.79	\$2078.06	\$5221.06
RETURNS TO LAND AND LABOR (WITHOUT LABOR'S LABOR)	\$1052.19	\$170.00	\$47.07	\$152.16	\$1052.19	\$170.00	\$47.07	\$152.16	\$1052.19	\$170.00
LABOR'S LABOR										
FISH	\$95.68	\$217.15	\$261.22	\$277.38	\$201.02	\$277.35	\$261.22	\$217.15	\$261.22	\$277.35
HOES	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00	\$16.00	\$32.00
RETURNS TO LAND AND LABOR	(\$7068.81)	\$529.59	\$199.31	\$226.81	\$575.27	(\$9.20)	\$199.31	\$602.77	\$61.81	\$226.81

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TABLE 27 - FLOW OF INCREMENTAL NET BENEFITS FOR FISH-DUCK MODULE

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
FOND	\$2035.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$465.50	\$6.00	\$6.00	\$6.00	\$26.00	\$230.50	\$6.00	\$0.00	\$0.00	\$0.00
CORRAL	\$540.30	\$0.00	\$0.00	\$0.00	\$0.00	\$540.30	\$6.00	\$6.00	\$151.00	\$6.00
BROODSTOCK	\$67.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$4275.50	\$6.00	\$6.00	\$6.00	\$26.00	\$770.80	\$18.00	\$12.00	\$151.00	\$6.00
CONTINGENCY (10%)	\$427.55	\$0.60	\$0.60	\$0.60	\$2.60	\$77.08	\$1.80	\$1.20	\$15.10	\$0.60
SUBTOTAL	\$4703.05	\$6.60	\$6.60	\$6.60	\$28.60	\$847.88	\$19.80	\$13.20	\$166.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
DUCKLINGS 1/	\$148.50	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00
FERTILIZER	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42	\$0.00	\$7.42	\$7.42
FEED 1/	\$600.60	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20
MARKETING	\$161.19	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38
INTEREST WORKING CAP.	\$85.84	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85
SUBTOTAL	\$1639.65	\$1984.43	\$2031.87	\$2031.87	\$1904.43	\$2031.87	\$2031.87	\$1984.43	\$2031.87	\$2031.87
TOTAL COST	\$5740.28	\$1991.03	\$2338.47	\$2038.47	\$2013.03	\$2879.75	\$2038.47	\$1991.03	\$2197.57	\$2038.47
GROSS RETURNS	\$988.83	\$2775.14	\$2469.98	\$2469.98	\$2889.50	\$2469.78	\$2469.78	\$2889.50	\$2469.78	\$2469.78
NET RETURNS TO CAPITAL, LAND, AND OPERATOR'S LABOR	(\$4751.45)	\$784.11	\$431.51	\$431.51	\$876.47	(\$409.77)	\$431.51	\$898.47	\$272.01	\$431.51
OPERATOR'S LABOR										
FISH	\$79.55	\$184.90	\$245.10	\$245.10	\$184.90	\$245.10	\$245.10	\$184.90	\$245.10	\$245.10
DUCKS	\$229.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00
NET RETURNS TO CAPITAL AND LAND	(\$5060.00)	\$155.21	(\$257.59)	(\$257.59)	\$247.57	(\$1098.87)	(\$257.59)	\$269.57	(\$417.09)	(\$257.59)
1/INCLUDES TRANSPORT										

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YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1722.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$320.50	\$6.00	\$26.00	\$6.00	\$6.00	\$230.50	\$145.00	\$6.00	\$6.00	\$6.00	\$62.50
\$540.30	\$0.00	\$0.00	\$0.00	\$0.00	\$540.30	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$0.00	\$0.00	\$26.00	\$6.00	\$6.00	\$770.80	\$145.00	\$6.00	\$6.00	\$6.00	\$67.00
\$0.00	\$0.60	\$2.60	\$0.60	\$0.60	\$77.08	\$14.50	\$0.60	\$0.60	\$0.60	\$0.00
\$271.00	\$6.60	\$28.60	\$6.60	\$6.60	\$847.88	\$157.50	\$6.60	\$6.60	\$6.60	\$0.00
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$277.00	\$277.00	\$297.00	\$297.00	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00	\$277.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$0.00
\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$0.00
\$163.85	\$167.77	\$167.77	\$163.85	\$167.77	\$167.77	\$163.85	\$167.77	\$167.77	\$163.85	\$0.00
\$1704.43	\$2031.07	\$2031.07	\$1784.43	\$2031.87	\$2031.87	\$1704.43	\$2031.07	\$2031.07	\$1784.43	\$0.00
\$2731.31	\$2038.47	\$2060.47	\$1991.03	\$2038.47	\$2879.75	\$2143.93	\$2038.47	\$2038.47	\$1991.03	\$0.00
\$2889.50	\$2467.98	\$2467.98	\$2889.50	\$2467.98	\$2467.98	\$2889.50	\$2467.98	\$2467.98	\$4751.80	\$0.00
(\$41.81)	\$471.51	\$407.51	\$898.47	\$431.51	(\$407.77)	\$745.57	\$431.51	\$431.51	\$2760.77	\$0.00
\$184.90	\$245.10	\$245.10	\$184.90	\$245.10	\$245.10	\$184.90	\$245.10	\$245.10	\$184.90	\$0.00
\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$0.00
(\$670.71)	(\$257.59)	(\$279.59)	\$269.57	(\$257.59)	(\$1098.87)	\$116.67	(\$257.59)	(\$257.59)	\$2331.87	\$0.00

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YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$0.00
\$381.11	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$381.11	\$0.00	\$0.00	\$0.00	\$0.00
\$459.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$459.00	\$0.00	\$0.00	\$0.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$846.11	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$846.11	\$6.00	\$6.00	\$6.00	\$285.00
\$84.61	\$0.60	\$0.60	\$0.60	\$0.60	\$0.60	\$84.61	\$0.60	\$0.60	\$0.60	\$0.00
\$930.72	\$6.60	\$6.60	\$6.60	\$6.60	\$6.60	\$930.72	\$6.60	\$6.60	\$6.60	\$285.00
\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$0.00
\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$0.00
\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$0.00
\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$0.00
\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$0.00
\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$0.00
\$7344.37	\$6420.25	\$6420.25	\$6420.25	\$6420.25	\$6420.25	\$7344.37	\$6420.25	\$6420.25	\$6420.25	\$0.00
\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$7125.00	\$0.00
(\$504.37)	\$419.75	\$419.75	\$419.75	\$419.75	\$419.75	(\$504.37)	\$419.75	\$419.75	\$704.75	\$0.00
\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$0.00
(\$696.37)	\$227.75	\$227.75	\$227.75	\$227.75	\$227.75	(\$696.37)	\$227.75	\$227.75	\$512.75	\$0.00

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TABLE 32. FLOW OF INCREMENTAL NET BENEFITS FOR CATTLE ENTERPRISE.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FINANCIAL RATE										
FIXED COSTS										
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00
CORRAL	\$381.11	\$0.00	\$0.00	\$0.00	\$0.00	\$381.11	\$0.00	\$0.00	\$0.00	\$0.00
FENCE IMPROVEMENT	\$759.00	\$0.00	\$0.00	\$0.00	\$0.00	\$459.00	\$0.00	\$0.00	\$0.00	\$0.00
PASTURE RE-ESTAB.	\$380.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$1890.81	\$6.00	\$6.00	\$6.00	\$6.00	\$846.11	\$6.00	\$6.00	\$6.00	\$6.00
CONTINGENCY (10%)	\$189.08	\$0.60	\$0.60	\$0.60	\$0.60	\$84.61	\$0.60	\$0.60	\$0.60	\$0.60
TOTAL	\$2079.89	\$6.60	\$6.60	\$6.60	\$6.60	\$930.72	\$6.60	\$6.60	\$6.60	\$6.60
VARIABLE COSTS										
STOCKERS	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00
FEED	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08
CROP INSURANCE	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
TRANSPORTATION	\$240.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00
INTEREST WORKING CAP.	\$507.97	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57	\$529.57
TOTAL	\$6152.05	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65	\$6413.65
TOTAL COSTS	\$8231.94	\$6420.25	\$6420.25	\$6420.25	\$6420.25	\$7344.37	\$6420.25	\$6420.25	\$6420.25	\$6420.25
GROSS RETURNS	\$0.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00	\$6840.00
NET RETURNS TO CAPITAL, LAND AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$8231.94)	\$419.75	\$419.75	\$419.75	\$419.75	(\$504.37)	\$419.75	\$419.75	\$419.75	\$419.75
OPERATOR'S LABOR	\$96.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00	\$192.00
NET RETURNS TO CAPITAL AND LAND	(\$8327.94)	\$227.75	\$227.75	\$227.75	\$227.75	(\$696.37)	\$227.75	\$227.75	\$227.75	\$227.75

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YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$376.00	\$6.00	\$96.00	\$6.00	\$96.00	\$286.00	\$96.00	\$6.00	\$96.00	\$6.00	\$2.25
\$3871.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$2100.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$6347.70	\$6.00	\$96.00	\$6.00	\$96.00	\$286.00	\$96.00	\$6.00	\$96.00	\$6.00	\$2.25
\$634.77	\$0.60	\$9.60	\$0.60	\$9.60	\$28.60	\$9.60	\$0.60	\$9.60	\$0.60	\$0.23
\$6982.47	\$6.60	\$105.60	\$6.60	\$105.60	\$314.60	\$105.60	\$6.60	\$105.60	\$6.60	\$2.48
\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$0.00
\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$0.00
\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$0.00
\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$0.00
\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$0.00
\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$0.00
\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$0.00
\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$0.00
\$13663.96	\$6688.09	\$6787.09	\$6688.09	\$6787.09	\$6996.09	\$6787.09	\$6688.09	\$6787.09	\$6688.09	\$0.00
\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7689.60	\$0.00
(\$5976.84)	\$999.03	\$900.03	\$999.03	\$900.03	\$691.03	\$900.03	\$999.03	\$900.03	\$1001.50	\$0.00
\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$0.00
(\$7346.84)	(\$570.97)	(\$669.97)	(\$570.97)	(\$669.97)	(\$878.97)	(\$669.97)	(\$570.97)	(\$669.97)	(\$568.50)	\$0.00

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TABLE 29. FLOW OF INCREMENTAL NET BENEFITS FOR CHICKEN ENTERPRISE.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FINANCIAL RATE										
FIXED COSTS										
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$370.00	\$6.00	\$96.00	\$6.00	\$96.00	\$286.00	\$96.00	\$0.00	\$0.00	\$0.00
CHICKEN HOUSE	\$3871.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6.00	\$96.00	\$6.00
PUMPS, TANKS	\$2100.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$6706.40	\$6.00	\$96.00	\$6.00	\$96.00	\$286.00	\$0.00	\$0.00	\$0.00	\$0.00
CONTINGENCY (10%)	\$670.64	\$0.60	\$9.60	\$0.60	\$9.60	\$28.60	\$9.60	\$6.00	\$96.00	\$6.00
TOTAL	\$7377.04	\$6.60	\$105.60	\$6.60	\$105.60	\$314.60	\$105.60	\$6.60	\$105.60	\$6.60
VARIABLE COSTS										
CHICKS	\$480.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00	\$960.00
FEED	\$2368.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00	\$4735.00
VACCINATIONS	\$40.80	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60	\$81.60
TRANSPORTATION	\$88.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00	\$176.00
SANITATION	\$83.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00	\$166.00
MAINTENANCE	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21	\$11.21
INTEREST WORKING CAP.	\$276.39	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68	\$551.68
TOTAL	\$3347.40	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49	\$6681.49
TOTAL COST	\$10724.44	\$6688.09	\$6787.09	\$6688.09	\$6787.09	\$6996.09	\$6787.09	\$6688.09	\$6787.09	\$6688.09
GROSS RETURNS	\$3843.56	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12	\$7687.12
RETURNS TO CAPITAL, LAND AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$6880.88)	\$999.03	\$900.03	\$999.03	\$900.03	\$691.03	\$900.03	\$999.03	\$900.03	\$999.03
OPERATOR'S LABOR										
CHICKENS	\$785.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00	\$1570.00
RETURNS TO CAPITAL AND LAND	(\$7665.88)	(\$570.97)	(\$669.97)	(\$570.97)	(\$669.97)	(\$878.97)	(\$669.97)	(\$570.97)	(\$669.97)	(\$570.97)

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YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1932.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$235.50	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$131.00	\$6.00	\$6.00	\$6.00	\$62.50
\$381.11	\$0.00	\$0.00	\$0.00	\$0.00	\$381.11	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$459.00	\$0.00	\$0.00	\$0.00	\$0.00	\$459.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67.80
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$1075.61	\$6.00	\$6.00	\$6.00	\$6.00	\$1060.61	\$131.00	\$6.00	\$6.00	\$6.00	\$285.00
\$107.56	\$0.60	\$0.60	\$0.60	\$0.60	\$106.06	\$13.10	\$0.60	\$0.60	\$0.60	\$0.00
\$1183.17	\$6.60	\$6.60	\$6.60	\$6.60	\$1166.67	\$144.10	\$6.60	\$6.60	\$6.60	\$2347.30
\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$0.00
\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$0.00
\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$0.00
\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$0.00
\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$0.00
\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$0.00
\$529.57	\$533.48	\$533.48	\$529.57	\$533.48	\$533.48	\$529.57	\$533.48	\$533.48	\$529.57	\$0.00
\$6413.65	\$6461.08	\$6461.08	\$6413.65	\$6461.08	\$6461.08	\$6413.65	\$6461.08	\$6461.08	\$6413.65	\$0.00
\$7596.82	\$6467.68	\$6467.68	\$6420.25	\$6467.68	\$7627.76	\$6557.75	\$6467.68	\$6467.68	\$6420.25	\$0.00
\$7468.08	\$7258.72	\$7258.72	\$7468.08	\$7258.72	\$7258.72	\$7468.08	\$7258.72	\$7258.72	\$9815.38	\$0.00
(\$128.74)	\$791.04	\$791.04	\$1047.83	\$791.04	(\$369.04)	\$910.33	\$791.04	\$791.04	\$3395.13	\$0.00
\$288.10	\$339.70	\$339.70	\$288.10	\$339.70	\$339.70	\$288.10	\$339.70	\$339.70	\$288.10	\$0.00
(\$416.84)	\$451.34	\$451.34	\$759.73	\$451.34	(\$708.74)	\$622.23	\$451.34	\$451.34	\$3107.03	\$0.00

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TABLE 28. FLOW OF INCREMENTAL NET BENEFITS FOR FISH-CATTLE MODULE.

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
POND	\$2835.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$360.50	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00
CORRAL	\$381.11	\$0.00	\$0.00	\$0.00	\$0.00	\$220.50	\$6.00	\$6.00	\$131.00	\$6.00
BROODSTOCK	\$67.80	\$0.00	\$0.00	\$0.00	\$0.00	\$381.11	\$0.00	\$0.00	\$0.00	\$6.00
FENCE IMPROVEMENT	\$759.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
PASTURE RE-ESTAB.	\$380.00	\$0.00	\$0.00	\$0.00	\$0.00	\$459.00	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$5148.11	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$0.00	\$0.00	\$0.00	\$0.00
CONTINGENCY (10%)	\$514.81	\$0.60	\$0.60	\$0.60	\$0.60	\$1060.61	\$6.00	\$6.00	\$131.00	\$6.00
TOTAL	\$5662.92	\$6.60	\$6.60	\$6.60	\$6.60	\$1166.67	\$6.60	\$6.60	\$144.10	\$6.60
VARIABLE COSTS										
FISH SEED	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10	\$0.00	\$34.10	\$34.10
STOCKERS	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00	\$5000.00
FERTILIZER	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42	\$0.00	\$9.42	\$9.42
FEED	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08	\$254.08
CROP INSURANCE	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
TRANSPORTATION	\$240.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00	\$480.00
INTEREST WORKING CAP.	\$511.88	\$529.57	\$533.48	\$533.48	\$529.57	\$533.48	\$533.48	\$529.57	\$533.48	\$533.48
TOTAL	\$6199.48	\$6413.65	\$6461.08	\$6461.08	\$6413.65	\$6461.08	\$6461.08	\$6413.65	\$6461.08	\$6461.08
TOTAL COSTS	\$11862.41	\$6420.25	\$6467.68	\$6467.68	\$6420.25	\$7627.76	\$6467.68	\$6420.25	\$6605.18	\$6467.68
GROSS RETURNS	\$86.53	\$7410.96	\$7258.72	\$7258.72	\$7468.08	\$7258.72	\$7258.72	\$7468.08	\$7258.72	\$7258.72
NET RETURNS TO CAPITAL, LAND AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$11775.88)	\$990.71	\$791.04	\$791.04	\$1047.83	(\$369.04)	\$791.04	\$1047.83	\$653.54	\$791.04
OPERATOR'S LABOR	\$131.15	\$288.10	\$339.70	\$339.70	\$288.10	\$339.70	\$339.70	\$288.10	\$339.70	\$339.70
NET RETURNS TO CAPITAL AND LAND	(\$11907.03)	\$702.61	\$451.34	\$451.34	\$759.73	(\$708.74)	\$451.34	\$759.73	\$313.84	\$451.34

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YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	RESIDUAL VALUE
\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$91.00	\$6.00	\$26.00	\$6.00	\$6.00	\$16.00	\$20.00	\$6.00	\$6.00	\$6.00	\$2.25
\$540.30	\$0.00	\$0.00	\$0.00	\$0.00	\$540.30	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
\$631.30	\$6.00	\$26.00	\$6.00	\$6.00	\$556.30	\$20.00	\$6.00	\$6.00	\$6.00	\$2.25
\$63.13	\$0.60	\$2.60	\$0.60	\$0.60	\$55.63	\$2.00	\$0.60	\$0.60	\$0.60	\$0.23
\$694.43	\$6.60	\$28.60	\$6.60	\$6.60	\$611.93	\$22.00	\$6.60	\$6.60	\$6.60	\$2.48
\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$0.00
\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$0.00
\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$0.00
\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$0.00
\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$0.00
\$2678.86	\$1991.03	\$2013.03	\$1991.03	\$1991.03	\$2596.36	\$2006.43	\$1991.03	\$1991.03	\$1991.03	\$0.00
\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1635.67	\$0.00
(\$1047.92)	(\$360.09)	(\$382.09)	(\$360.09)	(\$360.09)	(\$965.42)	(\$375.49)	(\$360.09)	(\$360.09)	(\$355.37)	\$0.00
\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$0.00
(\$1471.92)	(\$804.09)	(\$826.09)	(\$804.09)	(\$804.09)	(\$1409.42)	(\$819.49)	(\$804.09)	(\$804.09)	(\$799.37)	\$0.00

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TABLE 31: FLOW OF INCREMENTAL NET BENEFITS FOR DUCK ENTERPRISE

FINANCIAL RATE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
FIXED COSTS										
STORAGE SHED	\$364.70	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$105.00	\$6.00	\$6.00	\$6.00	\$26.00	\$16.00	\$6.00	\$6.00	\$26.00	\$6.00
CORRAL	\$540.30	\$0.00	\$0.00	\$0.00	\$0.00	\$540.30	\$0.00	\$0.00	\$0.00	\$0.00
SUBTOTAL	\$1010.00	\$6.00	\$6.00	\$6.00	\$26.00	\$556.30	\$6.00	\$6.00	\$26.00	\$6.00
CONTINGENCY (10%)	\$101.00	\$0.60	\$0.60	\$0.60	\$2.60	\$55.63	\$0.60	\$0.60	\$2.60	\$0.60
SUBTOTAL	\$1111.00	\$6.60	\$6.60	\$6.60	\$28.60	\$611.93	\$6.60	\$6.60	\$28.60	\$6.60
VARIABLE COSTS										
DUCKLINGS 1/ FEED 1/ MARKETING	\$148.50	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00	\$297.00
INTEREST WORKING CAP.	\$600.60	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20	\$1201.20
	\$161.19	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38	\$322.38
	\$81.93	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85	\$163.85
SUBTOTAL	\$992.22	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43	\$1984.43
TOTAL COST	\$2103.22	\$1991.03	\$1991.03	\$1991.03	\$2013.03	\$2596.36	\$1991.03	\$1991.03	\$2013.03	\$1991.03
GROSS RETURNS	\$815.47	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94	\$1630.94
NET RETURNS TO CAPITAL, LAND, AND MANAGEMENT (WITHOUT OPERATOR'S LABOR)	(\$1287.75)	(\$360.09)	(\$360.09)	(\$360.09)	(\$382.09)	(\$965.42)	(\$360.09)	(\$360.09)	(\$382.09)	(\$360.09)
OPERATOR'S LABOR										
DUCKS	\$229.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00	\$444.00
NET RETURNS TO CAPITAL AND LAND 1/INCLUDES TRANSPORT	(\$1516.75)	(\$804.09)	(\$804.09)	(\$804.09)	(\$826.09)	(\$1409.42)	(\$804.09)	(\$804.09)	(\$826.09)	(\$804.09)

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