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USAID/PERU

PROJECT REVIEW PAPER

Title: Research and Development in Fresh-Water Fisheries

Project: 527-11-180-144

FY Proposed for Initial Financing:

Category: Food and Nutrition Development Grant

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PROJECT DEVELOPMENT TEAM

USAID

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I. Priority and Relevance

Background

Fisheries, particularly the anchovy fishmeal industry, has historically contributed significantly to Peruvian export earnings and domestic protein supplies. The Ministry of Fisheries (MinFish) created in December, 1969 by the Revolutionary Military Government, has also increasingly emphasized development of fisheries for human consumption, especially based on ocean resources.

Now for various reasons, the Peruvian Government has placed increased emphasis on developing inland fisheries, especially in the Sierra, which is the focus of this proposed project. These reasons include belief that: a) it will prove to be an economic source of protein for the indigenous population, the majority of whom are small-scale farmers, b) under-employed farm workers would be better utilized and c) higher family incomes would be generated by establishing fish culture as an additional economic activity.

This project will test these assumptions, determine resource potentials, and prescribe improved production, management, and marketing technology.

The soil, water and topographical characteristics of the Sierra area lends itself to this type of development. Stocking of natural lakes and reservoirs is a relatively low-investment, high-return activity and exploitation requires little capital investment or specialized labor/management skills. It is also highly labor intensive. Community interest and acceptance is another reason fish culture ranks highly with the GOP.

In addition to the program of stocking natural waterways, the GOP's plans call for development of small-scale fish farms for independent, small and medium-sized farmers, and larger-scale integrated fish-factory complexes that are being introduced into the large cooperative or communal units formed under the agrarian reform process. Related to this development is EPSEP's (Empresa Pública de Servicios Pesqueros) ^{1/} fish-factory complex currently being constructed in the Department of Junin (village of Quichuay near Huancayo). GOP officials indicate that the purpose of this state-owned complex, which includes a hatchery, growing tanks, a processing unit and cold storage facilities, is to serve as the axis around which a vertically-integrated, trout-production complex can be developed in the Huancayo valley.

GOP Goals relative to In-land Fisheries Development

The MinFish's inland fisheries development programs are designed to contribute to the solution of the following problems:

1. shortages of protein of animal origin at a price conducive to improving diets of low-income populations;
2. inefficient management of existing natural water resources, compounded by a lack of effective farm organizations capable of managing them;
3. high costs of intensive methods of trout production (fish farms) prohibit consumption by low-income families, so cheaper means of production must be developed, including stocking of natural waterways and cultivation of species other than trout;
4. lack of basic information of productive potential of waterways, especially in the high-mountain areas, has thus far inhibited proper exploitation of these resources;

^{1/} EPSEP (Public Enterprise for Fisheries Services) is a semi-autonomous agency in charge of commercial management and marketing of fish in Peru.

5. low-levels of technical skills both in professional areas (research and production) and among the farming population, especially as regards fishing techniques and management of fish farms, and
6. general deterioration of aquatic resources due to contamination from agriculture and mining activities in the mountain regions.

Specific Program Elements for In-land Fisheries Development

Existing GOP programs may be conveniently divided into three categories:

1. biological and economic research,
2. promotion of the commercial exploitation of trout orestias (catfish), pygidae and other species among individual farmers and various collective farm organizations, and
3. development of large-scale, vertically-integrated trout factories whose end product is destined largely for the world export market.

Assistance is required in all of the program categories. Details of USAID's proposed participation are presented below (part III), but a word on the philosophy guiding the choice of specific USAID inputs will provide the methodological framework within which the USAID-financed assistance is to operate.

The principle guiding the selection of programs and specific types of experts to provide maximum impact on development is that to be cost effective, assistance must be comprehensive and cover a broad spectrum of activities linked by technical and economic factors. Failure of any link weakens the whole system. USAID has selected the weakest, most critical links for concentrated assistance. Furthermore, the improvement in technical and managerial know-how that will be generated by this assistance is not sufficient. In our view, capital inputs will also be required to exploit gains in technology. Thus, depending on the results of the grant funded pilot program, the total assistance package could include a loan (perhaps for FY 78) which would serve to carry the program to a self-sustaining level sufficiently successful to support long-term development of the inland fisheries program.

The GOP Budget

The MinFish's operating and investment budget related to inland fisheries development for 1975-76, totals \$1.87 million (Table I). This compares to \$1.38 million budgeted for 1973-74, indicating a modest increase in emphasis on inland fisheries development. Additionally, as also indicated in Table I, \$3.36 million will be invested by EPSEP in the fish-factory at Quichuay, which when combined with the MinFish's budget, represents approximately a four fold increase in the total budget directed at development of inland fisheries.

TABLE I

Operating and Investment Budgets for Inland Fisheries,
Ministry of Fisheries and EPSEP, 1975-1976

(Million \$) 1/

<u>ITEM</u>	<u>AMOUNTS</u>
1. <u>Ministry Operating Budget, total</u>	<u>1.03</u>
a. Salaries	0.57
b. Other	0.46
2. <u>Ministry Investment Budget, total</u>	<u>0.84</u>
a. Sub-program 01 - Fish Station at Ingenio, studies, feed plant, etc.	0.52
b. Enlargement of fish station at Coima	0.02
c. Fishing port at Puno, fish stations at Cuzco, Madre de Dios and Apurimac	0.29
3. <u>EPSEP Fishfactory at Quichuay, total (1975-77)</u>	<u>3.36</u>
a. Working capital	0.08
b. Land, buildings, equipment and other fixed assets	3.28
4. <u>TOTAL BUDGET for Inland Fisheries</u>	<u>5.23</u>

1/ Converted from Soles (\$1.00 = 43.38 Soles)

Note: Totals do not add due to rounding

This proposed project will be focussed on development of inland fisheries in the Department of Junin (Ingenio) where nearly one-half of the MinFish's 1975-76 budget is to be concentrated and EPSEP's major investment in the fishfactory complex at Quichuay is located.

II. Administering Agency

The grantee is the Ministry of Fisheries (MinFish) and the executive agencies are the Bureau of Continental Fisheries and EPSEP which have responsibility for implementation of various aspects of the project. The Bureau has three regional centers for purposes of implementing regional research and development projects. These are: 1) the Northern Continental Fisheries Division, 2) the Central Division at Huancayo, and 3) the Southern Division located at Puno. EPSEP operates from central offices in Lima, but has established branch offices where necessary to implement specific projects.

Principal counterparts for the proposed technical advisors will be the Director of the Junin Zonal Office of the MinFish, the Director of the Ingenio Experiment Station, and the manager of the EPSEP Fishfactory at Quichuay. Headquarters and personnel of other fish culture stations will also be involved in the project at varying stages to various degrees. If other professionals are deemed necessary by the intensive review for full time project collaboration in the project, no major difficulty is foreseen by responsible MinFish administrators in obtaining the required budget for additional personnel.

III. Description of Project

The project is designed to improve the income, employment and nutritional levels of small farmers located in the economically-depressed highlands of the country. Its primary purpose is to assist in the development of commercial fisheries in highland natural and artificial lakes that are presently owned or administered by associative agricultural enterprises. Efforts will be directed towards: 1) developing basic information through research, 2) establishing and developing adequate production facilities, and 3) establishing and developing marketing channels adequate to insure economically priced supplies of fresh and processed fish to low income families in the Sierra and in coastal cities.

The project directly supports the MinFish's three-stage program for developing commercial fishing in fresh-water lakes and reservoirs, which includes: 1) biological/economic surveys of lakes and reservoirs in Junin to determine basic indexes of feasibility, 2) a pilot commercial fisheries enterprise which will test the technical and economic soundness of this activity, and 3) expansion to other regions of the Sierra if the pilot program proves viable.

Technical Advisors (\$264,000)^{1/}

During the two year period of this technical assistance project the following specialists are tentatively identified as being required to achieve project objectives;

1. Fisheries Biologist (12 m/m) will be provided to determine indices of productivity for natural lakes and reservoirs. ^{2/}
2. Aquaculturist (18 m/m), expert in management of trout hatcheries and fish farms, to advise on improvements in management of government-operated hatcheries and experiment stations, to advise on implementation of EPSEP's pilot production unit at Quichuay, and to advise MinFish on promotion of fishculture among individual farmers and collective units organized under the Agrarian Reform.
2. Economist (6 m/m), expert in the economics of production and marketing of fish, to advise on studies necessary to determine economic feasibility of the pilot project; including estimates of production costs and market demand for alternative enterprises.
3. Nutritionist (12 m/m), expert in selection of balanced diets capable of developing economically and technically adequate diets from locally available raw materials.
4. Production Engineer (6 m/m), expert in processing and freezing facilities to select equipment and supervise initial production runs of the pilot fishfactory complex.

Additional experts, totalling no more than 12 m/m, will be utilized to advise on selected aspects of the development of commercial inland fisheries. The required technicians and their scope of work will be jointly identified by the Aquaculturist and his Peruvian counterparts during the first year (FY 76) of the project. Required specialties tentatively identified in addition to those named above are genetics, management, and engineering.

Other Inputs (\$186,000)

Participant training and short-term visits will be provided on a limited basis (\$36,000 for the two-year period) in critical technical fields described above. Funds will not be used for degree-type training

^{1/} 56 m/m at \$4,000/m-m. Does not include technical advisors projected to assist in development of the Project Proposal (See Table II, below).

^{2/} Three lakes, Abascocha, Pomascocha, and Nahuinpuquio were tentatively identified for in-depth study.

but rather, key ministry personnel will be given intensive, practical courses in research methods, management techniques and the like. Visits by high-level managers and technicians to successful inland fisheries projects in Latin America are expected to play an important role in the training process.

Funds for laboratory equipment, vehicles, and other required equipment will be provided in quantities not to exceed a total value of \$150,000.

IV. Beneficiary

The project will primarily benefit small farmers located in the highlands (Sierra) of Peru. Most of these farmers work in associative groups defined and institutionalized by Agrarian Reform such as Agricultural Societies of Social Interest, Production Cooperatives, and Indian Communities.

The project will create productive employment for the under-employed farmers working in these associative enterprises. The current economy of which is based principally on wool, mutton and subsistence food crops. Also, the project will increase the economic stability of these organizations and foster sustained, balanced growth by providing for 1) diversification of production and 2) introduction of agro-industrial activities (e.g. fish canning and freezing, processing of fish feeds). It is expected that the project will raise income levels, permitting farmers to increase consumption of goods from other sectors of the economy. This in turn will strengthen intersectoral linkages and contribute to general economic growth through the multiplier effects of the new activities. Furthermore, the farmer's diet will be improved through increased consumption of fish protein, which will include trout harvested from natural lakes and other species grown in small, cheaply constructed farm ponds.

V. Project Design

- Goal: To improve the employment, income, and nutritional status of the economically-marginal, rural population of the Peruvian Sierra.
- Purpose: To assist in the development of commercial fisheries in highland lakes and on fish farms owned and managed by cooperative enterprises in the Sierra provinces and to assist the COP to establish marketing and processing facilities.
- Outputs:
- 1) Biological and economic research necessary for testing the economic and technical feasibility of trout and other species in natural lakes (stocking) and in tank farms in the Sierra.
 - 2) Establishment of a research and production unit which will:
 - (a) provide for adaptive research in fish species, (b) test

alternative feed rations and estimate minimum-cost rations, (c) produce fingerlings for stocking of natural lakes and tank farms, and (d) provide for extension of technical and managerial information to producers.

- 3) Development of a pilot commercial processing and marketing facility capable of producing trout for export markets as well as trout and other species for domestic consumption.

Inputs: Technical Advisors (\$264,000)

- 1) A biologist to assist in the development of a comprehensive survey of highland lakes to determine (12 m/m): a) the number of lakes and total area suitable for stocking, b) the number of fingerlings required for initial and annual stocking in the region, c) estimates of rates of growth, marketing catch and gear selection in a pilot project, d) costs of fingerling production vs. benefits to the regional economy.
 - 2) An Aquaculturist, expert in fishculture research to develop recommendations for construction and management of experiment stations, management of fishfarms to evaluate current problems, and to develop pilot fishfarms with linkages to the experiment stations (18 m/m).
 - 3) An Economist, expert in fisheries, to advise on economic analysis of the diverse elements of the total project, including the anticipated costs and benefits of producing various species of fish (6 m/m).
 - 4) A Nutritionist, expert in balanced-feed rations for fish with knowledge of commercial production to develop a program study designed to determine alternative rations, sources of supply, costs, location of feed plant, etc. (12 m/m).
 - 5) A Production Engineer, expert in processing and freezing facilities to select equipment and supervise early production runs of the pilot processing plant (6 m/m).
- 6) Selected short-term consultants (12 m/m).

Training: (\$36,000)

Short-term practical courses in relevant disciplines, including research methodology, management and operation of facilities, handling of breeding stock, feeds and feeding, and the like. Visits to successful fishfarm/research projects in Latin America are expected

Commodities: (\$150,000)

- 1) Laboratory equipment,
- 2) vehicles for use by the technical advisors and their counterparts, and
- 3) other research and test equipment for the pilot project.

End-of-project Status: It is expected that upon completion of the two-year project: 1) The trout experiment station will be in place and functioning efficiently, 2) a pilot production, processing and marketing unit will be operating, 3) ten lakes will have been stocked with appropriate species and their production potential estimated. Sufficient information from studies will have been developed to enable a sound biological, technical, and economic projection of costs and benefits to be derived from expansion of farms, stocking operations and marketing and processing facilities.

If the pilot project proves economically and technically feasible, USAID will consider developing loan proposals for FY 78 whose purpose would be to assist the GOP to expand operations throughout the Sierra.

Place in Government Programs: Major GOP goals are to improve the income, employment and nutritional status of small farmers in the highlands. In line with this program of stimulating maximum use of human and natural resources, GOP promotion of fish-culture is designed to exploit the productive capacity of natural lakes, reservoirs, and rivers, and to develop intensive cultivation of fish in tanks owned and operated by associative enterprises being developed under the Agrarian Reform. In the words of an Auburn University evaluator: "There is excellent potential for trout farming in Peru, especially in the Departments of Junin, Huancayo and Jauja". There is suitable soils, water and topography and considerable interest on the part of producers. However, there is a general lack of management expertise, credit, feed and processing and marketing facilities. Moreover, while several experimental hatcheries and pilot fish farms have been established, little useful data has been generated. Problems that require solution before existing hatcheries and farms could serve as a basis for an expanded inland fisheries industry include:

- 1) polluted water supplies;
- 2) lack of adequate production records (data needed include number and weight, market potential, feed composition, amount of feed used, monthly growth rates, feed conversion, temperature records, and flow rates of water);
- 3) management procedures should be standardized, preferably in manual form; and

- 4) stocking policies that take into account water productivity, flow rates, size of lake or river, harvest rate, natural reproduction and marketing rates.

VI. Background: USAID Assistance to Peru in Fresh-Water Fisheries

During 1967 USAID contracted with H.W. Maynard and Company to study the "Fishing Industry for Human Consumption in Southern Peru". The study leader Thaenum, investigated natural resources, the sea fish industry, and distribution systems and marketing channels, including analysis of wholesale and retail prices. The report included three page Annex on fisheries in Lake Titicaca, stressing the economic and social importance of this inland water resource to southern Peru. It mentions that in 1967 a U.N. technician investigated the ecology and marine biology of the lake. Also, the availability of a Peace Corps Volunteer from the U.S. with inland fishery experience stimulated the preparation of a program outline intended to establish production parameters for the lake. This program was begun in 1971 with technical assistance provided by scientists from the University of the Pacific and the University of California at Davis.

During mid-1970 Moss and Smitherman of the University of Auburn (AID Project-csd-2270) prepared a "Fishculture Survey Report" for the country. The purpose of this exercise was to provide technical advice on the development of inland fisheries, particularly focussing on aquaculture. Major recommendations were (1) short-term training of selected supervisory and technical personnel, (2) control of the exploitation and re-stocking of Lake Titicaca to ensure recovery of the trout population, and (3) establishment of a research station to serve the Amazon region. Few of these recommendations have been implemented as yet, although most are included in 1975-78 development plan.

Shell completed a report on the "Status of Trout Culture in Peru" (August, 1971), also under the above AID Contract. The purpose of the survey was to evaluate the potential for trout farming in Peru and to evaluate certain aspects of the Ministry of Fisheries' proposed program for the development of the trout-farming industry. Major recommendations were (1) construction of a demonstration trout farm in Ancash, (2) construction of a trout farm at the Junin hatchery, (3) collection of trout eggs at the Pallajchuma River for developing the trout farming industry in Peru, and (4) construction of a large trout farm on the Chacachimpa River near Junin. All recommendations have been implemented.

Moss (Auburn University) completed the report "Aquacultural Developments in Peru" in April, 1972, recommending: (1) construction of a warm-water agricultural research center in the Amazon region, (2) an in-country training program and a graduate training program for technicians from the Ministry of Fisheries, (3) surveying all fresh-water fish experiment stations in Peru to determine major contributions of each to the national

fisheries program, and (4) reorganizing the Ministry of Fisheries in order to eliminate duplicative efforts among various agencies. Recommendation #1 is being implemented but the remaining three are still in the planning stages. This project will help implement these three recommendations.

A study by Davies and Shelton from Auburn University (AID/csd-2270) during September 1974 provided the Ministry of Fisheries with recommendations for developing a realistic program of stocking, management and harvesting of fish for lakes in the Central and Southern Sierra regions. They also evaluated fish hatchery and farming activities to determine the degree to which recommendations from the above, earlier surveys were being implemented. Their report noted that "virtually no data is available on catch per unit of effort, size composition of the catch, or age selection", information which is necessary for adequate evaluation of present and potential stocking operations in lakes and streams. Based on a cursory survey of seven representative highland lakes, and application of relevant productivity indexes, favorable levels of yield were projected, indicating that the biological potential of many natural waterways may be sufficient to support development of commercial trout fisheries. However, owing to a lack of essential data, they recommended an expanded program of research, suggesting the technical assistance required to initiate the program.

Specific suggestions for a technical assistance program included assigning a full-time Peruvian biologist to determine: 1) the number of lakes and total area suitable for trout production, 2) the approximate number of trout required for initial and annual stocking in the region, 3) estimates of rates of growth, mortality, catch, and gear selection in a pilot project (they suggested lakes Nahumpuquio and Abascocha), and 4) costs of fingerling production vs. benefits to the regions economy from potential harvest. They also suggested that an advisor be financed to assist the MinFish in implementing the project.

(Information on AID experience in programs in other countries whose results have relevance to the present proposed program will be provided by AID/W.)

VII. Other Donor Coordination

The UN-FAO is involved almost exclusively in the development of marketing and processing systems of fish for human consumption, based on marine exploitation. They have advised EPSEP informally on development of their integrated fresh-water project at Quichuay in the Central Sierra (near Huancayo). The project includes fingerling production, feeding tanks, a processing plant, and freezing facilities. They expect to establish nine additional farms in the Huancayo region in a second stage, ultimately producing around 3,000 MT annually.

Also, the Ministry of Fisheries is processing an EPSEP request for technical and financial assistance for establishing a model fish-factory in Quichuay. Danish authorities indicate that they will be able to finance one of the four technicians being requested.

The Directorate General of Continental Waters (DIPAC) of the Institute of the Sea (IMARPE), a semi-autonomous research and development agency of the Peruvian Government, has carried out limited programs of basic research in fresh-water fisheries. These programs include investigation of warm water species in the jungle areas and the causes of the virtual disappearance of lake trout in the Lake Titicaca in the late 1960s. They have carried out a series of basic studies of the lake and its flora and fauna during the last three years, assisted during 1972-73 by experts from the University of the Pacific, Stockton, California, and the University of California at Davis. Their work was financed by diverse groups, including their respective Universities. Lack of funds required early termination of the research in December, 1973.

VIII. Financial Plan

The plan for financing the project includes grants of \$477,000 distributed over FY 75 through FY 77 and a possible loan in FY 78 (see Table II).

During FY 75 USAID will grant \$27,000 (technical support funds, 4th quarter) to finance the cost of US technicians participating in the development of a biological and economic analysis required to develop the Project Paper. It is estimated that 9 m/m at a cost of \$3,000/m will be required to execute the necessary technical and economic studies which will include feasibility studies for fish farms, organizational development, recommendations for required research projects, and development of work plans for the key advisors described above.

The GOP contribution during Phase I amounts to \$13,000 for covering costs of counterpart technicians and for provision of such items as secretarial services, office space, transportation, and laboratory equipment.

During FY 76 and 77, USAID will provide grants totaling \$150,000 and \$300,000, respectively, to cover the cost of major activities of the program, including commodities and training inputs totaling up to \$186,000 and technical advisors' services of up to \$264,000. The GOP counterpart contribution during this period is estimated to be \$3,697,000. This figure includes the cost of counterpart technicians, local support services and equipment.

Finally, a loan to the Ministry of Fisheries for implementation during FY 78 to expand commercial fisheries to other regions of Peru, primarily in the Central and Southern Sierra, will be considered pending results of the pilot project.

IX. Project Development Schedule

Approximately 4 1/2 months will be required to develop the final Project Paper. Development will begin in May 1975 upon receipt of authorization from AID/W. The anticipated date for submission to AID/W is September 15, 1975. A description of major tasks, timing, personnel requirements and costs follows, and is summarized in Table III.

Organization of a project development team composed of USAID staff and GOP technicians will be finalized in late April. The team will develop detailed work plans for technical advisors and will identify data required for the technical, economic and social analysis required for project justification. Terms of reference for the required studies will also be developed.

Various outside advisors will be contracted in May to assist in data collection and analysis. Advisors needed include Economist, Aquaculturist, and Nutritionist. Total costs of outside assistance are estimated to be \$27,000. Major points requiring preliminary analysis are: 1) The status of biological research on water resources and fish species adaptable to varying environmental conditions, 2) availability of feed supplies, 3) employment (income generating aspects of fishculture, 4) markets and demand for trout and other species, and 5) evaluation of skills required at all levels of the research production and marketing process.

Reports by various TDY and GOP technicians will be summarized and included in the final Project Paper. Final writing will be the responsibility of the USAID Agricultural Division and the Program Office. The estimated completion date is September 15, 1975.

X. Analysis

Although the GOP has committed substantial resources to development of trout fisheries in the Sierra, it is apparent that the decision was more intuitive than based on sound technical and economic analyses of the feasibility and potential benefits of such a program. Therefore, the purpose of this project is to conduct such analyses through provision of advisors and financial support to a program of basic research and analysis of the results of a pilot project.

Preliminary analyses required to establish the reasonableness of the program include evaluation of the technical and economic feasibility of production. Ongoing research and production projects will be surveyed to determine preliminary indications of costs, feed availability, the

availability of sufficient water supplies, environmental problems, and the like. Reports by outside advisors summarized above will be updated in so far as possible by additional field investigations. Data generated during the last two years by the several fishculture stations operated by the MinFish will be collected and analyzed to this end.

Potential economic benefits of fishculture development will be analyzed in a preliminary fashion by developing data on production costs, employment and demand. Several preliminary studies are available which will form the basis for the expanded analysis. Marketing and price studies form part of the feasibility study currently being conducted for the EPSEP pilot fish factory at Quichuay, as well as technical/engineering analyses. These will be evaluated and expanded as necessary to establish measures of potential economic benefits.

XI. Issues

1. Current prices of trout in the Huancayo region, which appear to closely reflect the production costs of fish-farms, ranged from S/.40 to S/.60 per kilogram during 1974. Budgets of lower-income consumers in the rural areas obviously will not permit them to consume trout at this price. Thus, trout fisheries will have little if any direct impact on protein intake of lower-income families.

The PP must carefully explore, in this regard, a) the indirect nutritional benefits to be derived from commercial exploitation of trout, b) the possibilities for low-cost exploitation of trout in natural waterways, and c) the possibilities for introducing species which may provide cheaper protein supplies than trout.

2. Successful development of vertically-integrated, production and marketing complex for trout fisheries depends on close and effective cooperation between the MinFish and EPSEP, with the former carrying major responsibility for research and breeding and the latter for development of marketing and processing facilities. Interviews with key personnel in both organization reveal an absence of cooperation currently. This problem must be resolved before agreeing to provide the technical assistance inputs discussed in this proposal, particularly because of the importance of the fishfactory as a marketing and processing outlet, for its research value to the project on feed alternatives, costs of production, etc., and for its potential roles in technical assistance to the small producers, source of supply for fingerlings, etc.

TABLE II

FINANCIAL PLAN

Phase and FY		A.- A.I.D. CONTRIBUTION	B.- G.O.P. CONTRIBUTION		
Phase	FY	Item	Amount	Item	Amount
I	75	<u>Technical support to develop Project Proposal</u>	\$27,000		
		- 3 m/m aquaculturist		- Counterpart personnel, (18 m/m at \$500 m/m)	\$ 9,000
		- 3 m/m advisor in research design, nutrition requirements, etc.		- Secretarial services (3 m/m x 2 sec. x \$100)	600
		- 3 m/m economist		- office space and equip.	3,400
II	76	<u>Pilot Commercial Fisheries Program</u>	\$150,000	- Counterpart personnel (research technicians, management personnel, laborers, and Secretaries).	\$57,800
	77	<u>Pilot Commercial Fisheries Program</u>	\$300,000	- Facilities (experim. station, tank farms office space and fish factory Ingenio (267,200) Quichuay (\$3,359,000)	\$3,626,200
		TOTAL:	\$477,000		\$3,697,000
III	78	<u>Extension of Project to other Regions of the Sierra</u>	(Loan)		

TABLE III

PROJECT DEVELOPMENT SCHEDULE

TASK	DATES (1975)	COSTS	PERSONNEL REQUIREMENTS
1. Organization of Project Develop. Team, outline of work, identification of data availability and requirements, on site review of project areas.	May 1-15	Travel and secretarial services \$500.	USAID - Agr. Economist and Technical Assistant GOP - Project Manager and two assistance TDY - None
2. Collection of basic data and interviews with GOP officials and technicians and analysis of basic data.	May 15- Aug 15	TDY consultants \$27,000	TDY 1 - Economist 2 - Aquaculturist 3 - Nutrition Spec. USAID 1 - Agr. Economist 2 - Tech. Assistant GOP 1 - Biol. Researchers 2 - Ag. Engineers 3 - Management pers.
3. Preparation of final Project Paper	Aug 15- Sept 15	--	USAID Staff