

DCAE9E
Rm 3378
6/4-2:00

PROJECT EVALUATION SUMMARY (PES) Part II
SMALL SCALE FISHERIES DEVELOPMENT 497-0286

Summary

The Small Scale Fisheries Development Project consists of six sub-projects, namely : 1) Pilot Flake Ice Plant;; 2) Tambak Extension Service; 3) Floating Fish Cage Culture; 4) Rice/fish Culture; 5) Freshwater Shrimp Production; and 6) Artisanal Fishery Management.

The project is currently in its third year, having been funded in 1980-1981 for disbursement over the five years FY 81-86. Funding consists of a USAID grant of US\$ 3 million, primarily intended for U.S. technician's salaries, vehicles, and scientific equipment, and GOI funds for hatchery construction, housing support, vehicle support, and indigenous project personnel.

The project is chronologically near mid-point, although some of the various sub-projects are nearing completion while others have scarcely begun or not begun at all. Listed below in chronological order are the summaries of the six sub-projects.

A. Pilot Flake Ice Plant

The sub-project is approximately 10 months behind schedule, primarily due to delays in procuring and importing the ice plant. Further delays were encountered due to the necessity to alter the ice plant building to accommodate a larger-than-anticipated ice making machine.

The physical facility is completed except for some final soldering connections and some plumbing repairs which are expected to be completed by 1 July 1983. The project technician predicts that the plant will be producing ice before 1 August 1983.

Both the sub-project technician and the Dinas Perikanan Chief are enthused and optimistic that sub-project goals will be achieved.

The most pervasive problems associated with this sub-project have been technical support and scheduling problems. The PP provides for a refrigerator technician to arrive after the ice plant is on site. Upon completion of installation and after a short running-in period, the refrigeration technician was to leave country, to be replaced by a junior economist who was to act as sub-project manager and attempt to gauge the effectiveness of the sub-project and create a data base for use in the expected project replication. Instead, one quality control/shrimp processing technician was brought on board approximately 6 months prior to the arrival of the ice plant and he will depart country a few days after start-up, leaving the sub-project without a manager.

B. Tambak Extension

This sub-project has had one technician in-country for almost one year, and is nearing completion. The sub-project objective is to assist the DGF provincial officials in four provinces to increase the effectiveness and services of their tambak extension programs.

|

The sub-project technician has spent a great deal of time in the field - 64% of his time - gathering program information and identifying needs. There is evidence to suggest that the sub-project would have been better served by a technician who is well grounded in tambak production technique and methodology. It also appears that the geographic territory may have been too extensive for one technician to adequately serve.

The technician has recommended to DGF that a Tambak Advisory Group be formed (Appendix I), the group to consist of representatives from DGF Office of Production, Kepala Dinas West Java, East Java, Central Java, and South Sulawesi. Apparently the DGF has agreed to form the group, because a meeting was held in Semarang in mid-May with representatives from the sub-project provinces. It is currently unclear whether or not the DGF will continue to hold the Group meetings after the sub-project technician has departed post.

C. Floating Fish Cages

This sub-project has not yet commenced due to the difficulty of identifying a suitably qualified technician to assume the sub-project management position.

Since the cage culture methodology to be addressed is apparently practiced only in Vietnam and Cambodia, it may be advantageous to seek a knowledgeable technician from the Vietnamese and Cambodian refugee population in the U.S.

The Project Manager will make a concerted effort to have a project technician on site by September 1983. Housing, a vehicle, and both DGF and USAID support funds are available.

Some misunderstanding of this very important sub-project seems to exist in the minds of both DGF and USAID planners, due to the scarcity of written material available on the fast-water, high-density stocking method this sub-project seeks to introduce to Indonesia. The method originated in Cambodia, spread south to Vietnam, and has not been replicated elsewhere despite its huge success in its originating area. The sub-project has very little in common with the fish entrapment enclosures on lakes and estuaries and the low-stocking density floating cages located on canals and slow moving streams. Selection of a properly qualified technician is vitally important to the eventual success of this sub-project.

D. Rice/Fish Culture

The rice-fish culture sub-project located in North Sumatera has not yet been implemented. The evaluation has been conducted with the objective of verifying the validity of the assumptions made during the preparation of the project, and the inputs made by the GOI and USAID.

Measures taken by the GOI in the sub-project area to control the rice cropping pattern will effect the pattern of rice-fish culture as well. The development of running water systems and race-ways for growing fish will open new opportunities for rice-fish culture activities by providing fingerlings to the new industry.

Some adjustments of the sub-project's inputs are needed to optimize the expected outputs. Adjustments of some of the outputs are also needed, particularly the fish fry production of the two hatcheries.

E. Fresh Water Shrimp

This sub-project appears to be well on its way toward meeting its objectives, although there is some confusion as to what is expected in terms of the sub-project goals. If the goals are to have 5% of the fresh water fishermen engaged in Macrobrachium shrimp culture through the production of 5 million juveniles per hatchery per year (a total of 20 million young shrimp for stocking purposes), then if constraints (as indicated below) are overcome, the sub-project goals may be met. It is doubtful that goals will be met during the current time frame, and the project may have to be extended to resolve DGF budgetary problems and to implement a shrimp extension program, inventory and distribution system and marketing quality control program.

The goal which suggests the testing of a system of juvenile production by brackish water fish farmers is not feasible. The techniques, methodology, logistics, etc. are too technical for Javanese brackish water fish farms as they exist. Only fresh water farmers can be expected to participate and to utilize post larvae or juveniles which will be produced by the hatcheries.

F. Artisanal Fisheries Management

Since preparation of the project paper some changes have occurred which affect this sub-project. Of major significance was the Presidential decree banning most trawling within 12 miles of the coast of Java. This will impact, both on a short term as well as long term basis, the production by the artisanal fishermen.

To establish a clear basis for proceeding with this sub-project a planning workshop was held in April of 1983 (report attached, Appendix II). As a result of the workshop it has been possible to clearly define the types of data needed and the procedures needed to collect the data on schedule, but by its very nature is long term and will require continuing efforts if all of the objectives are to be reached.

It is recommended, that (1) a statistical analyst be assigned to the program for a minimum of one year and (2) the geographic area of responsibility be reduced to enable the current consultant to devote more time to the establishment of a management program model.

2. Evaluation Methodology

The evaluation was conducted in May/June 1983 and was designed as a mid-project review. The stated purpose of the evaluation was to determine whether the originally envisaged project impact is still probable and if the project design/inputs are adequate and relevant. Based on the evaluation, the team was to make recommendations to modify the scope of the project as needed during the last two years of implementation.

The evaluation schedule included : collection of project data and records; interviews with appropriate DGF officials, consultants and USAID staff; and field trips to subproject sites. Three core questions served as a guide for these data gathering activities.

1. Were the inputs - technical assistance, commodities and training - provided on schedule?
2. Given the current status of input deliveries, is it reasonable to expect that the outputs will be produced on schedule?
3. Based on the progress achieved to date, will project purpose be attained?

The evaluation team was led by Mr. Glenn Walters and included two consultants from the National Marines Fisheries Service, Dr. Aaron Rosenfield and Mr. Keith Brouillard. Two Indonesian fishery experts, Mr. Hadi and Mr. Sunyoto, as well as a member of the USAID staff, Mr. Timothy Mahoney, also participated. Individuals interviewed by the team included :

Mr. Damanhuri	Director of Planning DGF
Mr. Soleh Samsi	Senior staff Directorate of Production
Djoko Sugiarto	Senior staff Directorate of Planning
Ms. Eni Sutopo	Chief Foreign Relation Division
Mr. Soedarman	Chief Dinas Perikanan Yogyakarta
Mr. Bramas	Staff Dinas Perikanan Yogyakarta
Mr. Nur Sejati	Staff Macrobrachium Hatchery Prigi
Mr. Agus Purnomo	Staff Macrobrachium Hatchery Prigi
Mr. Mulyono	Chief Macrobrachium Hatchery Prigi
Mr. Subianto	Staff Macrobrachium Hatchery Prigi
Mr. Patrick Gage	Project Officer USAID/Agriculture
Mr. Tapan Banerjee	Chief of Party/Jakarta
Mr. Jim McVey	Macrobrachium Fisheries Expert/Yogy.
Mr. Billy Miles	Ice Plant Project Expert/Lampung
Mr. Sihiti	Chief Dinas Perikanan Lampung
Mr. Bambang Suboko	Chief Dinas Perikanan North Sumatra
Mr. Syahbandi	Staff Dinas Perikanan North Sumatra
Mr. Matondang	Staff Dinas Perikanan North Sumatra
Mr. Simanjuntak	Staff Dinas Perikanan North Sumatra
Mr. Sinaga	Chief Dinas Perikanan Kabupaten Simalungun
Mr. Sianturi	Staff Fish Hatchery Kerasaan
Mr. Agus Husein	Staff Fish Hatchery Kerasaan
Mr. Siahaan	Staff Fish Hatchery Ambarita
Mr. Richard Dudley	Artisanal Fishery Mgt. Expert/Semarang
Mr. Neil Ross	Tambak Extension Expert/Semarang

3. Goals/Subgoals

The sector goal is to increase annual per capita fish consumption to 18 kg. while improving the quality and variety of food fish available to Indonesians.

At the end of project, assuming all sub-projects are successful, the EOPS will be:

a. A reduction in annual fish losses due to spoilage by 30% below current marketing loss rates in Maringgai, Lampung Province.

Status The flake ice plant sub-project is behind schedule, but all primary commodities are in-country and in place. Discussions with fishing industry representatives indicate that ice will be properly utilized. Although behind schedule, it is anticipated that this sub-goal will be achieved.

b. Ten percent of the tambak on Java and S. Sulawesi will utilize the GOI tambak demonstration ponds (DEMPONDS).

Status Increased utilization of the DEMPONDS by tambak owners cannot be verified. The tambak extension specialist will soon complete his tour and USAID inputs will cease. Tambak Advisory Groups consisting of DGF personnel have been formed, but their eventual impact on tambak farmers cannot be predicted at this time.

c. Fish farmers will have commenced independent construction of floating fish cages near Palembang and Jambi, with at least 30 cages constructed.

Status The floating fish cage sub-project has not yet been implemented due to the difficulty of finding and hiring a suitably qualified technician. Commodity inputs are on hand, ready for the technician's use. This sub-project will be completed late, and it is too early to predict EOPS.

d. Five percent of fresh water fish farmers in Java will be producing fresh water prawns.

Status The fresh water shrimp sub-project will require additional inputs to distribute the shrimp juveniles produced in the hatcheries to the farmers. Successful hatchery operation has been demonstrated and production targets should be met. Distribution difficulties remain to be resolved.

e. Twenty-five percent of irrigated rice fields in North Sumatera will be producing at least one annual fish crop.

Status The rice/fish sub-project has not yet commenced because a suitably qualified technician has not been hired. A technician has been identified and employment negotiations are underway. It is too early to predict EOPS.

f. Marine fish catch, per unit of effort, and marketing will have increased about 5% above current rates along the north coast of Java.

Status The artisanal fishery sub-project has only recently been initiated. The consultant has obtained GOI agreement on the needs and methodology of a management program. Additional technical inputs may be necessary to attain predicted outputs.

4. Sub-Project Assessments

a. Flake Ice Plant

Available evidence seems to suggest that the original assumptions are valid in the case of the flake ice plant sub-project. Considerable interest has been displayed by many fishermen and the Dinas Perikanan expects to produce and utilize the full plant output of 8 M.T./day within one year of start-up. The major unexpected external factor has been the GOI's decision to ban trawling. This decision has resulted in the local sea shrimp catch being reduced by more than half, thereby making it even more imperative that losses due to spoilage be reduced to the absolute minimum.

The DGF project support funds for the sub-project are barely sufficient and should be increased. Example : the project technician must furnish fuel for his project vehicle. Technical personnel from DGF should be provided with on-the-job training at the manufacturers facility as soon as possible. Furthermore, a U.S. technician should be assigned as sub-project manager on a part-time basis for at least one year after start-up. The entrance channel from the ice plant to the river should be dredged to a depth of 4 to 5 feet and funds allocated for annual channel maintenance. The DGF should also procure a small SSB transceiver for communications between the ice plant and Dinas Perikanan at Teluk Betung. If it appears that the ice plant sub-project goals are to be met or exceeded, USAID should provide future year-end funds to purchase a small ice truck and build a powered boat with an insulated ice hold in order to deliver flake ice to remote users at small roadless fishing villages along the coasts.

The sub-project is at mid-term chronologically, but the outputs are not yet measureable. During the next evaluation period it is anticipated that there will be measureable outputs.

There are no current beneficiaries, but the presumed beneficiaries remain as listed in the PP.

A small village has been established near the ice plant. Project planners did not anticipate growth of the village, and the reasons for its growth are unclear. It would appear that the building of the ice plant road and the water delivery system were contributory factors.

The major problems associated with the ice plant sub-project have been scheduling problems: (1) ice plant machinery delivered late; (2) technicians brought on-site too soon; (3) loss of DGF funds due to late signing of the project paper.

In projects which include large machinery and technical assistance components it is vitally important to properly identify the desired machinery in the PIO/C, taking into consideration maintenance and repair parts support requirements.

b. Tambak Extension

The Tambak Extension sub-project technician is nearing the end of his assignment and will depart country in mid-June 1983. This sub-project has not achieved the degree of success envisioned by project planners due to a number of negative factors, namely : 1) the technician chosen to manage the sub-project is not an aquaculturist but rather, a farm extension specialist. Therefore, he lacked the fisheries related expertise to mount an extension program patterned after the Banda Aceh extension plan, as outlined in the PP; 2) apparently the technician received only minimal guidance from USAID project leaders.

The major output from the sub-project has been a series of recommendations - the technician is a gifted writer - and the formation of a Tambak Advisory Group composed entirely of DGF personnel. No cooperatives or farmer's associations are represented on the group. The purpose of the group is to hold monthly meetings to discuss tambak needs, identify solutions, and transmit findings to the field. It is too early to predict the impact of this sub-project on the tambak owners, and currently no satisfactory method exists to measure the impact.

One bureaucratic impediment to this sub-project has been that the BPLPP is responsible for extension, rather than DGF. The DGF has now been granted authority to oversee their own extension programs and presumably will benefit from the change.

All inputs have been delivered with the exception of the short term participant training.

This sub-project is essentially completed, except for monitoring of results. EOPS data should be available for use in the next scheduled PES.

It is not recommended that this sub-project be extended.

c. Floating Fish Cages

The sub-project technician has not been hired, or even identified, so the project has not yet commenced.

If a suitable technician can be located and hired in a timely manner, and if the demonstration cages are constructed and launched within the project time constraints, this sub-project may fulfill EOPS estimates.

There is no deleterious information available to indicate a need for sub-project re-direction, or a need to amend EOPS estimates.

d. Rice/Fish Culture

USAID inputs to the rice-fish culture sub-project have not commenced pending arrival of the project technician in July 1983, GOI inputs have been made to support the sub-project. Major GOI inputs since 1981, beside routine operational expenses for two hatcheries, consist of pilot projects for rice-fish culture, purchase of a truck for the

Krasaan Hatchery, and funding for the construction of a house in Prapat and another house in Pematang Siantar for the sub-project technicians.

Measures to control planting and harvest times for rice, as envisioned in the rice-fish culture project document will become effective starting in the fall of 1983. This change, which is designed to encourage farmers to produce two rice crops/year and at the same time interrupt the life cycle of the brown leaf hopper, will shorten the fallow periods for rice culture. These periods (of 1 1/2 months) might be used to grow fish from fry to fingerling size or to grow fingerlings to greater sizes. The opportunity to grow fish should therefore not be limited to rotational cropping but rather should be directed to both simultaneous and rotational cropping with rice.

With the development of running water systems (irrigation) and race ways recently introduced into North Sumatera, the demand for fish fry and fingerlings is expected to slowly increase.

The fish fry production of the two hatcheries in Kerasan and Ambarita reached 4.5 million fry in 1982. It may be possible to exceed the projected production target of 9.0 million fry at the end of the project, if the role of the small scale breeders could be expanded. The GOI's perception of the project purpose is that increasing fish production should be an instrument for increasing the income of fishfarmers and fishermen, as well as increasing fish consumption. Marketing of the products should therefore be an essential supplement to every production effort even though it is not necessarily an integral part of the subproject. The end of project status (EOPS) for this subproject is that "Twenty five percent of irrigated rice fields in North Sumatra will be producing at least one annual fish crop". It is suggested that the geographical area be restricted to Simalungun Kabupaten.

Beneficiaries of this sub-project are as outlined in the PP.

To optimize the activities and subsequently the output of the sub-project as originally planned, additional facilities for fry rearing are needed at the Ambarita hatchery. These might consist of additional on-land rearing tanks, but due to limited land available, floating rearing devices directly in the lake could be explored. Additional water pumps and air blowers for the aeration of the tanks are also needed.

To support experiments on rice-fish culture techniques, the Krasaan hatchery should utilize trial rice fields on land currently owned by the hatchery, instead of using rice fields owned by rice farmers.

e. Fresh Water Shrimp.

The Macrobrachium hatchery at Samas is not yet completed and other hatcheries have problems with water quality, and during dry seasons with water quantity. The GOI priorities dictate funding and pace of construction, digging of wells and other elements not under the direct influence of the Sub-project technician or AID. Thus the 4 proposed hatcheries probably will not be fully functional on schedule

nor will production levels be reached at all facilities. Nevertheless, it is probable that total productivity levels can be reached through increased efficiency of at least two of the macrobrachium hatcheries, Prigi and Adiraja. Several problems exist in the Macrobrachium sub-project that affect inputs.

1. Unavailability of funds (or insufficiency of funds) for such purposes as communications, personnel services, purchases, repairs, etc.
2. A great deal of difficulty is being experienced in expediting orders for needed equipment. Furthermore, the inordinate amount of time for processing purchases and the lag time before orders are received leads to inefficiency and schedule delays.
3. A great need exists for more vigorous support by DGF for the extension as needed in this sub-project. However, such a service is planned. USAID could improve its interactions between consultants in the various sub-projects to improve extension services to the project as a whole.

Considering the delay in implementation of the fresh water shrimp culture (Macrobrachium) subproject there has been considerable progress made toward goal achievement. Two Macrobrachium shrimp hatcheries are well on the way toward producing their target levels of 5 million Juvenile shrimp per year. It is probable that the subproject will exceed this target if constraints mentioned elsewhere are resolved and all hatcheries proposed are completed and made fully functional (See Appendix 3).

Progress is also being made in developing prawn distribution centers in key locations in Java. An extension type service is being promoted and an inventory communication network is being established.

It is doubtful that the level of 5% of fresh water fish farmers in Java will be producing fresh water prawns at the end of the project since the project has a relatively brief time frame. There are thousands of small fresh water fish farms on Java. These farmers must be educated to recognize the benefits in terms of increased income from hatchery products.

Production of adult shrimp, if successful on any scale, will help increase income to small fresh water farmers. Moreover, linkages must be created between producers and consumers - in this case most likely small store keepers, auction houses and/or directly to households or restaurants. It is doubtful that these shrimp will become a common food resource for the general population. Private enterprises in Agribusiness could be a major beneficiary while at the same time assisting in developing contractual programs for shrimp production, developing market programs and various incentive programs that will bring more ponds into production or establish grow out systems, thereby increasing efficiency and income.

Physical/chemical problems such as unacceptable water temperature, poor fresh and salt water quality, and changes in proposed hatchery sites have required technical alterations. Only scant attention was

paid to a shrimp distribution-inventory system in the planning process, which if developed to the extent required is likely to change the economic picture of the fresh water shrimp fishery.

Certain technical lessons were learned in the fresh water shrimp sub-project. For example, it was necessary to develop a recirculating heat exchange system to maintain elevated water temperatures in the hatchery. Another area includes water quality which must be monitored regularly.

f. Artisanal Fishery Management

The Artisanal Fisheries Management subproject has only recently begun so there are no significant outputs to evaluate.

The major external change in the artisanal fisheries management sub-project was the Presidential Decree banning fish trawling within 12 miles of the coast. Supportive of this decree is the division of the coastal area into sectors for the various types of fishing vessels. Under this program the most inefficient vessels fish closest to the coastline, while more mechanized vessels are restricted to areas further offshore. The changes appear to have had beneficial impacts on the artisanal fishery, i.e., apparent, increases in catches by the artisanal fishermen. There can be little question that a reduction of the trawl fishery would result in more fish being available for harvesting by the artisanal fishermen. However, it is doubtful that the total fish catch is as high as before the trawl ban.

In this sub-project, the Chief of Party in his role as sub-project leader should establish at an early date the specific requirements for:

1. employment of a statistical analysis and,
2. training programs for DGF statistical agents.

The current method used by the DGF to collect fishery statistics leaves many questions unanswered. These gaps must be filled if an adequate management program is to be established.

The current statistical collection methods do not provide accurate data on the species composition by season, area, type of gear, and fishing effort. For many species, no data are available for size variations (year classes) by gear, area and season. All of these data are necessary to establish the basis for a management program.

As a step in reaching sub-project objectives, a workshop was held in April 1983 to clearly define the problems associated with the project and to make recommendations to resolve these problems. The report of the workshop (Appendix II) clearly indicates the status of available information, problem areas, and possible methods of reaching project objectives.

The stated beneficiaries are primarily the artisanal fisherman with the Indonesian consumers benefitting from increased supplies of fishery products.

It should be clearly understood that in the establishment of a fishery management program it is often necessary to place restrictions on fishermen if the maximum sustainable yield

is to be reached. Explaining to fishermen that they must change or restrict their fishing methods often results in resistance to the management program.

If low cost fishing gear can be developed that will better utilize some resources that are not now heavily exploited it would be easier to develop an overall management program since it would provide an alternative harvesting method to the fishermen. Some work has been initiated in this area and it should be encouraged.

Since the planning of the Artisanal project and its implementation, trawls have been prohibited within 12 miles of the coast. This may result in increased fish catches in the artisanal fishery, however, possible increases in the future could contribute to the establishment of future management programs.

In the artisanal fishery sub-project the technician has been over-extended by the wide geographic area of responsibility. A better use of available resources could be made if efforts were devoted to a smaller area. It would still be possible to establish a management model without overburdening the technician with extensive travel.

In this sub-project as in others in this Project, some scheduling problems occurred. The housing was not available upon arrival of the technician and some project funds had to be diverted to cover rent, thus reducing total dollar funds available to the sub-project.

The GOI transmigration policy may have a long-term impact on artisanal fisheries. Before implementing such a policy consideration should be given to (1) changes in catches and management regimes in the area leaving and (2) impact on fishery resources in the new area.

5. Comments/Recommendations

It is too early to make reasoned judgements concerning goal accomplishment, impact on beneficiaries, replication, etc., in this mid-course evaluation.

The project generally is behind schedule, due almost entirely to the ponderous USAID project approval requirements. The PP was signed ten months after it was written. USAID inputs have been slow in arriving, and at the mid-point of the project, two technicians still have not been selected and brought on board.

The GOI, by contrast, has provided its inputs in a timely manner and apparently had the capability to act/react much more rapidly than USAID.

The project team composition is not as outlined in the PP. Example; The artisanal fishery management team is supposed to consist of one Biologist/Marine Management for 36 mm, and one Biologist/Technical for 24 mm, and one of these technicians is to be designated as "Chief of Party. Instead, one technician has been assigned as the Artisanal fishery sub-project manager and the other

long-term technician has been designated "Project Coordinator", with no collateral duties. This oversight has resulted in the loss of one technician to the Artisanal fishery sub-project and created confusion vis-a-vis the project management authority/responsibility. The PP does not even mention a "Project Coordinator".

The Project Management position must be filled by a USAID direct hire project manager. The very term "Project Coordinator" has a different connotation than the term "Chief of Party", and this semantical faux pas has created a great deal of unnecessary confusion in the minds of all parties associated with this project.

Specific recommendations

A. Ice Plant:

1. Assign one project technician the collateral duty of ice plant sub-project monitoring for at least one year. This technician will gather data on usage factors, changed habits, loss ratios.
2. Assign Indonesian project personnel to on-job-training in manufacturers facility as soon as possible.
3. Dredge entrance channel to a depth of 1-1 1/2 m and provide annual maintenance dredging.
4. GOI provide a SSB transceiver at plant site for communications between Maringgai and Teluk Betung.

B. Tambak Extension:

1. Do not extend. This sub-project was envisioned as a logical extension of the Sumatra Brackish Water Fisheries project and the Tambak Survey project, and was to be a "hands on" effort modeled after the Banda Aceh model. Instead, it became a policy vehicle with little hands-on activity. There is little likelihood that it will make any significant impact on the achievement of the Sector Goal.

C. Floating Fish Cages

1. Continue project, since it has potential for success beyond the modest PP predictions. Selection of a properly qualified sub-project technician is of paramount importance.

D. Rice/Fish :

1. Continue sub-project.
2. Select/hire sub-project technician as soon as possible.
3. Review commodities needs based on GOI desire to expand scope of sub-project.
4. Utilize hatchery-owned land for some experimentation instead of utilizing only privately owned padis.

E. Fresh Water Shrimp:

1. Continue sub-project
2. Sub-project technician is doing an excellent job. Continue to emphasize a data collection/recording inventory system for larval/juvenile production, and establishment of a distribution system predicated upon known inventories.
3. Additional links should be encouraged between processors and fish farmers to educate the farmers to the profitability of fresh water shrimp production.
4. Provide USAID funds to purchase conical tanks to enable two or three phase production of larvae and juveniles.

F. Artisanal Fisheries Management :

1. Continue sub-project
2. Assign a technician to develop statistical data base necessary to make accurate management decisions.
3. Additional Comments/Recommendations

Although no mechanism was provided for the addition of sub-projects to this wide ranging and comprehensive project, project planners were aware that once in the field project technicians would probably identify the need for additional sub-projects.

Three such sub-projects have been identified, and the evaluation team recommends that USAID/AGR and DGF jointly investigate the need and desirability of adding these sub-projects under the Project 0497-0286 umbrella.

The identified sub-projects are:

1. Lake management: fry production, fish enclosures, floating calm-water cages on Lake Toba. Sub-project would complement the Rice/Fish sub-project and utilize some of the same inputs.
2. Quality Control: product handling, cold chain maintenance, market sanitation, quality standards. Would complement flake ice plant, floating cages, and to lesser extent Artisanal fisheries and rice/fish sub-projects.
3. Fishery Marketing Extensionist: to address marketing constraints which may be associated with each of the sub-projects, and to concentrate most specifically upon increased production which may result from the Artisanal fishery management sub-project.

Best Available Document