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ANNUAL REPORT - YEAR THREE

BRACKISHWATER FISHERY PRODUCTION PROJECT - NORTH SUMATRA, INDONESIA

Auburn University Contract No. AID/ASIA-C-1177

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INTRODUCTION

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From November 1, 1976, to September 1, 1978, technical assistance under the present project was made available to the provinces of Aceh and North Sumatra. Technical assistance to Aceh terminated with the scheduled departure of the resident advisor on September 1, 1978. Technical assistance to North Sumatra was extended an additional year because of the slow start-up of the project. This was due to the innovative nature of the project, and lack of experience in the Provincial Fisheries Service in brackishwater pond fisheries.

This annual report describes project progress for the period September 1, 1978, to September 1, 1979, in the province of North Sumatra.

PROJECT PURPOSE

The project purpose is "to assist the government of Indonesia to increase brackishwater (tambak) fisheries production in seven Kabupatens in the provinces of Aceh and North Sumatra and the creation of an infrastructure base upon which tambak expansion can take place."

The project emphasis in Aceh was intensification of production in existing ponds. In North Sumatra, where there are very few ponds and no tradition of tambak fisheries, the emphasis is tambak area expansion (extensification).

PROJECT OUTPUTS

1. Fry resources evaluated and improved capture and distribution programs operational in Aceh and North Sumatra.
 - a. twelve-month evaluation of fry resource completed
 - b. fry catch doubled
 - c. improved marketing to increase availability by 20%

As reported in a previous annual report extensive surveys carried out since 1974 indicate that there are no milkfish fry naturally occurring in east coast waters of North Sumatra. The west coast has not yet been adequately surveyed. At present and for the foreseeable future milkfish fry for North Sumatra will come from Aceh where sur-

plus annual production available for other provinces is approximately 50 million fry. The projected fry requirement for North Sumatra by the end of the second year of Pelita III is 1.5 million, and 10.5 million by the end of Pelita III.

Because of the distance and seasonal nature of the fry source there will be a need for fry distribution and fingerling production facilities in North Sumatra. Ultimately this function can and should be performed by the private sector. During the early stages of tobacco development the Fisheries Service should perform this function. It is especially critical that this service be provided for the pilot projects.

Shrimp post-larvae surveys have continued on a sporadic basis. The quantity and quality of shrimp post-larvae available from natural sources for stocking in ponds is not clear at the present time. P. monodon, the prime commercial species, does not appear to be present in appreciable numbers. In general shrimp resources in the Straits of Malacca are expected to continue to decline due to fishing pressure, pollution and other factors. It is thus in the interest of the future of shrimp culture in the northern Sumatra region to become increasingly independent of natural sources of post-larvae.

It is recommended that a shrimp hatchery feasibility study be conducted, and that if determined feasible a hatchery development program be undertaken with the goal of a fully operational hatchery in place in North Sumatra by the end of Pelita III.

2. Government policy change making fertilizer available to fish farmers at Rp.120/kg, and fishpond use in the two provinces of about 900 tons/year.

Inorganic fertilizers continue to be available to fish farmers on the same basis as for other agricultural commodities at Rp.80/kg.

3. Increased lending by GOI Bank Rakyat and/or other lending institutions for fish production and development; \$2,151,458 for short-term production and \$795,014 for mid-term capital improvements for project life.

Bank Rakyat Indonesia granted Rp.2,676,470 to each of 17 extensifi-

cation pilot project participants for development of a four-hectare tambak unit plus operations cost for the first year. Cash flow analysis projected a 6.5 year repayment period, based on development cost and production projections provided by the Fisheries Service. During the credit repayment period annual income per 4-ha unit is projected to be approximately Rp.240,000. Greater flexibility and capacity to absorb the inevitable losses that occur in agricultural activities would result if the credit repayment period were extended to a maximum of 12 years, as is the case with the World Bank financed tambak project in Java and South Sulawesi.

The cost of tambak development is high, even when low elevation land is used which does not require excavation, and "mini-estates" are developed which reduce costs through sharing of dikes, canals and other infrastructure. Land charges for "tanah negara" by local government in the case of the present pilot project are excessive (Rp.5/m²), and represent about 10% of the development cost, thus adding an additional burden to the already-high cost of development.

It is recommended that a means be sought for extending credit repayment to a maximum of 12 years, and that the GOI investigate means of subsidizing the land cost.

3. Provincial program operational with technical assistance; eight PFDUs (Provincial Fisheries Development Units) operational in demonstrating improved production systems; 40 trained extension agents providing guidance to 2,412 small tambak operators with 4,800 hectares of land; and each PFDU conducting three farmer training sessions per year.

As reported in previous annual reports this output has been largely achieved. Two PFDUs were completed and became operational during this year. There are now three PFDUs operational in North Sumatra. The establishment of a fourth PFDU is projected during Pelita III for Kabupaten Labuhan Batu.

Experience in operating Sialang Buah PFDU suggests that a minimum of one year is required for PFDU construction problems to be recognized and repaired, for pond fertility to be restored sufficiently through fertilization for good food production, and most importantly for inexperienced PFDU staff to gain confidence, basic knowledge and skills through work experience at the PFDUs.

A field trial facility is needed for the northern Sumatra region to support the extension effort by providing technical information based upon trials conducted under local conditions. Such a facility would probably be an expansion of an existing PFDU and would be composed of small ponds in sufficient number to permit replicated testing of techniques developed through research elsewhere in Indonesia and other countries of the region. A proposal for a field trial facility has been prepared by the Provincial Fisheries Service and is presently under consideration by the Directorate General of Fisheries.

As tambak extensification accelerates and the Fisheries Service is able to pay increasing attention to the intensification needs of existing tambaks in North Sumatra, there will be an increasing need for a provincial tambak extension center with a clearly defined extension function. The functions of the center and its staff would be to give technical assistance to tambak farmers, produce and distribute extension literature, and organize training programs and demonstrations for farmers at the PFDU's. New staff would not be needed, but rather two or three existing extension agents could be selected for additional training and reassignment. A mobile extension unit should be available from the center to support the outreach program. The mobile unit would set up displays, distribute literature, and have audio-visual equipment for showing sound movies and slides. Such an extension facility should be in place and functioning by the end of the pilot project phase after the second year of Pelita III.

5. Trained staff functioning with technology and methodology for intensification outreach.
 - a. nine years long-term and two three-month, short-term training in the U.S. and Philippines.
 - b. in-country training (Java) for 16 PFDU staff, and 40 extension agents.

This output was accomplished during the first two years of the project. During this year project extension agents received an additional three man/months of formal training and an additional 140 man/months of on-the-job training.

The attainment of training objectives is actually a continuing

effort. The success of the present project is predicated upon the existence of extension agents well-trained and sufficiently experienced to gain the confidence of fish farmers by offering sound technical assistance through the vehicle of appropriate extension methodology. PFDU managers should be knowledgeable and experienced in extension methodology, ideally having once served as extension agents. They should be particularly capable, however, in the technical aspects of fish culture, and have ability to plan, implement and interpret the results of field trials. The PPS, who is responsible for daily management and supervision of the project, should also have a good grasp of technique and extension methodology. More important skills for the PPS, however, are planning and coordination of project activities, supervision of implementation, personnel management and training program design and methodology. These skills are often assumed to already exist in technical assistance projects and are thus infrequently included in participant training. In actual fact, planning, training and management skills often are not sufficiently present and projects may falter because of it even though technical fisheries skills are adequate.

In the present project, although the personnel have gained considerable experience as the project has developed, priority should be given to further developing the skills and experience described above to ensure project success.

It is recommended that training for the PPS be provided to the M.Sc. level or equivalent at a recognized fish culture institution. Provision should be made for this training to include planning, training and project management skills.

It is recommended that training be provided for the PFDU managers to include intensive treatment of the principles and practice of aquaculture, with particular attention to yield trial planning, implementation and interpretation of results. At the conclusion of the training a study tour to the Philippines should be provided.

It is recommended that the extension agents attend the three-month training program at Jepara, which should include intensive training in the principles, practice and methodologies of fish culture and extension. Participants in this training should be carefully selected to ensure successful completion of the training.

Extension agent performance is probably the single most limiting factor in giving effective assistance to tambak farmers. Performance problems are often related to lack of technical skills, and recommendations for improving this in the present project are given above. Just as often, however, performance problems are related to a lack of motivation. The following recommendations are given as means of improving motivation.

Extension agent (PPL) status should be increased. The title or designation of "PPL" should not be given routinely, but rather should be awarded as a result of meaningful accomplishment. Individuals hired to perform as PPLs should be given another designation, such as "candidate PPL", until they have attained a minimum standard of knowledge and skills as determined by examination and certification by the Directorate General Of Fisheries. The minimum standard of knowledge and skills enabling "candidate PPLs" to pass the examination could be attained, for example, by successfully completing the Jepara three-month training course followed by nine months of on-the-job supervised training.

Upon attainment of PPL status, the PPLs should be elevated to "pegawai negeri" if possible, or under a contractual arrangement should receive an adequate monthly honorarium of at least Rp.25,000. At present-North Sumatra PPLs receive Rp.10,000 per month, which by any standard is inadequate.

In the case of PPLs who do not show aptitude for or interest in their work, their performance should be evaluated by the Fisheries Service, and if found lacking be released from their contract.

6. Annual production from existing tambaks in the two provinces doubled, with annual production from 4800 hectares increased to 4,610 tons (an increase of 2258 tons).

This output was fully achieved during the first two years of the project. Production increases were realized only in Aceh. In North Sumatra tambak development by extensification has not reached the production stage.

7. New employment created for underemployed agricultural and fishery families, with new off-farm jobs for 425 men and 425 women, creating indirect jobs for an additional 2550 people.

Some gains in employment are reported in previous annual reports. With the beginning of construction of the first extensification pilot

project this year in North Sumatra 17 heads of household are now employed fulltime by a government contractor in construction of their tambaks. At the end of the six-month construction phase they will begin management of their tambaks on a fulltime basis.

8. Increased number and greater role for producer associations, with new associations formed in 20 areas of North Sumatra and Aceh, and each association guided by extension agents.

Gains are reported in previous annual reports. In North Sumatra the first two tambak producer associations have organized for the purpose of constructing and operating two tambak extensification pilot projects with a total area of 172 hectares.

9. GOI infrastructure in place and functional to handle intensification of the remaining 12,300 hectares of current tambak and capable of furnishing advice to new fish farmers as they are settled on the remaining 125,450 hectares of potential tambak lands, and headquarter and provincial staff trained and operational are sufficient to support 40 extension agents in the field.

This output in North Sumatra is related primarily to extensification, the priority activity in this province. Information on extensification and progress to date is found in previous annual reports, and in the following section.

STRATEGY FOR TAMBAK DEVELOPMENT IN NORTH SUMATRA DURING PELITA III

The potential for a significant tambak industry in North Sumatra clearly lies with extensification, i.e. development of new tambaks from the large areas of unexploited coastal swamp, estimated at 50,000 hectares. Existing tambaks have low productivity and probably number only 300 to 400 hectares. Most of these tambaks were developed along traditional lines in scattered locations with poor construction, bad site selection, and on land not owned by the farmers and thus ineligible for bank credit. There is no reliable information on existing tambaks and efforts to collect this data have been frustrated.

During this year the North Sumatra Provincial Fisheries Service prepared an outline tambak development plan for Pelita III. This plan takes into consideration problems and needs encountered during the first two years of the project and is thus more realistic than original Project Paper estimates and time frame.

The target for tambak development in North Sumatra under the new plan is to develop through extensification 2,100 hectares of intensively managed tambak during Pelita III, with a minimum production potential of 1470 tons per year of milkfish (700 kg/ha/yr), and 630 tons per year of shrimp (300 kg/ha/yr). The workplan for achieving the above target consists of the following outputs, which should form the basis for continuing and additional project initiatives.

- A. Three pilot project tambak "mini-estates" totaling 300 hectares constructed and demonstrating the feasibility of tambak extensification. Each "mini-estate" will be operated by a tambak farmers association with technical assistance provided by the Fisheries Service, and credit and credit supervision from Bank Rakyat Indonesia.
- B. PFUDs managed as fully operational demonstration and extension centers for support of pilot projects and subsequent tambak extensification. PFDU facilities will also be used to conduct limited field trials until a proper field trial facility is constructed.
- C. Creation of a field trial station as an expansion of an existing PFDU to support extension activities by providing technical information gained from locally conducted field trials.
- D. The establishment of a milkfish fry distribution and fingerling production center to solve seasonal supply problems.
- E. The establishment of a shrimp hatchery to produce P. monodon post-larvae for stocking in tambaks.
- F. A marketing survey conducted and market promotion for milkfish to promote its consumption within the province, and investigation of the possibilities of marketing milkfish outside of the province, particularly in Java; PFDU production utilized for market promotion
- G. Shrimp surveys continued along the east coast of North Sumatra, and shrimp and milkfish fry surveys initiated on the west coast of North Sumatra.
- H. Improvement of quality of staff and extension agents and the services they provide through the provision of more opportunities for training and practical work experience.

- I. Two persons with technical engineering background recruited and trained to function fulltime as a team in conducting land surveys, selecting sites for tambak development, supervision of construction and related activities.
- J. Working relationships established with other government offices having responsibilities for credit, land use, infrastructure, planning, administration, etc.
- K. A PFDU established and operational in Kabupaten Labuhan Batu.
- L. Extensification survey continued with new extensification sites identified.

Substantial progress towards output A has been achieved during this year. A 68 hectare pilot project is now under construction in Kabupaten Deli Serdang for 17 fish farming families. The site was initially identified and surveyed by the Provincial Fisheries Service staff (for technical details of site selection and other background information see "Brackishwater Aquaculture Development in Northern Sumatra" R&D Series No.23, International Center for Aquaculture, Auburn University, 1979). The farmers organized into an association, land status was clarified permitting the farmers to apply for ownership status from the local government, credit was arranged by BRI and a government construction firm was retained to construct the ponds with the participation of the farmers. Potential exists in this area for further expansion, with immediate prospects for an adjoining 52 hectare site. The governor of North Sumatra is providing funds for canal construction and improvement of existing canals to the pilot project site. In Kabupaten Langkat a 104 hectare pilot project site has been identified, surveyed and mapped. Land status problems are presently being dealt with and farmer participants have been identified.

The attainment of the above outputs desired by the North Sumatra Provincial Fisheries Service rests upon certain reasonable assumptions. The most important of these assumptions are the following:

- a. Continued desirability of coastal tambak development for social, economic and political reasons.
- b. Adequate financial and personnel resources available from the central government and North Sumatra Provincial government.
- c. Continuation of technical assistance and provision of specialized commodities from donor/cooperating agencies.

TABLE 5: SCHEDULE OF COSTS, REVENUE AND PROFITS AT
CURRENT AND CONSTANT 1980 PRICES

Years	Gross Revenue ^{a/}	Gross Costs	Gross Profit	Net Present Value of \$/		
				Revenue	Costs	Incremental Profit or Cash Flow
1980	35,837,500	38,269,500	-2,432,000	35,837,500	38,269,500	-2,432,000
1981	91,230,075	59,257,029	31,973,046	79,333,673	51,529,912	27,803,761
1982	116,283,995	65,627,367	50,656,628	87,922,329	49,620,852	38,301,476
1983	148,463,508	72,953,256	75,510,252	97,614,756	47,966,766	49,647,991
1984	189,362,200	81,378,035	107,984,165	108,358,370	46,523,823	61,834,547
1985	217,800,500	91,066,517	126,733,983	108,290,408	45,278,272	63,012,138
1986	250,429,400	102,208,279	148,221,121	108,260,630	44,184,639	64,075,991
1987	288,011,500	115,021,588	172,989,912	108,263,523	43,236,615	65,026,908
1988	331,178,150	129,756,208	201,421,942	108,262,137	42,417,304	65,844,833
1989	380,991,450	146,701,516	234,289,934	108,315,869	41,707,241	66,608,628

~~Discounted at 15% rate.~~

Total

950,459,195

450,734,924

499,724,273

a/ From Table 4

b/ From Tables 2 and 3

c/ Discounted at 15%.