

## AwF Aceh Project # 1

This project was initiated by funding from NACA (Network of Aquaculture Centres in Asia-Pacific). The funds for completion were supplied through the WAS Tsunami Relief Fund (donated by YSI) through AwF.

Country: Indonesia

Project Title: Pilot project for rehabilitation of small-holder tambaks for income and livelihood in three villages in Pidie District, Aceh province, Indonesia.

Project Number:

Funding: US\$28,812 [US\$10,000 was made available by NACA and US\$18,812 was donated by YSI through WAS-AwF]

### I. Project rationale

#### 1.1 Background

Aquaculture is an important activity for many small-scale farmers in the coastal communities of Aceh. Before the tsunami of the 26th December 2004, the farming of fish and shrimp in ponds in coastal ponds (locally known as tambaks) produced around 10,000 tonnes of shrimp and 6,000 tonnes of fish from over 45,000 ha of ponds. Preliminary assessments conducted in early 2005 indicate that over 50,000 people depended directly for employment on the aquaculture sector.

The FAO assessment of the impacts of the tsunami on the aquaculture sector show the tsunami has severely damaged or destroyed over 10,000ha of tambak ponds, caused lower levels of damage to 25,000 ha of tambak ponds and disrupted over 600 km of water supply canals. The impacts on livelihoods of small-scale tambak farmers have been significant, and most farmers are now facing considerable difficulties in restarting their livelihoods. These assessments suggest most urgent priorities for restoring tambaks for small-scale aquaculture are in the north-eastern coastal districts of Pidie, Bireuen and Aceh Utara. Thousands of small-scale tambak farmers in these coastal districts need assistance to restart their livelihoods.

#### 1.2 Problem statement and rationale

Consultation with small-scale tambak farmers in Pidie, Bireuen and Aceh Utara, reveal that tambak farmers have several difficulties in starting fish and shrimp production, due to lack of access to water (from degraded water supply and drainage systems), and lack of financial assets to rehabilitate ponds and purchase the necessary inputs (seed, fertiliser) to restart fish and shrimp production. Tambak farmers in these districts give priority to restoring water supplies to tambaks by removing the silt and sediment clogging water supply canals. Furthermore, farmers in many villages in these three districts have little other work activities and a cash for work program to clean up debris and silt from suitable tertiary and secondary water supply canals will provide tambak farmers and their communities with opportunities to earn cash and take the first steps in restoring tambak farming and their primary source of livelihood.

The project aims to support a pilot activity in tambak water supply rehabilitation in three priority villages to clean up tertiary water irrigation systems to small-scale farmer tambaks in Semalanga sub-district of Pidie district. This pilot project has been prepared in consultation with tambak farmers in the three villages, the sub-district tambak farmer association, Pidie Fisheries Office and the local technical-supporting agency (Ujung Batee Regional Brackishwater Aquaculture Development Centre) staff. The purpose of this pilot activity is (1) to support farmers restore tambak water supplies in three villages; and (2) through monitoring and supervision to learn from

the experience and apply the lesson's learned to the development of future cash for work programs, including that to be supported under other planned FAO recovery projects (eg ECHO).

The project will be organized through and technically supervised by the Ujung Batee Regional Brackishwater Aquaculture Development Centre of the Ministry of Marine Affairs and Fisheries (MMAF). The centre has a government designated responsibility to support rehabilitation of the aquaculture sector in Aceh, and will itself be rehabilitated by FAO and the Government of Italy. The technical staff of the centre have a responsibility and experience in rehabilitation of tambak farming areas in Aceh.

## 2. Objectives and outputs

The pilot project has immediate objectives and expected outputs as follows:

Objectives	Outputs
1. Support farmers to clean up tertiary canals and restore water supply to 392 ha of tambaks for 426 farming households in three villages (Jemerang, Pasi Lhok, Lancang) in Pidie district through a cash for work program.	1.1 Farmer teams mobilised for clean up in 3 villages  1.2 Tertiary canals cleaned of debris and silt and water successfully restored  1.3 Plan prepared by farmers to restart traditional tambak farming
2. Develop guidelines on organising cash for work programs for tambak restoration.	2.1 Monitoring and evaluation of pilot project.  2.2 Guidelines for tambak restoration prepared.

The pilot project is the first step in restoring small-scale, traditional, aquaculture in these three villages, providing a learning experience for all concerned for subsequent expansion of activities in other villages and sub-districts in Pidie. The site has been chosen by Ujung Batee staff, district Fishery Service staff and the FAO Aquaculture team because of the following reasons:

(1) Tambaks are socially important. Traditional tambak aquaculture (of milkfish and shrimp) is an important source of income to households in the three villages, with a high proportion of small-holders with farm holdings less than 1ha

(2) Restoring the tertiary canal will make a difference to small-holders. Restoring the public water supply through tertiary canals in these three villages will provide a much-needed water supply to the tambaks, presently closed due to siltation.

(3) Learning experience. The three villages chosen will provide valuable learning experience involving small-holders.

(4) Participatory development. The pilot project was developed by the farmers and village authorities and is based on the expressed needs of the community.

## 3. Organisation of the pilot project

The pilot project is divided into two parts as follows

### 3.1 A cash for work contract

A cash for work contract will be provided to the Ujung Batee Regional Brackishwater Aquaculture Development Centre of the Ministry of Marine Affairs and Fisheries (MMAF). The contract will cover the following items:

Cash for daily work of farmers/villagers. The workers will be selected by the tambak farmers association chief of the sub-district (who is village chief of Pasi Lhok). The village chief will organise work schedules to share the work among villagers who want to work (including tambak farmers, labourers and others who need work in the village).

Tools (lham, baskets, bags for putting sand from the canals, strong string)

Two water gates (for each village) public canals (to be managed – as before –by the local tambak farmer association)

#### (1) Cash for work

The following are the estimates of work required prepared in consultation with farmers:

Village	Length of canal to be cleaned (m)	Volume of silt to be removed	Number of person-days required	Estimated time required for completion	Cost (Rp35,000/day)
Lancang	2500	5000 m <sup>3</sup>	2222	45 days	77,770,000
Pasi Lhok	3195	6390 m <sup>3</sup>	2840	45 days	99,400,000
Jeumeurang	1250	2500 m <sup>3</sup>	1111	45 days	38,885,000
Total			6173		216,055,000

The estimates are made on the basis of the following assumptions:

One worker will remove 2.2 m<sup>3</sup> of sediment/day.

1 m length of canal = 2m<sup>3</sup> (2.5 width at top, 1.5m at bottom, x 1.0m depth).

Maximum of 137 people per day, working over a period of 45 days

#### (2) Tools and water gates

The estimates of tools and materials (for water gates) required are as follows:

Tools	Number	Unit cost	Cost
Lham	137	30000	4,110,000
Pengki	60	8000	480,000
Bags	6000	1000	6,000,000
Hoe	60	37000	2,220,000
Wheel cart	15	175000	2,625,000

<b>Sub-total</b>			<b>15,435,000</b>
Water gate	6	1,500,000	9,000,000
Small bridge	3		6,000,000
<b>Sub-total</b>			<b>15,000,000</b>
<b>Total</b>			<b>30,435,000</b>

### (3) Organisation of the cash for work

The cash for work contract will be organised as agreed with District Fisheries Office, village head and farmer association chair, and Ujung Batee Centre, under the overall management of the Ujung Batee Regional Brackishwater Aquaculture Development Centre of the Ministry of Marine Affairs and Fisheries (MMAF) as follows:

Coordinator – one staff from Ujung Batee will be assigned for full time coordination (in the field) of the pilot project. She/he will be paid Rp150,000/day.

Supervisor – one district staff from the District Fisheries Office will be assigned for full time coordination (in the field) of the pilot project. She/he will be paid Rp 90,000/day, plus fuel (estimated as Rp 5,000/day).

Chairperson – the Chair of the BMPT (tambak farmer organisation) or person nominated by the supervisor and Chair will be responsible for organisation of the cash for work program in each village level, selecting workers with the supervisor, keeping a daily record of the names of people working, and disbursing cash to villagers each Friday. Three Chairpersons will be appointed, one for each village. She/he will be paid Rp 40,000/day.

30-50 persons will work/day under the Chairman, depending on daily availability of labour and other daily commitments of farmers.

### Costs estimates

Person	Number of person-days required	Costs/per day	Units	Total cost (Rps)
Coordinator	1	150,000	45	6750000
Supervisors	1	95,000	45	4275000
Chairpersons	3	40,000	45	1800000
Labor	6173	35,000		216055000
Sub-total				228,880,000
Water gate			6	15,000,000
Small bridges			3	6,000,000
Tools				15,435,000
Sub-total				30,435,000
Total (Rp)				259,315,000
Total (US\$)				28,812.7

The contract for restoration of the water supply in tertiary tambaks will be with Ujung Batee Regional Brackishwater Aquaculture Development Centre. The centre will have the following responsibilities:

Technical and organisational supervision of the program

Disbursement of the cash through the Chairman of each work group, following UNDP guidelines on cash for work programs.

Monitoring and evaluation of the cash for work pilot project according to agreed plan.

Organising with the District Fisheries Office a final review workshop involving farmers from the three villages to review outcomes of the cash work lesson's from the pilot, and develop an aquaculture action plan for follow up work to ensure full recovery of the brackishwater ponds, with an emphasis on small-scale farmers and labourers.

Reporting on the cash for work pilot, and with FAO backstopping staff, for drawing out lessons and preparing guidelines on tambak rehabilitation cash for work projects for wider application elsewhere.

### 3.2 Monitoring and evaluation

The Ujung Batee staff will report on the progress, and the final outcome from the project to the Directorate General of Aquaculture, who will report to WAS and AWF.

#### Aceh Project # 2

This project was funded entirely by the WAS Tsunami Relief Fund (donated by YSI) through AwF.

### REHABILITATION OF SMALL-SCALE SHRIMP HATCHERIES IN NANGROE ACEH DARUSALAM AFTER EARTHQUAKE AND TSUNAMI

#### 1. Introduction

The Aquaculture sub-sector in Aceh is socially, economically and environmentally important, and significant part of the livelihoods of many coastal people. Nanggroe Aceh Darussalam Province is one of the widest brackish water ponds province in Indonesia, also became a victim of earthquake and tsunami. Many shrimp hatcheries, shrimp ponds, shrimp ponds canal, floating nets, freshwater pond, and other aquaculture facilities are destroyed.

The main farming system is the brackishwater water (locally known as a Tambak) producing mainly milkfish (*Chanos chanos*) and shrimp (*Penaeus monodon*) and other species. The earthquake and tsunami disaster in Aceh Province and the island of Nias on the west coast of the province of North Sumatra that happened on December 26th, 2004, has influence very big impact for fisheries and aquaculture sector.

There are 223 shrimp hatcheries in Aceh before the tsunami, a total of 193 hatcheries were extensively damage. Hatcheries along the east coast districts of Aceh Besar, Pidie, Bireun and north Aceh were severely affected. The extent of damage ranges from total loss of the hatcheries building and associated equipment (blowers, generators, pumps etc.) to damage to the roof and infrastructure.

Hatchery operator in Bireun and Pidie, North Aceh, and Aceh Besar reported loss of shrimp crops at the time of the tsunami. Ministry of Marine Affairs and Fisheries estimate loss of shrimp larvae / Post larvae as Rp. 13.6 billion (US\$ 1.5 million).

Over 80 % of the hatcheries have been damaged by the tsunami, therefore support is necessary to rebuild capacity of hatcheries to supply shrimp seed for farmers. This will require infrastructure building and technical assistance to ensure hatcheries produce good quality fry stocking in farmers ponds.

Directorate General of Aquaculture, Ministry of Marine Affairs and Fisheries as an authority agency for aquaculture development in Indonesia joint with FAO will support to rehabilitation small-scale shrimp hatcheries at Pidie and Bireun. That is one of program priority for empowering shrimp

hatcheries farmer to produce shrimp seed for the recovery of aquaculture in Aceh.

## 2. Objective

There is a need to rehabilitation small-scale shrimp hatcheries to support the livelihoods of people dependant on aquaculture, and the recovery of the Aquaculture sector. Not only is this urgent, but socially justified due to the large number of people involved.

The objectives rehabilitation of small-scale shrimp hatcheries as follows:

- To provide Small-scale Hatchery equipments and infrastructure;
- Technical assistance of shrimp hatcheries technology to applied bio-security and introduce "Better Management Practices" (BMP) to the hatcheries to improve overall quality of shrimp seed produced, and hence reduce the risks of crop losses for tambak farmers ;
- Restarting small-scale hatchery production to ensure newly rehabilitated aquaculture areas have sufficient shrimp seed for stocking ;
- A simple shrimp seed certification scheme whereby only seed produced from hatcheries with a BMP program could supply seed to village aquaculture rehabilitation programs ; and
- Monitoring and evaluation program to ensure compliance with the above.

## 3. Location

Location where support for rehabilitation 2 (two) small-scale shrimp hatcheries are Pasi Ihok Village, Kembang Tanjung Sub-district, Pidie District and Rheum Baroh Village, Simpang Mamplam Sub-district, Bireun District.

## 4. Cost Estimate

For rehabilitation small-scale shrimp hatcheries per unit for estimated production 5 million per year shrimp post larva with operational 6 cycle per years need building and equipment as noted in table 1 below .

## 5. Project implementation and reporting

### Implementation

Funds for the rehabilitation of these two backyard hatcheries are being provided from the World Aquaculture Society (WAS) Tsunami Relief Fund, supported by a donation from YSI Inc. and routed through Aquaculture without Frontiers (AwF), which will monitor the progress of the work.

The Directorate General of Aquaculture (DGA), Ministry of Marine Affairs and Fisheries will execute this project

### Reporting

DGA will provide the following reports to the AwF Chairman, Michael New:

- brief regular progress reports

- A final report containing 'before and after' photos at the completion of the project.

All reports will be sent by email attachment to Michael\_New@compuserve.com

AwF will provide copies of the reports for WAS and YSI.

#### Funding

US\$ 15,000 donated by YSI through WAS-AwF.

Table 1. Cost Estimate for Rehabilitation per Unit Small-scale shrimp Hatcheries

Nr	Building and Equipment	Cost ( Rp. )
	>Building	
1	Genset House (2 x 3 ) m <sup>2</sup>	6.000.000
2	Pumps House (2 x 2 ) m <sup>2</sup>	4.000.000
3	Blowers House ( 2 x 2 ) m <sup>2</sup>	4.000.000
	Tanks	
1	Larval Tanks (cement): 4 Tanks ( @ 10 ton) 1 tank ( 2 x 5 x 1,25) = Rp 4.000.000,-	16.000.000
2	3 tank (cement) for algae culture ( @ 2 ton ) 1 tank = Rp 1,000,000,-	3.000.000
3	2 Artemia conical tanks (fibre glass) 1 tank (250 lt) = Rp 500.000,-	1.000.000
4	Sea water reservoir (cement) 15 ton 10 ton : Rp 5.000.000,-	7.500.000
	Equipment	
1	Glassware's hatchery equipment 1 (packet)	1.650.000
2	Root Blower ( 1inch = 1.5 PK )	3.500.000
3	Genset 10 KVA	15.000.000
4	Sea water pump 2 inch	7.500.000
6	Fresh water pump 1 inch	350.000
7	Sea Water and fresh water installation	1.000.000
8	Biosecurity Equipment (foot bath, hand wash, fence, etc.)	1.000.000
9	Aeration equipment (valves, stone, horse, etc)	1.000.000
	Total	72.500.000

AwF Aceh Project # 3

AwF is also providing on-going technical advice to Professionals International, an NGO that is

carrying out rehabilitation work in the tsunami-devastated areas of Aceh, through the services of two AwF volunteers (Kevin Fitzsimmons and Dallas Alston).

AwF Aceh Project # 4

AwF approved its fourth project in Aceh in August 2005. Like Projects 1 and 2, this project has been funded entirely by the WAS Tsunami Relief Fund (donated by YSI) through AwF.

TERMS OF REFERENCE (TOR)

SEAWEED CULTURE DEVELOPMENT IN NANGROE ACEH DARUSSALAM PROVINCE IN THE AREA OF TSUNAMI VICTI

Prepared by:

Directorate General of Aquaculture

MINISTRY OF MARINE AFFAIRS AND FISHERIES

JAKARTA, 2005

I. Background

1.1. Justification of the Project

Seaweed is one of aquaculture commodity which is well developed in some parts of Indonesia (Sulawesi, Nusa Tenggara Barat, Bali) since 1987. They are established by rural coastal community by simple technique, marketable with feasible price, labour intensive. They grow the plant closed to shore line with bamboo rack, lone line hanger, or sub bottom settling. Cultivation period of initial stock is about 30-45 days for normal harvest. Post harvest treatment before trading is just direct sun drying. This farming does not need imported materials and sophisticated technique.

Aceh province is one of the Indonesian parts surrounded by the sea, with various type of coastal ecosystem. Some of them are suitable for seaweed culture. Its generating income is estimated USD 50/unit farming/ month. Stimulating activities are required to build up a community business with this commodity i.e. showing the proof that their coastal water is suitable to produce seaweeds and demonstrating that seaweeds aquaculture could be conducted practically with local materials. This action could be the effective extension for community.

Even though the culture plant originally does not available, it could be transported from adjacent province or from special cultivation center. The step should be followed after selecting well adapted seed in a selected site. These survivors are expected as the superior seed for the region. The growth rate of adapted plant must be not less than 3% per day, so the yield per m<sup>2</sup> is about 7,5 kg fresh weight or about 1 kg marketable yield.

The trading of seaweed needs marketing chain from producer (farmer) to exporter or processing plant. The farmers need a broker who pay the product even in small quantity and collect them before delivery to the larger trader. The traders are usually interested to buy the product after its quality and quantity conformed. Production site needs a quality equalizing unit to confirm the product quality as required by trader.

2. Name of the Project:

2.1 Seaweed culture Development in Nangroe Aceh Darussalam Province in The Area of Tsunami

victim

Based on the socio-economic condition of the coastal and marine communities, the government of Indonesia have already launched program which one of them is development and management of integrated area model for seaweed culture activities. The objective is to increase marine culture production from seaweed culture. Several factors are addressed to the fisher folk affecting to slow development of seaweed culture are as follows: (a). Lack of capital, (b). Lack of skill on seaweed culture technique, (c). Lack of marketing access due to infrastructure problem, (d). Lack of post harvest technology, (e). And other external factors.

### 3. Main Activity of the Project:

- a). Survey of project site selection for identification and other collection data and information
- b). Implementation of the project composes of:
  - a. Demonstration on site experiment and pilot project
  - b. Delivery of superior seeds and local cultivation
  - c. Farming by earlier adopted persons
  - d. Build up of equalizing unit
  - e. Build up of relationship with trading company
- c). Monitoring and evaluation of the project

### 4. Institutional Framework

The Directorate General of Aquaculture (DGA), Ministry of Marine Affairs and Fisheries will be the executing agency, while the Directorate of Fish Production will be the project coordinator. The project coordinator in the implementation of this project will collaborate with the other related institutions.

### 5. Government Follow-up

After the completion of the project, the Directorate General of Aquaculture will continue to maintaining and improving the existing of seaweed culture activities. If possible, it would be disseminated to the other areas that have the similar conditions to improve the living quality of the coastal and marine communities, especially fish farmers.

## II. Objective of the Project

- a). To select the most of suitable site for seaweed culture activities and most required for poverty alleviation.
- b). To introduce the seaweed culture technique by demonstration of commercial scale pilot project.
- c). To supply the seed of seaweed and some supporting facilities for community based seaweed culture development.
- d). To build an equalizing (pre-processing) unit located closed to seaweed culture area.

e). To help in assisting creating jobs or other livelihood for the Tsunami victims along coastal areas and to reduce a pressure of illegal coral reef collection.

### III. Propose schedule of the Project

The project will be proposed for 17 (seventeen) weeks operation in 2005. The activities will be executed as follows:

No	Activities	weeks																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Site selection	■																
2.	Experiment and pilot project		■	■	■	■	■											
3.	Seed delivery						■											
4.	Seed cultivation							■	■	■	■	■	■	■	■	■	■	
5.	Farming stimulation											■	■	■	■	■	■	■
6.	Ware house building up																	■
7.	Pre-processing demonstration																	■

### IV. Project Cost

#### a. Site selection survey

- Supervision USD 1,500

- Analysis USD 100

#### b. Experiment and pilot project

- Materials USD 500

- Seeds USD 500

- Labor USD 500

- Supervision USD 1,000

#### c. Seed delivery

- Air-Transport USD 500

- Seeds USD 100

- Supervision USD 500

#### d. Seed cultivation

- Materials USD 1,500

- Small boat USD 400

- Labor USD 400

e. Farming facilities

- Material for 3 groups USD 4,500

- Small boat USD 400

f. Pre-processing facilities

- Roller machine USD 1,100

- Non permanent ware house USD 1,100

g. Monitoring and evaluation USD 500

h. Incidentals USD 900

Total USD 16,000

5. Project implementation and reporting

Implementation

Funds for this project are being provided from the World Aquaculture Society (WAS) Tsunami Relief Fund, supported by a donation from YSI Inc. and routed through Aquaculture without Frontiers (AwF), which will monitor the progress of the work.

The Directorate General of Aquaculture (DGA), Ministry of Marine Affairs and Fisheries will execute this project

Reporting

DGA will provide the following reports to the AwF Chairman, Michael New:

- brief regular progress reports

- A final report containing 'before and after' photos at the completion of the project.

All reports will be sent by email attachment to Michael\_New@compuserve.com

AwF will provide copies of the reports for WAS and YSI.

AwF Aceh Project # 5

This consisted of technical advice provided to MercyCorps by AwF Volunteer Kevin Fitzsimmons.

AwF Aceh Project # 6

AwF approved its sixth project in Aceh in July 2006. Like Projects 1, 2 and 4, this project has been

funded entirely by the WAS Tsunami Relief Fund (donated by YSI) through AwF.

## TERMS OF REFERENCE (TOR)

Accelerating the Recovery of Aceh Post-Tsunami through

Sustainable Coastal Aquaculture

[AWF-WAS-YSI Sustainable Coastal Aquaculture Project]

## INTRODUCTION

### Background

The aquaculture sub-sector in Aceh is socially, economically and environmentally important and represents a significant portion of the livelihoods of many coastal people. The main farming system is in a brackishwater pond (locally known as a tambak). Most of the pond farming in Aceh Province is by traditional methods and low input. Farms producing shrimp and milkfish in polyculture and monoculture are situated along the north-east coast. Semi intensive and intensive shrimp farms are also present, but in a small proportion (probably less than 20%) of the total numbers of ponds and area covered. Most traditional farmers are small-scale farmers (<2 ha). Land/farm ownership and employment patterns vary, some are owner operated, others are rented, contract farming, labour, as well as some ponds owned by the village community. The varied ownership patterns and beneficiaries have made the post-tsunami recovery very complex.

Aquaculture in Aceh is a highly significant livelihood activity for many people. According to Provincial Dinas Perikanan statistics, there were 14.859 brackishwater farmers. Each hectare of pond is estimated to provide direct employment of between 1 to 3 people/ha, depending on location and farming system. Subject to further verification, 94,000 or more people may be directly employed in 47,000 ha of ponds. Particularly along the north-east coast, pond farming provides a high incidence of the employment in coastal villages. With significant numbers of unemployed in north-east coastal areas following the tsunami, there is a strong social justification and increasingly urgent need for support to rehabilitation of aquaculture.

The shrimp culture industry was in decline prior to the tsunami. Damage to the mangrove ecosystem and intensification of farming had reduced water quality and led to frequent disease outbreaks. Proliferation of ponds, reusing effluent from one pond to the next, along with the degradation of water quality from competing uses of aquatic resources, had further exacerbated the situation. Restoration of the aquaculture industry, which has been an identified goal by the government and by most non-governmental organizations, should be encouraged.

Moreover, most governmental and non-governmental organizations have recognized that the current situation provides an opportunity for a new outlook that would allow the industry to be restored using better technical and ecological principals. Several groups and agencies are eager to collaborate to achieve this restoration in a sustainable manner. The basic concept is to utilize ecological concepts to construct a production system that uses plants and animals (seaweed, fish and shrimp) to produce marketable products in a manner that will not pollute the environment.

Seaweed is one aquaculture commodity which has been well developed in some parts of Indonesia (Sulawesi, Nusa Tenggara Barat, Bali) since 1987. Seaweed has a big potential market, so the development of seaweed cultivation has a good prospect. Aceh Province is one of the Indonesian parts surrounded by the sea, with various type of coastal ecosystem. Some of them are suitable for seaweed culture. Seaweed culture has been established by rural coastal communities by simple techniques, marketable with feasible price and labour intensive. Cultivation period of initial stock is about 45 days for normal harvest. Post harvest treatment before trading is just direct sun drying. In many countries, direct consumption of *Gracilaria* is also popular and can contribute a low-cost

and nutritious food item to the local diet. This farming does not need imported materials or sophisticated techniques. Finally, seaweed cultivation of *Gracilaria verucosa*, in particular, has been a source of pharmaceutical and food grade agars.

The development of technology has further shown that the seaweed could be cultivated with shrimp and milkfish in the same pond (polyculture system). For the shrimp, the surrounding of the seaweed plantation could filter the water removing nitrogenous and phosphorus compounds as fertilizers. Beside that, it could be used to produce organic shrimp for international markets.

The restoration of the shrimp industry is also dependent on the restoration of the shrimp hatchery infrastructure in the province. Several hatcheries have already been supported by AwF funds and technical assistance. Collection of local broodstocks, as opposed to importation of possibly compromised breeders from remote locations, is critical to the bio-security of the industry. Collection of wild breeders and development of captive broodlines that would supply local farms is much preferable to importing shrimp from remote hatcheries or local harvest of post-larvae from the wild.

Finally, several governmental and no-governmental agencies have already begun aggressive mangrove restoration efforts. The aquaculture sector should embrace this effort and recognize the benefits of integrating their aquaculture with the mangrove ecosystem instead of replacing it. Mangroves are important as biofilters and physical protection of tambaks. Mangrove –friendly aquaculture is being practiced across Southeast Asia and Aceh should be the leading demonstration site in Indonesia.

AwF has already collaborated with the government and several NGO's to conduct a series of training activities and demonstration efforts towards sustainable coastal aquaculture. The department wishes to further these efforts with more direct support of seaweed culture and biosecurity of shrimp hatcheries.

## PROJECT DIGEST

Accelerating the Recovery of Aceh Post-Tsunami through

Sustainable Coastal Aquaculture

1. Project Title : Accelerating the Recovery of Aceh Post-Tsunami through Sustainable Coastal Aquaculture

2. Location : Province Nangroe Aceh Darussalam

3. Executing Agency : Directorate General of Aquaculture (DGA)

Ministry for Marine Affairs and Fisheries

4. Objectives :

a. Short-Term Objectives :

- To share and explain concept of sustainable coastal aquaculture to tambak farmers;
- To increase the understanding of the need for biosecurity and captive broodstocks and increase knowledge and skill of shrimp collectors;
- To select the most suitable site for *Gracilaria* culture program;

- To introduce the seaweed culture technique by demonstration of commercial scale pilot project;
- To supply the seed of seaweed from nursery culture and distribute to farmers and hatchery operators;

b. Long-Term Objectives :

- To increase biosecurity of all aquaculture in NAD;
- To provide training and job creation for the Tsunami victims along coastal areas which would also reduce pressure of illegal fish and coral collection
- To assist the development of certified organic shrimp production in NAD;
- To work with international groups offering to market organic shrimp;
- To increase the quality of community welfare.

Funding

Funds for this project are being provided from the World Aquaculture Society (WAS) Tsunami Relief Fund, supported by a donation from YSI Inc. and routed through Aquaculture without Frontiers (AwF), which will monitor the progress of the work.

Scope of the Project :

Phase 1:

Training Program for Tambak farmers and NGO's

The staff at Ujong Battee, possibly assisted by international volunteers, will hold short workshops to explain the biosecurity and polyculture aspects of sustainable coastal aquaculture to tambak farmers impacted by the tsunami. Representatives from interested NGO's who are supporting aquaculture restoration will also be invited.

Phase 2:

Development and Management Nursery of Seaweed (*Gracilaria* sp.) Culture Shrimp Hatcheries.

This program will work with the Ujong Batte lab and a private hatchery to produce sporelings for growout. Also, a pond at Ladong will be used for demonstration of growout techniques in a tambak. This pilot project will produce the superior seeds of seaweed (sporelings) that will be used for Polyculture (in Phase 3).

Phase 3 :

Polyculture Pilot Project

This program is to develop polyculture technique among seaweed (*Gracilaria* sp.) and shrimp culture in the same pond. There are 4 locations which will be used in the pilot project; Bireun, Aceh Utara, Pidie and Aceh Besar. Each location consists of 1 ha area which belongs to a group of fish farmers and it will be managed by them self.

Phase 4 :

#### Monitoring, Evaluation and Reporting

The project will be monitored and evaluated to determine the number of farmers adopting sustainable techniques and the success of this program. Reporting will be used to improve and develop of the whole program based on the experiences in the fields.

DGA will provide the following reports to the AwF Chairman, Michael New:

- brief regular progress reports
- A final report containing 'before and after' photos at the completion of the project.

All reports will be sent by email attachment to michaelnew339@btinternet.com

5. Implementation: Fiscal years 2006

6. Project cost : Aquaculture without Frontiers (AwF) grant aid US\$ 25,000

7. Amount proposed for commitment :

a.	Sustainable coastal aquaculture training/workshop	US\$ 3,000
b.	New equipment for shrimp broodstock collectors	
	- Double mesh gill nets	US\$ 1,000
	- Live tanks	US\$ 1,500
	- Battery operated air blower and oxygen tanks	US\$ 2,500
	- Activated carbon, tris buffer	US\$ 2,000
	- Collecting boat	US\$ 1,000
c.	Development and Management of Nursery Seaweed ( <i>Gracilaria</i> sp.) Culture in the Pond.	
	- Seeds	
		US\$ 1,000
	- Seeds transportation (Jakarta - Aceh)	
		US\$ 1,000
	- Collecting boat	
		US\$ 1,000
	- Cage materials (netting, PVC pipes and glue)	
		US\$ 2,000
	- Microscope and slides	
		US\$ 2,000
d.	Polyculture in the Pond (Seaweed & Shrimp):	
	- Water pumps (4)	US\$ 2,400
e.	Shrimp feed	US\$ 1,600
f.	Monitoring, Evaluation and Reporting	US\$ 2,000
g.	Miscellaneous and contingency	US\$ 1,000

TOTAL

US\$ 25,000

TERMS OF REFERENCE (TOR)

I. Project Digest

1.1 Project Title :

Accelerating the Recovery of Aceh Post-Tsunami through Sustainable Coastal Aquaculture

1.2 Location :

Province of Nangroe Aceh Darussalam

1.3 Expected Funding Source and/or Assistance :

- a. Internal technical assistance
- b. External funding

II. Term of Reference of the Project

2.1 Institutional Frame Work

The Directorate General for Aquaculture, Ministry for Marine Affairs and Fisheries will be the executing agency, while the Directorate of Seed Development will be the project coordinator. The project coordinator in the implementation of this project has been collaborating with Aquaculture without Frontiers (AwF).

2.2 Government Follow Up

After the completion of the project, the Directorate General of Aquaculture will continue to maintaining and improving the existing development of sustainable aquaculture in NAD. If possible, it would be disseminated to the other areas that have the similar condition to increase the quality of community welfare

2.5 Scope of the Project

Based on the socio-economic condition of the coastal and marine communities, the government of Indonesia planned to launch program for rehabilitation of aquaculture in Aceh Province, which is consist of an organized plan for sustainable coastal aquaculture that would have the support of NGO's, multinational development agencies and international seafood marketing companies that are willing to contract for seafood from sustainable sources.

2.6 Propose Schedule of the Project

Items	2006			
	Sept	Oct	Nov	Dec
- Training and workshops				
- Polyculture Pilot Project				
- Shrimp broodstock collecting				

- Monitoring, Evaluation and Reporting

