

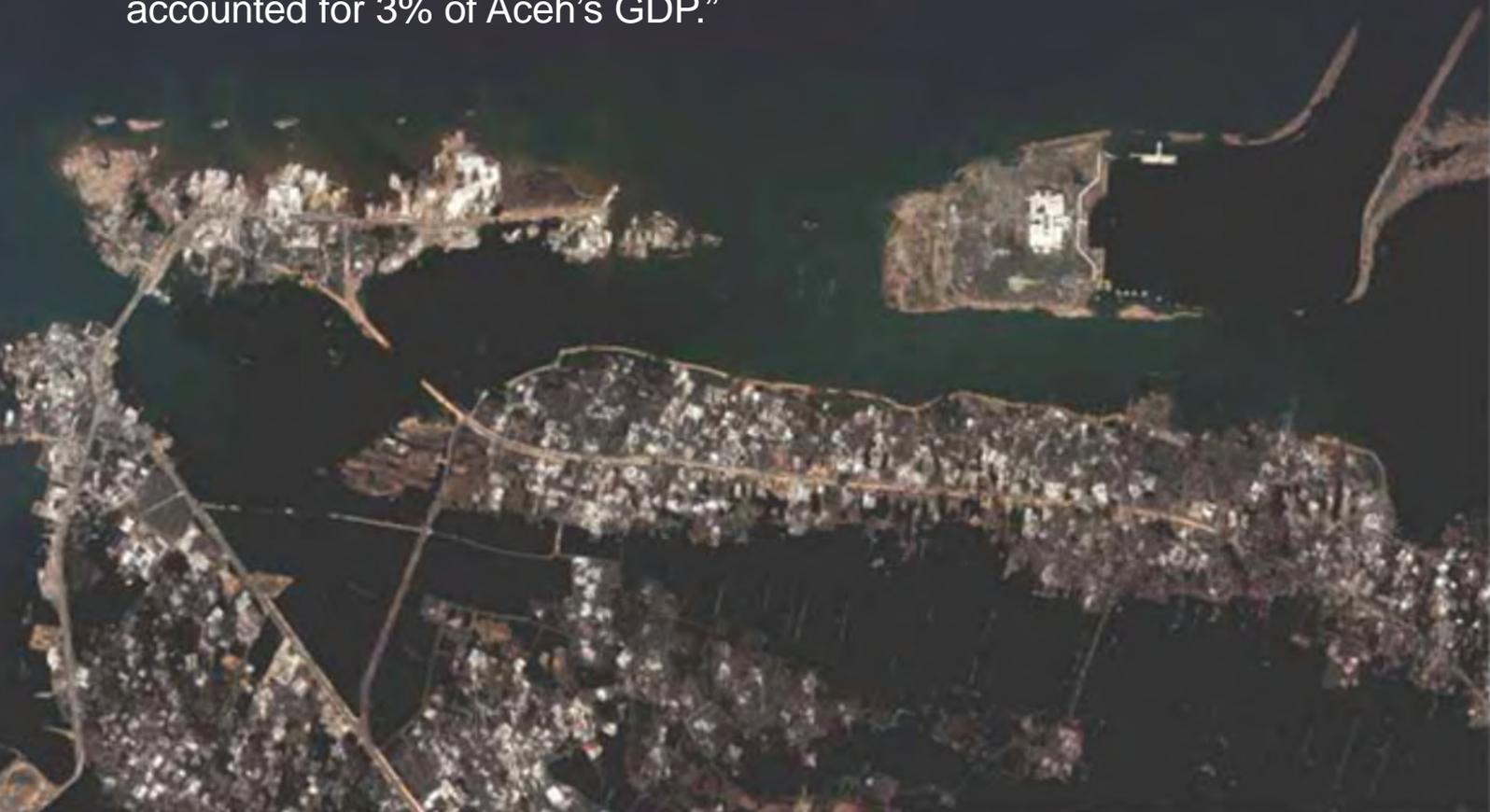
Strategy and Program

for the Rehabilitation and Reconstruction
of the Fishery Sector in Aceh and Nias,
Indonesia, following **the Tsunami**

Saut Hutagalung



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INTRODUCTION

During the informal SEAFDEC consultation on Support to Fisheries Relief Program for Tsunami Affected Countries of ASEAN, held in Hanoi in April 2005, the Indonesian delegation presented a strategy and program for the rehabilitation and reconstruction of the fishery sector in the areas affected by the 26 December 2004 tsunami. This article builds directly on the paper presented at the consultation, providing information about the rehabilitation strategy to be implemented in Indonesia.

This strategy was prepared by the Ministry of Marine Affairs and Fisheries (MMAF), with the assistance of the United Nations Food and Agriculture Organization (FAO), the Asian Development Bank (ADB) and the World Bank (WB). This paper does not represent the final position of agencies or donors, but instead presents an overview of actions to be undertaken, aimed at providing a platform for discussion. In particular, it has been prepared with special attention to consulting and involving local-level stakeholders, particularly the affected communities and local government, in order to ensure that activities will address actual needs and are properly implemented. In the meantime, other key government agencies and donors at the national level have also been consulted in order to maximize the efficiency and effectiveness in the use of resources.

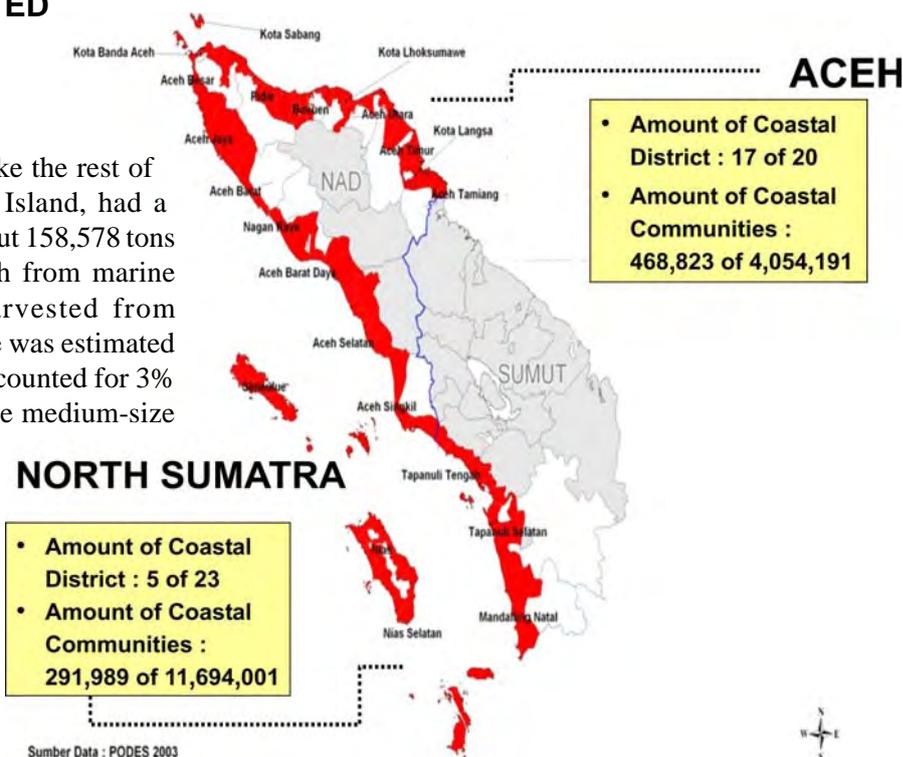
The fisheries sector provided employment for about 89,300 persons, or 16% of the total coastal population of 558,641 in the disaster affected areas of Aceh Province and Nias Island. Of these, some 58,000 were full-time fishers. Of the 18 districts (*kabupatens*), and municipalities (*kotas*), affected by the tsunami, five had relatively high coastal populations: Simeulue (93% of total population), Kota Sabang (87%), Aceh Selatan (35%), Nias (24%) and Aceh Jaya (23%).

Most members of the fishing communities were artisan fishers fishing inshore waters. Almost 15,000 canoes and small plank built boats, and about 5,600 inboard motor fishing boats were found along the coast. Commercial fleets were located on the north and east coast in Aceh Utara (Lhok Seumawe), Aceh Timur (Langsa) and Bireuen, and on the west coast in Aceh Barat (Meulaboh) and Aceh Selatan

FISHERIES IN TSUNAMI-AFFECTED AREAS¹

Before the Tsunami

Before 26 December 2004, Aceh like the rest of Northern Sumatra, which includes Nias Island, had a vibrant fisheries sector with an annual output 158,578 tons in 2003, comprising 133,976 tons of fish from marine capture fisheries and 24,602 tons harvested from aquaculture. The total value of the produce was estimated at Rp 1.59 trillion². The fisheries sector accounted for 3% of Aceh's GDP. The province had only one medium-size fish canning facility, and most of the fish caught and harvested in the province were either consumed locally or exported unprocessed to other countries or to other parts of the country. Similarly, the fisheries sector also used to play an important role in the economy of Nias Island.



¹ This material has been updated from MMAF material used for CGI Preliminary Damage and Loss Assessment, 19-20 January 2005, some of it from FAO and MMAF ongoing observations. The data cannot be considered fully validated. Updating of information is still ongoing.

² USD 1 = Rp 9,300

(Tapaktuan). The production of marine fisheries is pretty much evenly distributed between the Malacca Strait and the Indian Ocean *kabupatens* and *kotas*.

The infrastructure and facilities developed to support the fisheries sector in the disaster affected area included two large fishing ports in Banda Aceh and Nias, 49 small fishing harbours, and a large number of community-managed fish landing facilities. MMAF manages an aquaculture training centre, a demonstration hatchery, and fish and fishery product quality and hygiene control laboratories, as well as a training vessel. Each province and district has a number of field service offices (*dinas*) established by local governments.

About 36,600 ha of brackish water shrimp and fish ponds (*tambaks*) were used for less intensive aquaculture, mostly owned by individual operators. The development of aquaculture is mainly located on the northern and eastern coast of Aceh (Aceh Utara, Aceh Timur, Biereun and Pidie).



After the Tsunami

MMAF has initiated a systematic survey of damage and losses in each *kabupatens* but a comprehensive assessment will take time to be completed. In the meantime a preliminary assessment was made jointly by BAPPENAS (National Development Planning Agency), MMAF and the donor agencies. The information in this section is largely based on the initial findings of MMAF surveys, satellite imageries, reports received from local governments, and best estimates of MMAF staff and experts familiar with the physical features of the area and the fisheries sector activities in the localities. FAO has been working with local counterparts, and is in the process of

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compiling additional and complementary information through rapid and in-depth appraisals focusing on operational support to be provided.

The fisheries sector has been heavily affected by the disaster. A large number of fishers have been killed: based on initial rapid surveys and calculations, it was estimated that between 15-20% of the fishers in the 18 *kabupatens* died. Most of the infrastructure and other facilities have been destroyed or damaged, and many of the community members have lost their housing, fishing boat, engine and gear. Many boats not lost have been damaged beyond repair. It is anticipated that almost two thirds of the fishing boats and gears have been fully or partially destroyed, and only the *kabupatens* south of Lhok Seumawe have been spared. Boats destroyed or missing have been valued at about Rp 250 billion. There are some reports of larger boats resuming or continuing fishing on the east coast and in the southern part of the west coast.

In general, it can be stated that the extent of damage and losses in each *kabupaten* varies depending on the location; with the southern parts of both coastlines less damaged than the northern parts. The west coast was particularly heavily damaged: in some cases whole coastal fishing villages have been almost wiped out.

Regarding physical infrastructure, such as fishing ports and harbours, the most affected areas were

the *kabupatens* in the northern part of Aceh, both on the western and eastern coasts. Strangely, in Sabang (which is located on the northernmost island of Aceh), it was reported that none of

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the ports were damaged. Overall, it is estimated that 55% of the fishing harbours and ports were damaged.

MMAF lost almost 90% of its assets, which were mostly located in the areas hit hardest by the tsunami (around Banda Aceh, and the hatchery research stations in Simelue and Nias). The government hatchery in Ujung Batee alone lost its entire broodstock of tiger prawn (*Penaeus monodon*), milkfish and groupers, worth in total close to Rp 8.5 billion.

The damage to the brackish water culture ponds was relatively disseminated in most areas of Aceh. Even in the areas where the tsunami was not significant, such as in the southern part of Aceh, floods have partially damaged the infrastructure. In total, the damage is valued at Rp 466 billion, which accounts for about 50% of the total damage value to the fisheries sector.

Although only employing a small number of people, Aceh provided a large proportion of the wild caught broodstock for hatcheries throughout Indonesia. A fuller assessment of



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broodstock supply and demand is to be made with FAO assistance, as it remains unclear how many of the collectors survived, or what impact the interruption of these networks will have on the provision of fry for the shrimp farms throughout Indonesia.

The total damage to the sector is estimated at Rp 1,200 billion (over half of the industry’s total assets). In addition, there are losses to the economy which relate to the destruction of Aceh’s fisheries assets, in other words, revenue lost from fishing and aquaculture. It is estimated that outputs of Aceh’s fishing industry will fall by 60% due to the disaster. It has also been estimated that the recovery period to pre-tsunami production in aquaculture will take about 5 years, although this will mostly depend on the recovery rate of the private sector in the region. In capture or marine fisheries, however, the recovery rate will be much longer, estimated to be as long as 10 years. Considering that 65% of boats and equipment were lost and that 15-20% of the fishers died, the capacity to catch and land fish has been very significantly lowered. Prior to the disaster, fisheries yields were relatively stable despite increasing fishing effort, highlighting the fact that fisheries were operating at or beyond their optimum level. Further investigation will be needed to understand the disaster’s long-term impact on fisheries production. Based on the above assumptions, the total loss of revenue until recovery to the pre-disaster production level is estimated to be Rp 3.8 trillion.

Guiding Principles for the Rehabilitation and Reconstruction of the Coastal Area of Aceh and Nias Island

Rehabilitation and reconstruction efforts offers an opportunity for not just restoring livelihoods and rehabilitating ecosystems to the pre-tsunami situation, but also for creating conditions to overcome some previous weaknesses and create better livelihoods. To do so will require adherence to a set of principles which build on extensive Indonesian and international experience in

fisheries development and coastal management. These principles are:

- **Focus on poverty alleviation:** this includes promoting equitable access to land, capital and natural resources; addressing the patron-client relationship; focusing on technologies which can assist in creating sustained employment-intensive activities, which can benefit the most vulnerable and marginalized people.
- **Be market-led and economically sustainable:** so as to ensure the responsiveness and efficiency of the fishery rehabilitation efforts to the reality of local supply and demand in fishery products, inputs and markets. Only this can provide real incentives and opportunities for people in coastal communities to build up fishery-related economic activities into strong livelihoods, which will also enhance the local economy on a long-term basis.



- **Consider environmental sustainability throughout:** the health of fisheries-related ecosystems such as mangroves, coral reef and seagrass beds by protection will be ensured through zonation (e.g. restricted-use and non-use) and through fisheries management tools to prevent overfishing. Certain types of mariculture which support sustainable resources-use will be encouraged (fish and shellfish pen and cage culture, and seaweed culture), as well as fishing gears with a minimal negative impact on long-term fisheries production.
- **Be integrated and holistic, as such approaches are particularly important in the coastal zone and for poorer coastal communities:** Coastal areas tend to be fragile with a complex set of ecological interactions taking place. The economic well-being of communities depends on maintaining a variety of ecosystems around them.
- **Need to be participatory and consider the real needs and capabilities of local people:** Community members of coastal villages, in general the most heavily affected, should be at the forefront of all discussions on future activities. Full participation also implies transparency and accountability in the relationship between the community and the partners to maximize the effectiveness and efficiency of activities. Acehese leaders and the *Panglima Laut* fishers' organization should be engaged to facilitate information gathering and discussing options for rehabilitation and reconstruction activities. Similarly activities need to be community-led, and implemented by communities themselves when possible. This will give a greater sense of ownership to local communities and reinforce their ability to solve problems as they arise as well as strengthening community skills and building up their assets.

The rehabilitation and reconstruction efforts, in short, offer opportunities for realizing an Integrated Coastal Zone and Sustainable Fisheries Management on a provincial scale.

Strategies for Rehabilitation and Reconstruction

Rehabilitation and reconstruction strategies are needed to assist people and communities to rebuild their assets and restart economic activity. These must not repeat

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the mistake of the past by recreating poverty and unsustainable activities. Instead they should:

- **Restore private assets:**
 - Build up assets of coastal community members and households, including boats, gears, seeds and ponds
 - Introduce appropriate new technologies, such as mariculture, and
 - Give communities a leading role in management of resource and implementation of activities.
- **Rebuild public goods:**
 - Improve support services
 - Create efficient and transparent regulatory mechanisms, and
 - Rehabilitate and protect environmental resources with community ownership (coral reefs, mangroves).

REHABILITATION AND RECONSTRUCTION ACTIVITIES

Short-term Rehabilitation Activities

During 2005-2006, a number of short-term activities need to be started, aimed at providing immediate livelihood support through cash-for-work where possible, getting fishers to resume going to sea and also providing (temporary) alternatives. Aquaculture must be restarted, essential support and regulatory services re-established, and detailed assessments of preparations of long-term recovery plans and projects continued. These aims will be achieved through the following activities:

Assist Communities to Restart Productive Activities

Priority support to fishing activities

Local people should be provided support (possibly through cash for work) to recover and repair damaged boats. Similarly, local boat building should be supported to get underway, with training if necessary, and access to raw materials and equipment supported.

Fishers will not go back to fishing unless they can sell their fish. At present, there is a reluctance to eat fish captured near Aceh due to the concern that the fish are feeding on human corpses. However this fear is likely to be relatively short-lived and fishers may well soon experience strong demand, and high prices, for their catches. Provision of ice and fish boxes will be essential to get fish to markets with minimal waste and these should be provided as soon as possible. In the case of ice factories, mini-plants of some 10t/day can be set up relatively quickly and, in the short term, could be managed jointly by the private sector (who

would be expected to provide the land). Given their limited cost and high benefits, fish boxes should be provided free to the fishers.

Rehabilitating aquaculture

Most fishponds (*tambaks*) are located on the eastern coast of Aceh. Although some ponds have been completely destroyed, most suffered only minor damage but have been heavily silted. Cleaning out the ponds and repairing embankments would be relatively quick and easy, and much of the work could be done by local people under cash for work programmes. Repair work should include sheds, stores and other building used by the fish farmers.

For ponds which are not affected and for ponds that have been cleared and repaired, there is also a need for feed and fish seed, most of the hatcheries and feed making units having been damaged and needing to be repaired. In the short term, there may be a need to import these items from other provinces and the government would have to support private traders to bring in feed and fry, possibly by subsidizing their travel. As in the case of capture fisheries, the provision of ice and fish boxes would be important for proper handling and transport of fish.

Some of the local infrastructure would need cleaning and repair. This includes pumps, local supply channels, on-farm roads, stores, sheds and waste disposal units. Although much of this repair work may be accomplished using local labour, more equipment may need to be purchased outside the province. Local government, particularly the local fisheries staff, should help this process by bringing equipment dealers or subsidizing transport costs of local fish-farmers.



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Rehabilitate public services and infrastructure to support communities and longer term activities

Small landing site rehabilitation

Surveys carried out by government staff and FAO indicate that many ports have suffered damage or are silted up. Minor repair and dredging will allow these ports to become functional again in the short term. Local capacity is sufficient to carry out minor repairs, but building materials and tools need to be provided. Repair work should include the provision of toilets and tap water, among other facilities and utilities. Some dredging work can be done manually, but the main part will require heavy machinery, brought in from other parts of Sumatra.

Re-establishment of essential support services

Some support services need to be quickly restored as they are essential to productive activity. These include water quality testing stations in the fish culture areas and fish disease surveillance and control measures. Many of the public service facilities located on the east coast suffered relatively minor damage, and can be quickly repaired and re-equipped to answer these needs.

In the case of capture fisheries, essential services would include search-and-rescue teams, radio relay stations and the like. Community-based enforcement should be used where possible to ensure that the marine resources assets of the coastal people of Aceh and Nias are sustained.

Assessments and detailed programme preparations

It has been accepted that bringing the economy back to pre-tsunami levels and restoring growth will take at least 4-5 years. Detailed planning of longer-term interventions requires certain critical information which needs to be collected and processed as soon as possible. The potential for restoring production will rely on a good understanding of what the damage has been and what is needed. Detailed fisheries and coastal management assessment, including spatial and coastal zone planning are needed to provide an

overall framework, a master plan, for the diverse agencies taking apart into the rebuilding and relief efforts.

Further surveys on boats must be done, estimating the replacements and major repairs needed in conjunction with the assessments on the biological capacity of the fisheries resources in the regional waters. At the same time, many of the ports located in the western part of Aceh suffered severe damage, with much of their infrastructure completely washed away.

Since the shape and topography of the coastline have changed, it may not be even advisable or possible to reconstruct the ports at the same sites. In that regard, a detailed survey needs to be initiated, to recommend about where repair are needed and where relocation and reconstruction of ports is a better option. Similarly, there is a need to assess the capacity of the remaining service facilities, such as markets, extension offices and laboratories, in order to make proposals for future reconstruction and development.

In the case of aquaculture, surveys need to be conducted focusing on the claims made for key facilities, including protective dikes, ice plants and pumps. Detailed design and prioritisation of purchases and building will need to be done to maximise the benefits to coastal communities.

Because of the huge casualties, land and other assets have sometimes been left without owners. A process needs to be established for managing these assets. Land titles and records held by families or *kabupaten* offices may also have been destroyed. There is a need to find out what records are still available, and whether copies of lost files are available in provincial offices.

Finally, there is a need to estimate how local farmers and fishers institutions can survive in the post-tsunami period, and to what extent these are capable of getting involved in reconstruction planning and regulation.

Indicative Long-term Reconstruction Activities

Starting in 2005, and continuing for the next 5 to 8 years, reconstruction activities will build on communities' capacities, assets and infrastructure services. These will primarily cover the following:

- Building up community livelihoods management skills
- Strengthening credit, marketing and post-harvest services

- Supporting the development of appropriate new technologies
- Strengthening the physical infrastructure
- Rehabilitating the environment
- Managing and enforcing sustainable fisheries
- Education and awareness raising

All of these would be implemented through crosscutting activities to strengthen community organizations, which should be involved in decision-making and the management of the activities as much as possible. The government, the private sectors and NGOs will be targeted to support communities in these endeavours.

1. Strengthening communities and their productive activities

Reviving and strengthening coastal communities' economic activities

Marketing and post-harvest systems need to be stimulated and opportunities must be created, by providing government infrastructure and supporting initiatives by the private sector. Specific training would be provided to communities on a demand basis to fit their readiness for addressing more complex organizational and business activities.

As key infrastructure is repaired, business opportunities for local and inter-local fish trade will begin to emerge. MMAF is committed to re-establishing an integrated fisheries industry that is equitable for all stakeholders. It will support shrimp hatcheries, brackish water ponds, fish processing, ice plants, marketing development, and of course the capture fisheries sector.



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Such work must be implemented carefully, working in partnership with the local businesses, NGOs and international agencies.

Initial surveys will assess the status of informal financial arrangements, levels of indebtedness and patron-client relationships. Most fishers are likely to be indebted to a middle man, who can transfer debt to surviving family members. An assessment of patron-client relationships should be attempted in order to quantify assets, remaining financial capacity, and the financial services provided. In areas where traditional moneylenders play an important role, microfinancing and small and medium-scale business financing support would be provided, and ongoing programs on empowerment such as PEMP, Opti, BMT or cooperatives would be continued.

Support for development of appropriate new technologies

Aceh may focus on developing a midwater pelagic fleet and chose to refrain from developing fishing methods that have proven to reduce the regenerative capacity of the coasts. At the same time, it must be ensured that the overall pressure on fishery resources in inshore areas by small-scale fishers does not increase further above the local stock capacity, and that there are local employment benefits from this midwater industry. Trawls, fyke nets, explosive fishing and poisons all generate high catches in the short term, but their long-term effects have generally been assessed as reducing fisheries production, and current legislation limits or even prohibits them. The legislation should be strongly enforced, together with the necessary limitations on large-scale fishing inshore.

Seaweed production could be attempted in the sheltered bays of Simeulue and Sabang, while MMAF and donor communities may facilitate the establishment of marketing channels for the product. The fast growing cycle

of seaweed produces reliable revenue. The possibility of cage mariculture should be explored for the future.

Education and awareness building

The next generation – children who survived the tsunami – should be given specific educational materials on coastal ecology, tsunami response, sustainable fisheries and aquaculture. Existing materials (e.g. COREMAP books) developed and tested in Sumatra could be modified to address these needs.

2. Strengthening public services, rehabilitation efforts, and protecting public goods

Strengthening physical infrastructure

Reconstruction of fishing ports and facilities (including TPI, PPP and mini ice-plants) will be needed once the fishing industry starts growing beyond production for local needs. Communities should be involved in the selection of suitable locations for the rebuilding of fisheries infrastructure. In addition, some aquaculture facilities under the responsibility of the public sector, such as mains water supply and drainage canals for aquaculture ponds, as well as destroyed government fishery research facilities and laboratories, will need to be progressively reconstructed.

Sustainable fisheries management and enforcement

To reduce the influx of fishers from outside Aceh, simple registration of Acehnese fishing boats, perhaps with on-hull numbering and clear procedures for licensing of vessels fishing in Acehnese waters, should be developed. With a commitment to training Acehnese fishers in simple procedures such as Community Surveillance (*Siswasmas*), the fishing effort can be controlled whilst fisheries recovery and monitoring protocols are developed.

Environmental rehabilitation

After initial civil reconstruction of damaged towns has been undertaken, national or international financial aid should be solicited if any major environmental rehabilitation is required. Such rehabilitation should be taken into consideration during the planning of a town's reconstruction. Food-for-planting of mangroves and species of trees used for boat construction may be organized, together with the resolution of tenure and user rights, and clear agreement on sustainable harvesting mechanisms of these new plantations.

Supplementation arrangements

The government of Indonesia has finalised its Rehabilitation and Reconstruction Plan (the "blueprint")

and established the Agency for Rehabilitation and Reconstruction of Aceh and Nias, North Sumatra that coordinates the necessary detailed plans and works. For implementation, the Agency works closely with the Ministry and Marine Affairs and Fisheries.

MONITORING AND EVALUATION

A more in-depth set of objectives and indicators will be developed during the rehabilitation phase arising from detailed assessments and iterative planning. This will help in keeping work plans updated. This is especially important during the first year of rehabilitation and reconstruction, as changes on the ground will be very fast and unpredictable. A simple working log-frame or a results-based framework should be developed as a discussion tool, capturing key indicators and requested deliverables from the different agencies.

It is recommended that a national coordination office, based in MMAF, coordinates the implementation of M&E, getting regular feedback from the field through reports, field visits, special events and monthly meeting with stakeholders. In addition to monitoring and evaluation efforts, partners should provide a basis for realizing the commitment for transparency to communities and partners.

CONCLUSION

The required rehabilitation and reconstruction work are a great challenge not only for the government but for all stakeholders, including to the various donors. As partnership is very much needed to face such a huge task, close coordination and collaboration with donors and stakeholders should be promoted. Consultations with local communities and local governments need to be carried out before detailed plans are finalized. That being said, survey and research on stocks and the state-of-the-environment also need to be continued.



ABOUT THE AUTHOR

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