Impacts of the Tsunami on Fisheries and Aquaculture Livelihoods[1]

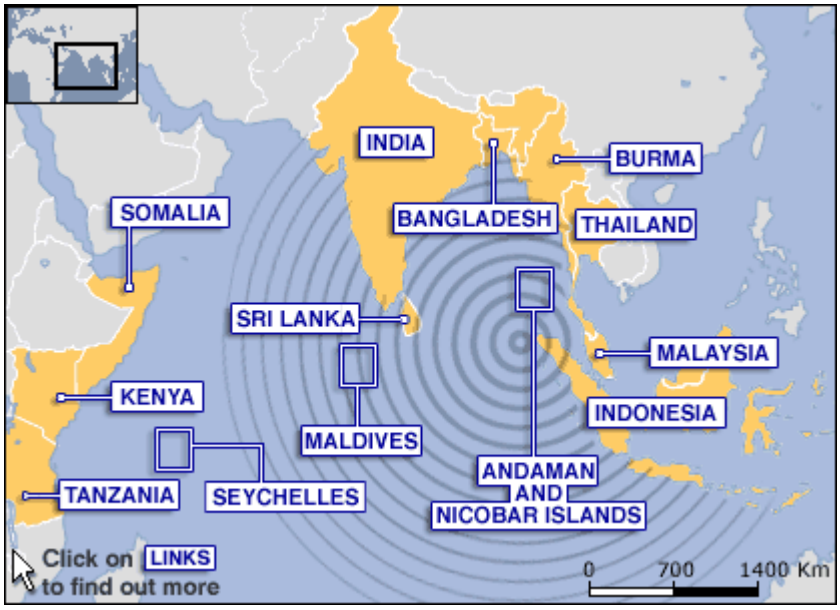
- Regional Overview –

(As of 3rd February 2005)

Affected areas

The massive earthquake in the northern part of Indonesia on 26th December 2004, and the resulting tsunami, had an impact on many countries in the Indian Ocean.

Figure 1: Countries affected by the tsunami



Source: http://news.bbc.co.uk/1/hi/in_depth/world/2004/asia_quake_disaster/default.stm

More detailed maps on country-specific areas that were impacted can be found in the individual country reports at www.apfic.org, on the BBC website http://news.bbc.co.uk/1/shared/spl/hi/world/04/asia_quake/quake_maps/html/1.stm, and from satellite information available from UNOSAT (http://unosat.web.cern.ch/unosat/asp/charter.asp?id=55) .

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Within individual countries the impacts of the tsunami were in some cases very localised, while in others they were felt along virtually the whole coastline. The table below summarises the main areas affected in different countries.

Table 1: Areas affected in different countries

Country	Main coastal areas impacted
Indonesia	Aceh and Nias Islands
Sri Lanka	12 of the 14 coastal districts in the country (Colombo, Negombo, Jaffna, Kilinochchi, Mullaitu, Tricomalee, Batticaloa, Ampara, Hambantota, Matar, Gale and Kaluthara districts)
India	South east coast and offshore islands. Tamil Nadu and the Andaman and Nicobar islands were worst affected. The States of Pondicherry, Andhra Pradesh and Kerala were affected to a lesser extent.
Thailand	Phan Nga, Phuket and Krabi Provinces
Maldives	Flooding in most islands, but impacts more extreme in the south. Twenty of the Maldives' 199 inhabited islands 'totally destroyed'
Malaysia	Northern States of Kedah, Penang Perlis and Perak
Myanmar	Limited to the southern coast (Thanintharyi Division and Rakhine State)
Somalia	Puntland
Kenya	Mainland (Malindi, Mombassa, Kalifi) and Lamu island
Tanzania	Mainland and islands of Pemba, Zanzibar and Mafia
Bangladesh	Basically not impacted
Seychelles	All islands

NB: Relatively limited impact was experienced in Kenya, Tanzania, Bangladesh and Seychelles

Background and summary data on fisheries and aquaculture pre-tsunami

Fisheries (and in some countries aquaculture) play an important economic and social role in all countries affected by the tsunami, contributing to both poverty alleviation and food security.

With respect to poverty alleviation, fisheries and aquaculture activities contribute to the livelihoods of many millions of people in the region, with those engaged in the sector doing so on a full-time, part-time or occasional basis, some as a form of subsistence and some as a means to earn income. Fisheries and aquaculture thus contribute to poverty alleviation at the household level, at the local level through multiplier effects, and at the national level through exports, taxation, and contributions to Gross Domestic Product (GDP).

In terms of food security, fish represents a valuable source of micro-nutrients, minerals, essential fatty acids and proteins. Average annual per caput consumption is more than 19 kg in all the affected countries, except in Somalia (2 kg) and India (4.9 kg). But it is as high as 191 kg (Maldives, the highest in the world) and 58.5 kg (Malaysia), as compared to the world average of 16.2 kg (or 13.2 kg if China is excluded). On average, fish contributes more than 40 percent of total animal proteins in all the affected countries, except for Somalia and India, but reaches levels as high as 58 percent in Indonesia or 81.4 percent in Maldives. In comparison, the share of fish proteins in total world animal protein supplies is around 15.9 percent in 2001 (14.7 percent excluding China). The importance of fish for food security (both in direct terms through its consumption, and indirectly by enabling those catching it to sell and buy other food types) is of course much greater for coastal populations than these national averages imply.

As would be expected given the large number of countries impacted, the range of fishing methods, vessels, gear, etc varies enormously and includes small-scale, semi-industrial and industrial activities. Aquaculture is also an important activity in some of the areas affected, most notably in Indonesia (predominantly cage culture), India (shrimp culture), Malaysia (cage culture) and Thailand (cage culture and shrimp culture). Some summary data is provided in the table below

Table 2: Summary data on fisheries in the region (2002)

Country	Capture production (tonnes)	% of production in affected areas	Aquaculture production (tonnes)	% of production in affected areas	Exports ($ '000s)	Numbers of fisher and fish farmers[2]
India	3,770,912		2,191,704		1,411,721	10,589,257
Indonesia	4,343,756		914,066		1,490,814	5,662,944
Malaysia	1,275,555		165,119		377,584	100,666
Maldives	161,057		0		55,937	14,355
Myanmar	1,312,642		121,266		248,343	2,834,759
Seychelles	63,209		234		?	?
Somalia	18,000				3,470	18,900
Sri Lanka	293,630		8,312		83,736	163,570
Thailand	2,921,296		644,890		3,676,427	354,495
TOTAL	**14,160,057**		**4,045,591**		**7,348,032**	**19,738,946**

Source: FAO (data on % of production in affected areas will be added at a later date)

Data on impacts on fisheries and aquaculture

Fishing and aquaculture households and communities in the region were especially hard hit by the tsunami. Detailed information on the impacts on individual countries are described in the individual country reports provided on the APFIC website (www.apfic.org). The impacts related to the death of fishers/aquaculturists, as well as the loss of fishing/aquaculture assets and related onshore infrastructure, both of which have reduced the ability of households to earn income and sustain livelihoods. However, many fishing households have been additionally affected through a range of other secondary impacts, including:

- impacts on agricultural land in the coastal zone being used by fishing households
- interruption of other economic activities which were previously contributing to livelihood strategies
- continuing requirements to pay debts and loans while having no ability to earn income
- disruption to informal sources and mechanisms of credit/savings, and loss of savings kept in households rather than in banks
- a lack of demand for fish in coastal areas (due both to unfounded concerns over safety issues, and the financial ability of coastal populations to purchase fish following the disaster)
- psychological impacts on fishing communities
- damage to ecosystems that supported the livelihoods of fishers and fish farmers

[2] Data includes full-time, part-time and occasional fishers and those engaged in marine, inland, and aquaculture activities. Data for Malaysia 1995, Somalia 1990, Thailand 2000

Data available to-date suggests that direct impacts on fisheries and aquaculture for the region as a whole are as follows:

- Over 60,000 fatalities in the fishing sector;
- 111,073 fishing vessels destroyed or damaged, a large proportion of them being small-scale vessels, and having an estimated replacement cost of US$ 161 million;
- 36,235 fishing vessel engines lost or damaged beyond repair, having an estimated replacement cost of US$ 73 million;
- 1.7 million units of fishing gear destroyed, having an estimated replacement cost of US$ 86 million;
- Other damages to the fisheries sector, such as to aquaculture, infrastructure and fishing harbours estimated repair costs in excess of US$ 100 million;
- Direct losses in the fisheries sector of around US$ 420 million; and
- The livelihoods of perhaps 1.5 million people in fishing and aquaculture households are now under threat.

In addition, it should be remembered that a) the figures on financial damage above do not include the indirect loss of being unable to fish and earn revenue, and b) fisheries and aquaculture generate significant multiplier effects both upstream (through the supply of inputs) and downstream (through processing and marketing) of production activities. The ripple-effect of the disaster throughout local and national economies is certain to be significant. This will be especially unfortunate for those countries, and regions within them, in which fisheries and aquaculture represent key sectors of the economy.

The differing impacts

The impacts of the tsunami were widely different in different countries in the region, as shown by some of the key impact data provided in the table below[3].

Table 3: Key impact data by country

Country	Vessels lost / damaged[4]	Fishing gear units lost[5]	Engines lost / damaged	Direct financial damage ($ mn)	Fisher households affected	Fish farmer households affected
India	64,000	?	?	?	800,000	?
Indonesia	3,000	?	?	210	45,000	?
Malaysia	524	?	?	14	5,200	155
Maldives	147	101	?	13	1,200	-
Myanmar	144	?	?	?	500	-
Seychelles	107	?	?	1	?	-
Somalia	2,731	125,000	1,527	?	250	-
Sri Lanka	19,637	10,994	2,687	120	33,000	-
Thailand	5,397	110,129	?	130	7,000	5,794

[3] Note that due to data inconsistencies/inadequacies, data in Table 3 does not necessarily correspond with total figures provided in the previous section

[4] A very large proportion of vessels damaged/destroyed were small-scale in nature

[5] Note that gear units are not comparable between countries as in some cases 1 unit might represent a large gill net costing many $ and providing the principal livelihood for many people, while in other cases 1 unit might represent a small fish trap contributing just small livelihoods benefits to a family or individual

The reasons for the differing extent of the impacts were due to two principal factors, firstly certain geographical features, and secondly the differing patterns and extent of fishing and aquaculture operations throughout the region.

Myanmar and Malaysia, were not badly affected although geographically close to the earthquake's epicentre. In Myanmar the Myeik Archipelago reduced the tsunami's force before it impacted the coast of Tanintharyi Division, and on its way to the Ayeyarwaddy coast, the wave had already hit the Andaman Islands (India). In addition, the Myanmar coast is also characterized by its hilly geomorphology. For Malaysia, much of its coastline was spared widespread devastation because it was shielded by Sumatra. And for the Maldives, while flooding was extensive given the low land elevation of all islands, the shallowness of the water limited the tsunami's destructive power. Sri Lanka on the other hand experienced devastating impacts on its fishing industry, given that virtually the whole coastline was affected.

The impacts of the tsunami on fisheries and aquaculture were also different throughout the Indian Ocean due to different fishing and aquaculture practices. Most obviously, aquaculture was only impacted in Thailand, India, Malaysia and Indonesia[6], as it was only in these countries that aquaculture was being practiced along coastal areas impacted by the tsunami.

At the national level, impacts to the national economy may be felt most strongly in Sri Lanka because of the large proportion of the total fishing industry that was affected, and in the Maldives because fisheries plays such a vital role in the nation's economy (only tourism as a sector contributes more to GDP). However, in terms of vessel numbers lost or damaged, India suffered the most, followed by Sri Lanka, Thailand and then Indonesia, largely just reflecting the numbers of vessels operating in the areas affected.

Within local regions of the countries affected, the impacts on local rural economies have been enormous where fishing and aquaculture played a dominant role, with few other income-earning opportunities. In the Maldives for example, in some of the islands where tourism employment is not a possibility and where large numbers of vessels have been destroyed, the whole economy was underpinned by fishing activities. In India, Sri Lanka, Indonesia and Thailand, many of the coastal villages impacted were almost entirely dependent on fisheries and/or aquaculture. In both Sri Lanka and Thailand, tourism represented an important outlet for fish sales. Evidence is already coming to light of a quick re-bound of tourism confidence, which will help such communities recover. A notable danger here however, is that governments may neglect the impacts on, and needs of, the fishing communities with a strong focus on supporting tourism as a first priority.

At the household level, the impacts of the tsunami will be greatly determined by the proximity that people were living to the shore, and the diversification of livelihood strategies. Those fishing communities with houses on or close to the beach, or living in mangrove areas, will have been especially hard hit due the fact that fishing/aquaculture is likely to have played a very dominant role in household livelihoods strategies. This will be especially true where land close to the shoreline is

[6] Also some very minor damage to seabass cage culture in Myanmar

unsuitable for agricultural production. For fishers and fish farmers living slightly further from the sea, tsunami impacts will also have been severe where salt-water intrusion may have had, and continue to have for a limited time, an impact on the productivity of kitchen gardens and the ability to keep livestock. Other fishers and fish farmers living further from the shore may have been more able to retain assets and livelihoods strategies outside of fishing, on which they can survive with less assistance.

Needs assessment

Immediately (i.e. in the 6 months after the tsunami), many countries in the region require inputs of fishing vessels, engines, gear, and seed for aquaculture activities, so that people can begin to feed themselves and earn money again. Such technical inputs are already being delivered by governments, NGOs, and international agencies. In addition, many countries in the region have instigated financial compensation schemes.

Detailed needs assessment of the medium- (6-18 months) and longer-term (18-months onwards) requirements of fishing and aquaculture communities are generally not yet available, although governments and many NGOs are beginning to produce relevant information.

What seems certain is that for all future activities there will be an over-riding need for good consultation with all those affected to ensure that any support is in line with their needs and requests, rather than being imposed. In addition, the following are also likely to be important ***principles*** of medium- to long-term rehabilitation".

- Rehabilitation activities which place fisheries and aquaculture within a broad framework of livelihood reconstruction and a focus not just on physical assets (vessels, gear etc), but also on wider livelihood assets. Microfinance (credit and savings mechanisms) and issues of land-ownership are likely to be especially important in this regard
- Careful attention to who receives the benefits of any support, so as to ensure that the very poor are not excluded due to their marginalisation. An emphasis on gender equality will also be important.
- Good coordination between government, NGOs (international and national/local), and international agencies and bilateral donors
- Recognition that rehabilitation will be a long-term process and that strong support must be provided not just during the emergency relief stage, but for longer-term initiatives

Future needs for rehabilitation will become apparent in more detail in the coming weeks. **Key needs will relate to different types of capital** conceptualised under the livelihoods approach, **as well as the need to improve Policies, Institutions and Processes (PIPs)**. Needs and activities may therefore include:

- Fishing assets (vessels, gear, engines) – *physical capital*
- Aquaculture assets (materials for cage culture) – *physical capital*
- Provision of seed/fingerlings for re-stocking – *natural capital*

- Fisheries and aquaculture infrastructure (reconstruction of harbours, fish/shrimp hatcheries, and onshore facilities such as ice plants, market stalls and related facilities, etc) – *physical capital*
- Provision of microfinance – *financial capital*
- Institutional support to improve government service provision – *social capital*
- Strengthening of community-based organisations – *social capital*
- Support for the creation and diversification of sustainable livelihoods of those from traditional fishing and fish farming communities – *all types of capital*
- Restoration/improvements in national marketing links and international export capabilities of the affected countries (through physical inputs, training/advice on relevant issues such as health and hygiene, and policy concessions on trade regulations) – *physical, human and social capital, and PIPs*
- Community-based planning and sustainable management in coastal areas – *increasing natural capital through better PIPs*
- Rehabilitation and conservation of fish resources and the coastal environment – *natural capital*;
- Linking fisheries and aquaculture sectors to emerging early warning systems for natural disasters – *social capital*
- Measures to improve safety-at-sea – *physical and social capital*
- Mutual insurance programmes for fisheries and aquaculture, which also cover the risk of natural calamities – *financial capital*

These ideas about the needed principles and inputs/activities are shown schematically in Figure 2.

What do we still need to know?

In many countries, detailed information on the impacts of the tsunami is now becoming available. Detailed needs assessment based on the views and wishes of those affected is now the primary challenge, so as to plan for both medium-term and longer-term support.

Ongoing activities

All countries have a variety of government task forces, donor coordination committees, and NGOs, all working to assessment impacts, conduct needs assessments, and plan for longer term rehabilitation and reconstruction. FAO and other CONSRN partners have fielded staff as part of impact assessment missions to countries affected by the tsunami. International agencies and national governments are also beginning to think about, and prepare strategic frameworks for longer-term rehabilitation. The CONSRN consortium[7], will be facilitating a workshop in the third week in February to put government officials together with staff from international and bilateral donors to agree on appropriate frameworks that should guide policy on medium- to long-term rehabilitation.

[7] FAO regional office in Bangkok, AFPIC, NACA, SEAFDEC, BOB-IGO, World Fish Centre

Figure 2: Components of a Rehabilitation Programme for Fisheries and Aquaculture