Tsunami impact on fisheries & aquaculture in Thailand[1]

(18th Jan 2005)

Affected areas (livelihoods)

About 490 fishing villages along the Andaman coast and islands were affected by the Tsunami that struck on 26 December 2004. The impact on these villages ranges from some broken fishing equipment on the beach to complete and utter devastation with great loss of life. The worst affected village, Ban Nam Kem (Takua Pa district, Phangna province) lost about half of its population of 6,000, nearly 80% of its infrastructure, and most of its fishing boats and equipment.

In total it is estimated that 3,936 small fishing boats and nearly 1,328 large fishing boats and trawlers were destroyed or seriously damaged by the tsunami in Thailand. More than 270 rai of fish/shrimp farms. It is estimated that the livelihood of 100,000 – 120,000 people have been affected. The rough estimate of total loss in the fishing industry is currently around 500 million Baht, although this can be expected to rise as assessment of lost opportunity and downstream impacts are costed in.

The destruction caused by the Tsunami appears to be very much localized and varies from total to almost invisible destruction. The common characteristics that played a major role in the impact of the Tsunami on all worst hit locations are:

- Very crowed human settlements at immediate proximity of the shoreline (tourism related facilities and fisher folks communities) that experienced in recent years a booming and poorly planned development
- Very low elevations (flat lands) of these settlements (a couple of meters above sea level) in exposed wide bays (to the west and south west) with no coral reef barriers and with sea beds presenting steep slopes and no natural barriers such as islands that could provide natural protection
- A total un-preparedness for such event with no historic records of similar disasters (including typhoon and hurricanes sea surges) nor warning systems or structures to mitigate potential damages caused by natural disasters whatever their causes may be.

The worst hit area, the central Thai Andaman coast from Phan Nga to Krabi with Phuket at the centre has seen a recent booming development of economic activities based on the coast and that are little diversified and all interwoven. In the past, the rural and coastal communities of Phan Nga and Phuket for example used to rely more on mostly land based activities such as forestry products, commercial agriculture (fruit orchards, cashew, copra,

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rubber) and particularly tin dredging (Phangna, Ranong and Phuket provinces). Fishing and aquaculture, although present, represented somewhat very marginal activities some 30 years ago.

Directly and indirectly, the boom of the tourism industry generously promoted and supported provided new attractive sources of income and jobs for the local younger generations (up to 50% of the staff employed by the destroyed major complexes of Khao Lak were from the surrounding communities). The tourism industry also provided new markets for the local production and subsequent revenues were invested in services and small businesses mostly oriented towards the industry (small souvenir shops, restaurants, fishery products, guided tours) all located along the coast in the vicinity of large resort complexes.

All along the central portion of the coast, the fishing communities which are traditionally among the poorest in Thailand saw the opportunity and directed a significant part of their activity to supply restaurants and resorts in fresh highly prized reef fish species and sea food products in general, increasing further the over exploitation of marine resources including in protected areas and expanding in size. There was also an opportunity to provide sea transportation services for tourist to nearby beaches and islands as an alternative to the less profitable fishing activities.

Migrant workers from Myanmar have became a significant part of the labour force in the fishing industry, shrimp fairs and other rural farming activities. Young Thai nationals from fishing communities rather targeted the more profitable tourism related jobs.

In summary, the flourishing and fast development of the coastal areas of Phuket, Phan Nga and Krabi provinces consisted poles of attraction for people originating from all over the kingdom and even abroad. This has contributed to "artificially" increase the population having their livelihoods almost entirely oriented, directly or indirectly towards the exploitation of coastal natural capital and resources.

The tight interdependency of livelihoods on a limited range of opportunities, all linked to the coastal environment and sustaining a large mixed population constitutes the major source of vulnerability for the post Tsunami recovery.

Some foreseeable impacts of the Tsunami on Livelihoods

- There is no doubt that the Tsunami will cause a large loss of income from tourism, fishing and all related activities. People have not only lost their productive assets such as boats, fishing equipment and business facilities (hotels, shops, rental equipment) but the expected tremendous drop in the demand in the mid-short term will take time and huge efforts to recover previous levels. Although the government has taken quick steps to respond to these losses in the short term, one has to expect long-term effects as well. There is therefore a crucial need for long-term mitigation measures in the management and planning for more resilient livelihoods.

- The fact that many livelihoods strategies in these coastal areas are tightly linked to the tourism industry is a double-edged sword. The loss of income from tourism alone is estimated at 10 billion Baht per month. Adding the loss of life, property and confidence, and compounded effects on depending livelihoods, this can contribute to a general

impoverishment of the coastal communities if adequate support is not provided (local sources estimate that as much as between 4,000 and 4,500 families have lost literally everything in Phan Nga coastal districts alone).

- It is highly expected that the Government and TAT will make a huge effort in terms of compensations but how the industry will pick up again, and in its wake the other subsequent livelihoods will depend on the reaction of the foreign and national demand for "Thai Andaman coast" tourism products.

- The impact on the fishery sector alone is a huge area for concern as explained in detail further. (See Fisheries) It is very important that this sector gets appropriate attention.

- The limited but certain impact on marine and coastal natural resources that constitute the base of the economic activities in the area will further hamper the immediate livelihood strategies.

- Highly justified and desirable measures to prevent further environment degradation (new zoning of natural parks, closure of specific sites) are likely to shut down opportunities that although somewhat "illegal" were sources of income for indigenous communities. Appropriate replacement opportunities or alternatives will have to be found in parallel.

- Similarly, the disaster has pointed out the limitations or mishandling of rules and regulations such as land ownership/access issues, predation on protected environment, insurance, labour enrolment rules among others. Though highly desirable, new rules and stricter enforcement may decrease the level of entrepreneurship that was once exploiting gaps and local "laissez faire" and driving the "flourishing" local economy.

- Migrant workers (temporary or semi permanent) of Thai or foreign origin are likely to move back (willingly or not) to their communities of origin. It is not evident how and when that cheap migrant labour force that once provided a competitive advantage for some local business will return or be allowed to do so in a near future. According to local sources, there is a problem with an estimated population of at least 10,000 of "Thai Plad Thin" (stateless) in Ranong province. Socially and rights based measures will have to be found and implemented.

- The pre-Tsunami most vulnerable groups (poor fisher folk's communities, single headed households, illegal migrant workers, and others…) who were already depending on fragile and marginal livelihoods and enjoying a sub-standard status in the society are likely to be even more weakened and further precipitated into poverty if specific and well suited support is not provided to them.

Fisheries

The total fish production for all of Thailand (both Andaman Sea and Gulf of Thailand) in the year 2000 was estimated by DOF as 3.7 million mt. The total fishery involved some 826,980 fishers using approximately 17,295 DOF registered fishing apparatus from 53,538 Department of Harbours registered fishing vessels[2].

The marine catch was valued at some 49.40 billion baht or just over US$1.1 billion in 2000 and accounts for some 2.77 million mt, or 79% of total fisheries production[3]. Catch usage falls into the following categories: a) 52% food fish, b) 31% trash fish, and c) 17% squid and cuttlefish, shrimp, shellfish and others. It is reported (FAO Thailand Country Profile Web Page) that 31.7% of the total marine catch is taken in the Andaman Sea.

FAO information in the Andaman sea fishery of Thailand4

FISHERY	LICENSED FISHING GEAR[5] 2000	FISHERS 2000	CATCH & VALUE 2000 (000s of mt & US$ Millions Equiv Yr 2000)	CATCH & VALUE 1996 (000s of mt & US$ Millions Equiv Yr 2000)
COMMERCIAL				
Trawl	1,017	9,143	490 mt / $199.542	512 mt / $250.925
Purse Seine	415	9,971	184 mt / $58.713	291 mt / $86.941
Gillnet & Entangle Net	57	436	1 mt / $1.729	3 mt / $2.489
Sub-Total	**1,489**	**19,550**	**675 mt / $259.984**	**806 mt / $340.355**
ARTISANAL				
Small gill net	194	388	28.439 mt / $43.377	12.615 mt / $21.903
Trap	10	20	4.662 mt / $7.871	3.439 mt / $5.098
Hook and Line	10	10	1.091 mt / $1.,355	2.040 mt / $1.414
Sub-Total	**214**	**418**	**34.192 mt / $52.603**	**18.094 mt / $28.415**
TOTAL	**1,703**	**19,968**	**34.867 mt / $312.587**	**18.900 mt / $368.770**

Fisheries impacts and current response (6)

The priority of villagers in worst affected villages is the retrieval of their dead, however, even in the worst impacted villages there is also a need for households to get back to their livelihoods. This is probably a natural reaction to disaster and probably an important part of the 'getting back to normal' process. For fisher folk, this means getting back on the water,

[2] Note that Department of Harbours licenses vessels (53,538 licensed as fishing vessels) while DOF licenses fishing gear (17,295 licensed in 2000).
[3] FAO Web Page, *Thailand Country Profile* (www.fAo.org/fi/fcp/en/THA/profile.htm)
[4] Statistics provided courtesy of the Department of Fisheries, Thailand via the FAO Questionnaire 2003.
[5] Note the fact that DOF licenses fishing gear (17,295 in 2002), and DOH registers fishing vessels (54,538 2000) – the discrepancy between the two figures being significant. DOF figures are utilized as this is the only available recorded catch information.
[6] For further information and updates on the tsunami and fisheries impacts see:
http://www.apfic.org/ Asia Pacific Fishery Commission
http://www.fao.org/tsunami/ FAO Tsunami website
http://www.enaca.org Network of Aquaculture Centres in Asia
http://www.icsf.net International collective in Support of Fish workers
http://www.bobpigo.org/ Bay of Bengal inter-governmental Organization

although some have expressed the feeling that the unpredictable nature of the disaster has left them cautious and anxious about whether it will reoccur.

Ranong is one of the most under populated provinces, where over half of the labour force are from Myanmar. Other provinces such as Phangna also have significant numbers of migrant labourers from Myanmar. Many of these are employed in the fishery sector in: shrimp farms, shrimp hatcheries and larger fishing vessels (see Annex 5).

Districts and number of villages registering fisheries/aquaculture losses or damage

There are 74 affected sub-districts and a total of 386 villages that have reported losses for fisheries and/or aquaculture.

	Areas of losses	
	Sub-district	Village
Ranong	**7**	**22**
Meuang	2	11
Kapoe	2	7
Branch Dist. Suk Samran	3	4
Phangna	**15**	**73**
Takua Pa	4	11
Takua Tung	2	13
Tai Meuang	2	7
Koh Yao	2	14
Kuraburi	4	23
Meuang	1	5
Phuket	**8**	**81**
Meuang	6	42
Krathu	2	11
Tha Lang		28
Krabi	**23**	**123**
Meuang	6	34
Klong Thom	5	19
Neua Klong	4	18
Ao Leuk	3	16
Koh Lanta	5	36
Trang	**12**	**51**
Gantang	4	14
SikAo	3	12
Palien	3	13
Branch Dist. Haad Samran	2	12
Satun	**9**	**36**
Meuang	5	15
La Ngu	4	21
Thung Wah	3	10
Total	**74**	**386**

Reported fishing vessel losses by Province (detailed list in annex)

Vessels that have been reported lost or damaged are 1,328 large vessels (over 10 metres length) and 3,936 vessels (below 10 metres length). A crude approximation can be made in the case of the small fishing vessels that there is one vessel per family (i.e. approximately 3,,936 small-scale fishing households have been affected).

For larger vessels the same approximation may not necessarily be applied as owners may have more than one vessel, although there are long tail boats that have a length of 10 to 12 metres. In several of the large harbours larger trawlers were damaged as there were many vessels in port at the time the tsunami struck.

A total of 834 vessels have been reported as retrieved either by the DOF or the by the owners themselves.

The costs of damage to vessels are variable and have not yet been estimated. This is because the actual compensation will depend upon the extent of the damage that has yet to be determined.

	Krabi	Trang	Phang-Nga	Phuket	Ranong	Satun	Total
Number of affected farmers	-	-	-	-	-	-	-
Damaged fishing boats:	1,066	662	1,267	1,178	637	587	5,397
- large boats	164	1	270	508	287	35	1,265
- small boats	902	661	997	670	350	552	4,132
Retrieved boats:	66	-	173	198	53	55	545
- big fishing boats	1	-	123	157	27	6	314
- small fishing boats	65	-	50	41	26	49	231
Fishing gears (pieces)	47,147	1,345	-	-	5,495	56,142	110,129

Source: DOF data 18th January 2005

There is an important distinction between damage to vessels and actual loss (i.e. irreparable damage that requires replacement). In the case of replacement of the vessel, there may be issues of availability of vessels - the original wood that the vessels were constructed from may not be readily available and reconstruction of the original type of vessel may not be possible (or at least not quickly). Replacement with a fibreglass composite structure may not be useful or encounter some resistance from (if the design is not appropriate and due to the lightness of the vessels). Engines that power this design are typically diesel long tail engines these may be more favoured in place of 'modern' outboard engine (which run on petrol and may not be as robust or flexible as the original). There is a fibreglass version of the long tail boat that has been commissioned by an NGO working in Krabi province.

Tourist vessels (typically long tail fishing boats used for tourist purposes)

In the table above, numbers of vessels reported as lost or damaged for Phuket include 87 large tourist vessels and 76 small tourist vessels (converted fishing boats). These can be separated from actual fishing vessel losses. For other provinces all vessels reported are for fishery purposes.

A separate list of tourism vessels is given in Annex 2 (typically small fishing boats that are used on day trips, carrying tourists to islands). The majority of these reported damaged or lost are in Krabi province (342 out of a total of 363). The total estimated damage (363 vessels) is 34 million Baht (average 94,000 baht per vessel – these are typically long tail boats).

A critical aspect of the tsunami impact in Thailand is the extent to which fisher folk have left the fishery or reduced their dependence upon it, in favour of providing boat services to tourists. The tsunami has therefore ha a double blow - in damaging the vessels that they would use for their livelihood as well as driving tourists away form these areas. Replacement or repair of these tourist vessels will not in the short term ensure that there are enough tourists to provide an income for these people. It might be expected therefore that a short term coping

strategy will be to return o fishing, even though the income from this activity is far lower than that which is normally obtained from tourism.

An additional aspect of this is that families may be dependent upon tourism employment in a broader way such as servicing local hotels and the mobility of family members means that the impact will be felt over a wider area than that immediately damaged by the tsunami (e.g. women's employment in hotels).

Impact to fisheries infrastructure (e.g. harbours and jetty services)

A number of fishing harbours have incurred damage (the most significant being Ban Nam Kem). Reports are variable but it seems that there are : Ranong 8, Phangna 2 (or more) (Ban Nam Kem, Thap Lamu), Satun (Pak Bara) [this list is not complete].

Damage or losses of jetty services have not been reported as yet (e.g. fuel operations, ice-making and cold storage structures that are typically found at fish landing sites). Yet such land-based infrastructure will have been affected (in Ban Nam Kem – all services were completely destroyed, but this is an extreme example). Some of these facilities would be state owned or operated or possibly through cooperative type ventures. Many ventures would also be privately owned by entrepreneurs (i.e. not directly involved in fishery production).

An assessment would have to at last get a breakdown of the number of harbour sites that were directly impacted by the wave. There has been a great deal of minor damage in areas not in the actual path of the wave and this can be readily rectified and should not be a focus of intensive rehabilitation.

Harbour locations that have been severely affected should be verified with the Provincial fishery office.

Aquaculture

Fish hatcheries

Few reports are available but a grouper hatchery in Sarasin Bridge Phuket was reported to have been damaged. The government stations are reported not to have incurred any significant damage.

Fish cage culture operations

Table of coastal aquaculture operations in the five affected provinces.

Province	Trang	Krabi	Phuket	Phangna	Satun	Ranong
Number of Cage	954	2,013	1,078	5,510	3,284	1,437
Number of Farmers	411	182	103	954	526	260
Cultured Species						
Sea Bass (*Lates calcarifer*)	x		x	x	x	x
Red Snapper (*Lutjanus argentimaculatus*)	x	x	x	x		
Brown Spotted Grouper (*Epinephelus malabaricus*)	x			x	x	x
Scylla serrata Forskal	x	x			x	
Green mussel (*Perna viridis*)	x	x	x	x		x
Oysters (*Crassostrea belcheri, C. iredalei,C. lugubris*)	x			x		
Cockles (*Anadara granosa, A. nodifera*)				x	x	x

Source: Coastal aquaculture database from Department of Fisheries Thailand
Note: The number has shown probably less than actual number because the database is not update, and the species that culture not includes shrimp.

There are extensive reports of damage and loss to cultured fish operations in cages. Cage culture sites on the west Coast of Thailand are typically in the mouths of estuaries and seaward parts of delta and mangrove areas. These areas are were exposed to the rapid rising waters and wave of the tsunami and their typically fragile construction resulted in the break up of some of the cages and loss or escape of the stocks.

In Phuket, Krabi, Satun, Ranong and Trang there are reportedly 2,610 owners affected with a reported cage area of over 648,157 square metres (approximately 25,926 cages at average size of 25 m^2). Phangna province has also a large area of cages impacted (140,870 m^2). It is not clear whether these cages have been completely destroyed, completely lost the stock or have lost some stock. The current government estimate of the losses from aquaculture cages is approximately US$92 million (3,803,000 Baht)

Impacted fish cage culture operations (data 5th January)

		Owners affected	Area of cages affected (m2)
Ranong		**583**	**827,008**
	Meuang	288	260,070
	Kapoe	139	69,309
	Branch dist suk sam ran	156	497,629
Phangna			**87,194**
	Takua Pa		12,726
	Takua thung		17,973
	Tai Meuang		9,351
	Koh Yao		26,653
	Kuraburi		26,653
	Meuang		7,812
Phuket		**315**	**45,172**
	Meuang	174	29,893
	Krathu	4	0
	Glang	137	15,279
Krabi		**359**	**74,108**
	Meuang	40	24,174
	Klong thom	102	5,669
	Neua Klong	50	26,532
	Ao Leuk	107	12,213
	Koh Lanta	60	5,520
Trang		**393**	**19,554**
	Kantang	67	10,850
	SikAo	139	6,192
	Palien	163	2,272
	Branch dist Haad samran	24	240
Satun		**960**	**70,140**
	Meuang	343	5,760
	La Ngu	617	58,859
	Thung Wah		
Total		**2,610**	**1,123,176**

Total impacted (Data DOF 11th January)

	Krabi	Trang	Phang-Nga	Phuket	Ranong	Satun	Total
Cage culture (m^2)	51,480	23,916	184,45	53,485	250,345	84,526	648,157

The compensation package for cage farms is rather low compared to the price of the cage and value of the stock. The compensation for an average cage ($25m^2$) would be 3,750 baht and the total compensation allowable (maximum 80 square metres is 12,000 baht). This can be compared with the following approximate data for the cost of a cage and the stock contained:

- Typical cost to build a cage is about 16,000 baht per cage (25 m^2) [verify]
- Cage size range 16 to 36 square metres each (4x4, 5 x5 and 6x6 metres are typical sizes) and owners typically have several cages.
- Fish are stocked at 10-20 kg of fish per square metre (typical cage loading about 100-200 kg [verify this].
- Value of fish contained is variable (about 120-160 baht per kilo of sea bass and 250-300 baht for grouper).
- The approximate value of the stock (if fully stocked and at harvestable size) would be 10,000 – 20,000 (sea bass) and 20,000 to 40,000 for grouper per cage ($25m^2$). [verify this]

- The ratio of grouper to sea bass farms is about 80:20 [verify this]

Shrimp hatchery impacts

Most shrimp hatcheries were not damaged in the Haad Rawai and Chalong bay area of Phuket (southern bay) but there are reports of damage to water intakes (under sand filters etc.) being blocked by tsunami sediment and physical disturbances.

	Krabi	Trang	Phang-Nga	Phuket	Ranong	Satun	Total
Hatcheries (m^2)	-	-	16,131	76,300	-	-	95,431

Source DOF statistics 18 Jan 2005

There has been complete destruction of shrimp hatcheries in the Khao Lak area of Phangna province. Some figures (based on area) are provided by DOF but they are almost certainly not complete (the mission observed at least 22 hatcheries destroyed in the Khao Lak / Ban Nam Kem area alone), these were mainly medium scale operations but one very large hatchery was also completely destroyed. The apparent compensation level offered (150 baht per square metre up to a total of 80 metres) is very low relative to the actual investment made in construction and operation of a shrimp hatchery (most of the damaged hatcheries observed had an area (concrete tanks) well in excess of 150 square metres).

The loss of the hatcheries in Phangna will affect supplies of post-larvae to the Thai shrimp industry, however in terms of overall number of the nations hatcheries that are out of commission, this is still a limited percentage.

Shrimp farms

There have been few *reports* of damage to shrimp farm operations. This probably because there are relatively few farms on the west coast of Thailand (as compared with the Gulf of Thailand coast) and the fact that many farms are not in the immediate coastal strip. Those farms that have been damaged are located in the immediate vicinity of the shore on low-lying land. Very few shrimp farm operators have reported losses or damage for compensation (this may be because the compensation level offered is very low (3,800 Baht per rai) and is therefore not worth the claim.

	Krabi	Trang	Phang-Nga	Phuket	Ranong	Satun	Total
Fish/shrimp Ponds (rai)	134	-	151	37	15	-	336

Source DOF statistics 18 Jan 2005

The figures presented by the Phuket fishery Rescue centre indicate a large number of farmers affected in Trang (1,910) and Satun (1,274) however the are of reported loss is minimal (a total of about 179 rai). It is worth verifying that shrimp farms were not significantly affected.

Recent news reports suggest greater losses, it appears that over 100 people and their families in the shrimp business in Phuket and the other affected areas are reported dead or missing and property damage is estimated at around US $25 million. This does not include the loss of Burmese hatchery workers (which are an unaccountable number but many of the hatcheries and shrimp farms employed Burmese labour)

The impact of the tsunami on the industry is likely to continue for much of the year since this area is one of the most important areas for PL production (Some estimates suggest up to 50% of national PL production although this seems to be an exaggeration).

Apart from the direct cost of the damage, many small hatcheries will be unable to start up again as their owners lost everything in the disaster. Others will have to borrow money to repair or rebuild their hatcheries, a process that is likely to take some time given the extent of repair work that is required. It has been estimated that it will take at least 6 months to get most of the hatcheries back into operation. The industry is speculating that this would be an additional lost opportunity of upwards of US$ 28 million and will inevitably lead to PL scarcity, higher PL prices and fewer ponds stocked, at least in the first crop.

The Thai industry is now facing another year of losses as a result of the tsunami damage and the recent decision by the ITC commissioners to conduct a "changed circumstances" review of the antidumping situation in the light of the tsunami's impact. This has encouraged the shrimp industry to investigate the losses and the lost opportunity and resulted in some substantial figures. An industry estimate of a reduction in production of around 30% (this figure also seems rather extreme and would need some form of validation) would be valued at US$ 525 million based on 2004 figures. This reduction will also affect exporters who will probably slow down or shut production lines resulting in the loss of women's jobs in processing (an industry figure places this at 300,000 jobs – this will need validating).

Shellfish concessions

These are principally cockle beds and green mussels, although in Phuket, there is also oyster and land based abalone operations that may have suffered some damage. The rehabilitation of these sites is probably not a major equipment issues but related more to restocking or reseeding and the time taken to get a new harvest.

Government assistance programs

Department of Fisheries response to the tsunami impacts

The Thai Department of Fisheries established a "Fisheries Rescue Centre" in Phuket (based at the Andaman sea fisheries research and Development Centre[7]. The centre coordinated the collection of damage and loss information for the Department of fisheries from all five affected provinces. As the losses are registered with the Provincial fisheries offices, these are communicated twice daily to the Fisheries Rescue Centre (FRC). The centre has just been closed and information services are now based in Bangkok (it is not clear where).

Data collected is restricted primarily to the cases of lost or damaged fishery equipment (boats) and losses incurred in aquaculture holdings. The detailed information is listed by village and it is therefore possible to identify at sub-district (Tambon) and even village level (in some cases) where significant losses have been reported. This data set can therefore be used as an indicator to assist in identification of the most affected areas.

The loss information collated by DOF is not linked to other data at the national level – but this might be possible to undertake at the provincial level. There may be some need for support to the Provincial office responsible for this in the short term.

Whilst some information is related to claims of losses, the Provincial fisheries office is also collecting some village level information relating to losses.

Targeting of impacted villages and households

DOF reported losses can be ranked according to the number of claims and this can be disaggregated to village level for most provinces (Satun, Trang, Krabi, Phang Nga, Phuket but not Ranong).

The large number of claims indicates serious impacts to fisheries or aquaculture livelihoods and is spread through all five affected provinces. If this information is coupled to village level information regarding loss of life and damage to housing (and any other available indicators) it will enable the ranking of villages into those that have been severely impacted and those where the impacts have been less severe or even minor (it is important to note here that this would not probably be a good targeting method for villages and households heavily dependent upon tourist services, since the tourist locations are focal, but those servicing the tourist sector may come from a wider area).

Villages severely affected could be focused on for a comprehensive package of interventions relating to livelihoods rehabilitation and community organization type activities. The interventions in these areas would require both short-term mitigation response as well as longer term rehabilitation.

[7] Address: 77 Sakdidej Rd., Amphur Muang, Phuket, 83000, Tel: +66-0-7639-1138 to 40 FAX +66-7-639-1139 afdec@yahoo.com

Less affected villages (i.e. those which have incurred losses to fishing/aquaculture equipment but relatively limited impact on other structures and/or loss of life, could be grouped for more immediate assistance but that does not require intensive holistic type intervention.

Villages will very limited impact on equipment/fishing vessels/aquaculture facilities may be given low priority, but should still be subject to some form of cross-check or verification type activity, to ensure that there are not other deeper livelihood related issues that are not linked to the indicators used for the preliminary screening (i.e. villages with a high dependence on servicing the tourism sector).

It is clear that many larger scale operations may not have reported losses because they do not require compensation (i.e. the amount offered is quite limited relative to their losses and therefore not worth the administrative paperwork to make the claim).

Compensation system and rates

There is an established system for registering losses following a natural disaster (e.g. cyclones, floods and most recently tsunami). Losses or damage claims that may be eligible for government compensation are registered at the Provincial fishery office (and possibly at Amphur level if a fishery officer is present).

The total Cabinet approved budget for RTG's tsunami response is 5,252 million baht, of this, the Fisheries Department had 1,343 million baht approved to assist 27,828 fishermen. This includes the repair of 3,426 small fishing boats (under 10 metres) and 544 larger fishing boats. (source: UNDP Thailand situation report no. 7)

Boat owners (as listed on boat registration) must register the loss with the Registering district or province within 15 days in the area where the vessel was affected or the registered home place of the vessel owner. The Provincial fisheries office (or district fisheries office) must collate the documents and check for accuracy before sending to the Department of Fisheries within 120 days.

Typical documentary evidence required for compensation is the vessel registration document, or permission to fish document (in date). Since the majority of vessels that have been damaged or lost are in the small-scale category, very few actually have registration documents. In this case alternative evidence of ownership may be considered/used as supporting evidence:

- Statement of ownership by the Provincial fisheries Office (stating the boat is repairable or beyond repair)
- Document of guarantee from a fishers association, farmers group, or fishery cooperative stating the owner is a member, or
- Sub-district headman (gamnan)
- Guarantee document from the village headman) may be accepted
- Record in the fishery survey,

a) Compensation for fishing vessels

There are several categories of loss that are eligible for compensation:

i) Support for the recovery of a vessel (i.e. re-floatation, or movement of the vessel – since many have been swept some distance inland above the high tide mark).
ii) Support for repairs to a damaged vessel
iii) Compensation for vessel loss (or damaged beyond repair)

The levels of compensation have been announced recently (but it is uncertain whether these will be revised as further information emerges). Current rates are as follows:

Fishing vessel less than 10 metres length	**Baht**
Retrieval	10,000
Repair	20,000
Vessel lost	66,000
Fishing vessel more than 10 metres length	
Retrieval	25,000
Repair	70,000
Vessel lost	200,000

b) Compensation for fishing gear loss

Loss of fishing gear may be compensated (at a relatively low rate (about 3,000 Baht per case). This is extremely difficult to assess unless the gear is assumed to have been associated with the vessel. In this was the vessel and the gear operated are assumed to be lost together. Small-scale artisanal gears may be reconstructed (such as fish and crab traps). Larger gears such as nets will require purchase.

The tsunami wave destroyed a significant amount of fixed gears, (such as bamboo stake traps 'pong pang') that are actually illegal. There is an opportunity at this stage to limit the re-establishment of illegal fixed gears. However, in cases where fishers have lost boats, they may start to use lower cost gears (which may be illegal) that do not require a boat as a coping strategy. This should be taken into account.

c) Compensation for aquaculture holdings

Information regarding loss from aquaculture holdings does not appear to have been announced (verify), however the document made available to the mission, that contains the dates of compensation also includes rates for aquaculture. Compensation is payable in the case of:

- Loss of fish stocks 1,400 baht per rai (for a total area not exceeding 5 rai)
- Loss of shrimp and crabs 3,800 baht per rai (for a total area not exceeding 5 rai)
- Cases of culture of fish in a cage, cement tanks or other (e.g. aquarium fish, frogs, soft-shelled turtle,) compensated at 150 baht per square metre of production upto an area not exceeding 80 square metres.

d) Compensation for non-Thai national migrant labourers

1,002 migrant labourers (2 from Ranong and 1,000 from PhangNga) have received 20,000 baht each in compensation (12th Jan 2005). Seven registration centres have been established to reissue registration cards for migrant labourers who lost their registration cards. These centres are at Ao Nang and Koh Lanta in Krabi Province; Bang Muang and Ban Nam Kem in PhangNga Province; Kamala Beach and Pa Tong in Phuket Province; and Suk Samran in Ranong Province. (Information from UN Situation Report No.7)

Environmental impact

Several national parks along the coast have been severely damaged. Over 200 million baht of property and infrastructure has been destroyed. The Ministry of Environment and Natural Resources have provided the following environmental damage estimates for each affected province (figures are in 'rai' except where stated otherwise. 6.25 rai = 1 hectare):

Province	Coral Reef	Beaches	Mangroves	Forests	Freshwater Wetlands	Salt Affected Soil
Phang-Nga	Under survey	5,000 rai	1,850 rai	500 rai severely damaged	Under survey	Under survey
Krabi	3,125 rai	17km severely damaged & 12km slightly damaged	No damage	No damage	122 rai severely damaged & 50 rai slightly damaged	23.5 rai slightly damaged
Phuket	Slight damage	Slight damage	No damage	Slight damage	Slight damage	Slightly damaged
Ranong	21 rai	Slight damage	550 rai severely damaged	No damage	No damage	400 rai slightly damaged
Trang	Slight damage	No damage	No damage	No damage	No damage	No damage
Satun	550 rai	1,200 rai	10 rai	No damage	90 rai severely damaged	No damage

Source: Department of Marine and Coastal Resources, MONRE, preliminary assessment undated.

The coral reefs along the Andaman coast are not only indispensable for marine wildlife in the area, but are also a crucial source of income for the tourism industry and local communities. Future development of sustainable eco-tourism and the recovery and diversification of livelihoods in fishing communities will depend on the restoration and protection of the coral reefs.

At first it was feared that much of the coral reef along the Andaman coast had been impacted by the tsunami. The Department of Coastal and Marine Resources estimates that on average about 5% of the coral reef along the coast and around the main islands has been damaged. Tsunami waves only tend to damage coral reefs in shallow areas, while corals below a depth of 7 meters did not appear to be affected[8]. However, this does not include longer term impacts from sedimentation which cannot be assessed at this early stage.

It is estimated that the coral reef will recover within 3 years in the case of branchy coral and 5-10 years in the case of bunchy corals. Fish life does not seem to have been affected by the tsunami as no significant number of fish were observed washed up on beaches.

[8] A full survey of the damage will be ready within 2-3 weeks

Key information resources and contacts:

NGO and local organizations network

A number of public organizations and NGOs in the field in Southern Thailand as well as NGOs from the North, East and Western Region of Thailand of 34 organizations and networks have united to form 'The Collaborative Network for the Rehabilitation of the Andaman Community and Natural Resources' The non governmental organizations based in Southern Thailand have also mobilized themselves to form The Network for the Rehabilitation of Andaman Coastal Resources. The two networks have worked together with objectives to highlight problems faced by the marginalized groups as a result of the tsunami and facilitate the process to ensure appropriate immediate and long-term rehabilitation through people's participation.

The network has collaborated actively to organize field-based task forces and conducted preliminary investigations into the extent of damage left to the small-scale fisherfolk and fishing villages residing on isolated islands and along the coastlines of Andaman. The findings of the assessed villages as concluded on the 9 January, 2005 revealed that there are 37,377 of various different types of fishing gears, 15,534 cages and over 2,000 small scale fishing vessels ruined, as well as 662 deaths of small-scale fisher folk, excluding missing people and the injured across the 6 provinces This has impacted community's livelihoods and prevented them from making a day-to-day living.

At the present time, the government compensation and support is reaching the communities. However, in most cases, the current support is insufficient for the small-scale fisherfolks to repair or replace the fishing gears that have been destroyed. The network will therefore work with 2,000 families of small-scale fishers in providing an immediate relief and ensure sustainable recovery of community and the natural resources.

The development of a database system on tsunami victims with specific focus on children, migrant workers, marine workers and small-scale fisherfolk through continuous information gathering. The database is also essential as a basis to be able to identify appropriate measures and plans for the communities' rehabilitation. The information collected will be validated and make available to the government, private sector as well as media. The task force responsible for implementing this activity are 'The Collaborative Network for the Rehabilitation of the Andaman Community', Southern NGO5 in the field, Foundation for Children and The Sustainable Development Foundation (SDF).

They have set themselves the following tasks:

1. The development of communication tools in the form of an interactive website called 'Save Andaman' with objectives to highlight the problems and issues faced by the marginalized as a result of the natural disaster.
2. Publicize the roles of different members of the task force at the affected target areas. Thirdly, to update the public on the implementation status of the task force (both NGO and government's action) and demonstrate how it leads to long-term mitigation. The task force responsible for implementing this activity are 'The Collaborative Network for the Rehabilitation of the Andaman Community Southern NGOs in the

field, Foundation for Children (Bangkok) and The Sustainable Development Foundation (SDF).

3. The establishment of 'The Community Support Fund' to provide financial assistance in the area of vocational recovery such as boat repairing and purchasing new boats and fishing gears. Equally important, the provision of temporary shelters for the target victims of communities that have left many homeless without relatives elsewhere. We see an urgent need to provide immediate relief to help the marginalized groups be able to resume their livelihoods. This is especially critical when the concerned victims have lost their fishing boats and fishing gear, which are needed to maintain their food security and income. Through this, the network will also raise fund from national and international sources to support the initiatives. The accountability and legitimacy of the fund is deemed highly important and to achieve this, the activities of fund establishment will be channelled through the Federation of Southern Fisherfolk who will formulate assessment for fund disbursement to ensure transparent and fair sharing of resources.
4. Provide immediate vocational relief such as restoring essential vocational tools especially boats and fishing gears as well as constructing temporary shelters for the affected groups in need. One month period from now, the task force and the network plan to outreach 2000 fishing families. It's implementation approach will be done through coordinating with the government and private sectors to ensure that their assistances reaches the marginalized victims. The activity will be financed through the fund being generated from the 'The Community Support Fund' which need to generate 60 million baths for 2,000 families who are in desperate needs of immediate vocation relief, particularly boats, fishing boats as well as temporary shelters.
5. Organize public forums to assess policy framework in addressing problems, as well as how policy framework can support the rehabilitation of community's livelihoods and the natural resources.

Timing, inputs

It is estimated that, the recovery phase will take up to 1- 3 months, depending on the extent of the damage incurred. At the moment, government support has already ready reach the community. However, time requires to broad reach the affected small-scale fishers varies in different areas. So far, the government support has not been able to compensate for the total amount of loss requested by the community.

The current approach needs to focus on organizing community for those that have not yet being organized in order to create an identity to receive support from the government. Furthermore, community organization is also a fundamental means to build or reinforce solidarity. Once the organization is stabilized, it will have a capacity to collect data and develop plan for repairing boats, engines, fishing gears through the support of the network.

The community organization that has already received support from the network at the beginning and also receive assistance from the Department of Fishery at the later stage, it must return the some of the fund that exceeded the total amount they request to group. This fund will be saved in the community organization's funds and utilized to support a long-term rehabilitation plan. It is expected that the community will gain 50 per cent of the fund they put back into the central fund.

Field Process for Community Relief

The community organizations that has been existed before the tsunami disaster take charged in conducting the relief, conduct damage assessment, establish a system for repairing boats, engines and houses. They have been able to conduct immediate relief for the other affected fishers.

Damage assessment has been expanded to cover nearby area. There has also been a support for each community to organize themselves internally so that relief support can be given out and can embark on rehabilitation quickly.

Once community organization is formalized and data collection is completed, information on losses and assistance that are needed will be available. This information will be presented at the province where a Small-Scale fisherfolk Society is based, and where issues and concerns are discussed before further arrangement of support is made for the community through the Network for the Rehabilitation of Andaman Coastal Community

The Network for the Rehabilitation of Andaman Coastal Community will coordinate with different sectors to seek support in the form of donation for the affected community. For instance, donation to construct boat garage, equipment etc. Temporary loans can be given to support vessels repairing to the group or network.

Once the community can resume their normal livelihoods, the community will consider returning money after deducting from the amount that do not received compensation from the government. In some case, part of the fund must be returned to the community fund immediately, some can be paid by installment even though the community has received sufficient support from the government, but there is a need to retain the fund to support family.

Some part of the fund that has been returned to the Provincial Federation to allocate the resources in other areas of community needs on a separate approval from the committee. Some part of this will be returned to the Federation of Southern Fisherfolk, which has previously provided a temporary support for the members at the sum of 1,500,000 baht. This is important to ensure that the Federation of southern Fisherfolk Fund will remain and be able to provide emergency support for the small-scale fisherfolks in the 13 provinces in the future.

The work process through out the last of two weeks, the network has mobilized people from different sectors to go and work with community.

The Collaborative Network for the Rehabilitation of Andaman Community trusts that collaboration with relevant sectors will bring about the capacity to develop participatory aid systems for the affected groups. With a respect for the integrity of all lives and support for the capacity building of affected communities we can help to turn this massive loss around, first to rehabilitation and ultimately to sustainable community development.

NGO's active in the affected provinces or coordinating the activities of local organizations with special reference to fisheries or fishery communities.

Name	Address	Amphur	Province	Tel/Fax:	e-mail	Contact
The Collective Network for rehabilitation of community and natural resources (national)	409 Thai Volunteer Service Building, Soi Rohitsuk, Pracharatchabamphen Rd. Huai Kwang		Bangkok	66-2-691-1216	ngocod@thai.com	
NGO Coordination Centre Bangkok (SDF)	86 LaPrao Rd., Wangtonglang		Bangkok	66-2-9352983- to 4 FAX 66-2-9352980	preecha@mozart.inet.co.th	Revadee Prasertcharoensuk Oy Sirisook
Federation of Southern Fisherfolk	8/3 Kok Kan rd. Tambon Tab tieng	Amphur Muang	Trang Province	66-75-212414	samapantran@hotmail.com	Pakpoom Witantiratiwat Wichosak Ronnarongpaidee

Funding Support Details

Funding support to marginalized tsunami victims can be made directly at

Account name: Community Support Fund, Account number: 189-0-01626-8

Bank Name: Krung Thai Public Company Limited, Branch: Klong Chao Khun Sing (Ladpraw 102)

Address: Ladpraw 102, Wangtonglang, Bangkok 10310, Telephone: + 66 2 530 4092, +66 2 530-4243

Information gaps

- Resource impact assessment (these will become available gradually)
- Costs of lost opportunity in the fishery and aquaculture
- Income and debt impacts
- NGO reports

References

- **Department of Fisheries Database of Fisheries and Aquaculture losses (in Thai 5th Jan 2005)**

"05-01-06 Damage Report update DOF o

- **DOF updated loss data (summary - 11th Jan 2005) MOAC.**
- **DOF updated loss data (summary - 18th Jan 2005) MOAC.**
- **UNDP/FAO/WB joint assessment mission report**
- **FAO assessment mission report (in prep)**
- **NGO Coord report of joint meeting (Trang Jan 05) SDF NGO Coordinating Committee, Thailand**
- **Coastal Fishing Communities in Thailand By ANGKARB POONNACHIT-KORSIEPORN. FAO Regional Office for Asia and the Pacific, Bangkok Thailand. RAP Publication 2000/06. http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/AC790E/AC790E02.htm**

Preliminary recommendations

Short term

- Targeting and ranking of impact (utilize DOF losses information by village, Provincial records of other damage, NGO reports).
- Separate in to severe, medium and minor impacts
- Needs assessment – FAO mission and ensure liaison with Provincial fisheries officers and NGO's active in fisheries sector and fishing villages
- Establish a plan for support to affected communities
- Ensure that support does not duplicate government support or adds value
- Equipment replacement as a short-term response, longer-term community organization in fishing communities may be possible.

Short/medium term

- Enable access to small-scale grants facility for communities that have organized (with UNDP?) – get NGO groups to assist communities to access these funds.
- Damaged hatchery operations most likely cannot be assisted as these require infrastructural rehabilitation and stock replacement.
- Damaged cage culture operations may be assisted, as the government compensation package may be too low.

General Recommendations on livelihoods

- There is a short-term need for alternative livelihoods mechanisms while the main driving economic sectors (tourism and fishing) are being re-equipped, adapted and improved (particularly in terms of planning). Coping and self-help mechanism set in place by the communities should be identified and promoted.

- Immediate and mid term response should be tailor made for broad categories of situations such as highly impacted, intermediate and low impacted.

- A special attention should be given to economically fragile communities such as vulnerable households (e.g the one who lost one or more active members, migrant workers if still present, small fishing crews…). Consensus between local communities, authorities and implementing agencies should be sought in selecting the most vulnerable.

- Communities should be encouraged to integrate disaster mitigation mechanisms from the scratch while reconstructing their livelihoods. In that regards, incentives and support to diversify the livelihoods strategies and develop potentially new economic resources and partnerships outside the strictly marine or coastal environment should be given priority.

- Given the socially destructive dimension of the Tsunami, there is an opportunity and a necessity to mainstream HIV/AIDS awareness and prevention in the recovery process.

- The Tsunami provides an opportunity for a more balanced and planned economic development approach. Planning and education for disaster mitigation is almost a

precondition to restore the tarnished image of the affected areas and to restore confidence between authorities, local populations and Clients abroad.

- Confidence-building mechanisms should be implemented immediately. Communities should be educated on what happened and on how to address their inherent vulnerability to such disaster even if the probability that a Tsunami strikes again the same area is very low. Even if there are plans for high tech regional warning systems, local knowledge is the best aid to long-term protection.

Annex 2 : Records of vessels and reported damaged/lost vessels[9] for the 5 tsunami affected provinces (current 15.00 5th January 2005)

Province	District (Amphur)	Areas of losses		Registered vessels		Vessels damaged/lost		Vessels retrieved	
				>10 ม.	<10 ม.	>10 ม.	<10 ม.	>10 m.	<10 m.
		Sub-district	Village	Large	Small	Large	Small	Large	Small
Ranong		**7**	**22**	**587**	**1,408**	**191**	**297**	**13**	**27**
	Meuang	2	11	445	843	51	87	2	6
	Kapoe	2	7	57	351	47	98		
	Branch Dist. Suk Samran	3	4	85	214	93	112	11	
Phangna		**15**	**73**	**825**	**2,782**	**284**	**607**	**107**	**153**
	Takua Pa	4	11	231	213	81	57	51	17
	Takua Tung	2	13	68	714	0	45	0	1
	Tai Meuang	2	7	144	102	119	157	49	67
	Koh Yao	2	14	133	576	11	206	5	63
	Kuraburi	4	23	190	518	11	206	5	63
	Meuang	1	5	59	659	73	139	2	2
Phuket		**8**	**81**	**574**	**676**	**476**	**636**	**157**	**41**
	Meuang	6	42	422	411	381	426	157	39
	Krathu	2	11	27	11	22	31	0	0
	Tha Lang		28	125	254	73	179	0	2
Krabi		**23**	**123**	**312**	**2669**	**147**	**775**	**1**	**44**
	Meuang	6	34	167	674	7	169	1	0
	Klong Thom	5	19	26	364	0	7	0	20
	Neua Klong	4	18	44	830	0	160	0	24
	Ao Leuk	3	16	55	345	12	34	0	0
	Koh Lanta	5	36	20	456	128	405	0	0
Trang		**12**	**51**	**626**	**2365**	**0**	**594**	**0**	**0**
	Gantang	4	14	577	1019	0	375	0	0
	SikAo	3	12	31	476	0	84	0	0
	Palien	3	13	7	463	0	25	0	0
	Branch Dist. Haad Samran	2	12	11	407	0	110	0	0
Satun		**9**	**36**	**783**	**2172**	**29**	**493**	**5**	**49**
	Meuang	5	15	460	1165	0	142	0	19
	La Ngu	4	21	323	1007	18	313	5	30
	Thung Wah	3	10			11	38	0	0
Total		**74**	**386**	**3,707**	**12,072**	**1,127**	**3,402**	**283**	**314**

[9] Comments: Phuket province numbers include 87 large tourist vessels and 76 small tourist vessels (converted fishing boats). These can be separated from actual fishing vessel losses. For other provinces all vessels are for fishery purposes

Annex 3 – Impacts on aquaculture production (5th January 2005 information is incomplete and liable to change)

Province	Amphur	Cage (m2)			Culture pond (rai)			Shellfish areas (rai)		
		Registered	Cases	Area (m2)	Registered	Cases	area lost	Registered	Cases	affected
Ranong			**583**	**827,008**						
	Meuang		288	260,070						
	Kapoe		139	69,309						
	Branch Dist. Suk Samran		156	497,629						
Phangna				**87,194**			**60**			
	Takua Pa			12,726			50			
	Takua Tung			17,973						
	Tai Meuang			9,351			4			
	Koh Yao			26,653			6			
	Kuraburi			26,653			6			
	Meuang			7,812						
Phuket		**26,025**	**315**	**45,172**	**2,214**	**294**	**6**	**707**	**7**	**397**
	Meuang	13,492	174	29,893	482.07	88	5	452	5	357
	Krathu	402	4		4.58	12				
	Tha Lang	12,131	137	15,279	1,727	194	1	255	2	40
Krabi		**32,039**	**359**	**74,108**	**13,009**	**921**	**113**	**7,723**		**30**
	Meuang	5,562	40	24,174	1,426	187	65	900		
	Klong Thom	8,827	102	5,669	2,073	250	5	1,500		
	Neua Klong	7,589	50	26,532	2,659	256				
	Ao Leuk	5,472	107	12,213	1,798	154	40	700		
	Koh Lanta	4,589	60	5,520	5,053	74	3	4,623		30
Trang		**214,936**	**393**	**19,554**	**45,743**	**1,910**				**7**
	Gantang	7,360	67	10,850	41,049	959				2
	SikAo	73,152	139	6,192	1,063	217				3
	Palien	132,800	163	2,272	2,277	521				2
	Branch Dist. Haad Samran	1,624	24	240	1,355	213				
Satun		**34,360**	**960**	**70,140**	**1,393**	**1,274**		**8,909**	**17**	**-**
	Meuang	15,488	343	5,760	880	467		8,909	17	
	La Ngu	18,872	617	58,859	512	807				
	Thung Wah			**5,521**						
Total		**307,360**	**2,027**	**1,123,176**	**62,358**	**4,399**	**179**	**17,340**	**24**	**434**

Annex 4 - Table of reported losses/damage to tourist boats (5th January 2005)

Province	District	Sub-district	Village	Vessels lost/damaged	
Krabi				**342**	**30,964,100**
	Meuang			**311**	**28,458,600**
	Meuang	Krabi yai		1	95,000
	Meuang	Krabi noi	8	1	15,000
	Meuang	Kao kram	5	1	60,000
	Meuang	Yao tong	2	8	356,000
	Meuang	Yao tong	3	1	60,000
	Meuang	Yao tong	4	2	120,000
	Meuang	Yao tong	6	2	75,000
	Meuang	Klong prasong	1	12	700,000
	Meuang	Pak nam		4	315,000
	Meuang	Lai tai	2	1	145,000
	Meuang	Lai tai	5	11	885,500
	Meuang	Lai tai	6	17	1,071,000
	Meuang	Ao nang	1	6	415,000
	Meuang	Ao nang	2	16	2,787,800
	Meuang	Ao nang	4	4	363,400
	Meuang	Ao nang	5	2	192,000
	Meuang	Ao nang	6	3	400,000
	Meuang	Ao nang	7	69	6,873,200
	Meuang	Ao nang	8	21	2,342,000
	Meuang	Ao nang		3	266,000
	Meuang	Ao nang	Ao nang long tail tourist boat coop	125	10,901,700
	Meuang	Nong talay	2	1	20,000
	Koh lanta			**5**	**400,000**
	Koh lanta	Koh lanta yai	7	2	140,000
	Koh lanta	Koh lanta yai	4	1	80,000
	Koh lanta	Klong yang	2	2	180,000
	Klong thom			**4**	**220,000**
	Klong thom	Hooa nam kAo	1	1	65,000
	Klong thom	Klong pon	9	1	45,000
	Klong thom	Klong pon	10	2	110,000
	Ao leuk			**6**	**460,000**
	Ao leuk	laem sak	2	2	130,000
	Ao leuk	laem sak	3	2	170,000
	Ao leuk	laem sak	5	1	80,000
	Ao leuk	Ao leuk	5	1	80,000
	Neua Klong			**16**	**1,425,500**
	Neua Klong	daling son	3	5	395,000
	Neua Klong	daling son	5	4	525,000
	Neua Klong	Neua Klong	3	1	95,000
	Neua Klong	Klong kanan	3	1	90,000
	Neua Klong	sri bor yah	1	1	100,000
	Neua Klong	sri bor yah	2	2	210,000
	Neua Klong	sri bor yah	3	1	3,500
	Neua Klong	sri bor yah	8	1	7,000
Phangna				**19**	**2,874,000**
	Koh Yao			**18**	**2,794,000**
	Koh Yao	Koh Yaonoi	4	1	70,000
	Koh Yao	Koh Yaonoi	5	2	585,000
	Koh Yao	Koh Yaoyai	2	3	230,000
	Koh Yao	Koh Yaoyai	4	7	564,000
	Koh Yao	Phru nai	3	5	1,345,000
	tai Meuang			1	80,000
	Tai Meuang	Sam sen	3	1	80,000
Phuket				**2**	**350,000**
	Meuang			**1**	**150,000**
	Meuang	Talad yai		1	150,000
	Glang			**1**	**200,000**
	Glang	Thep kasetri	5	1	200,000
				Number of boats	**Cost of damage**
			Total	**363**	**34,188,100**

Annex 5 – Estimate of undocumented migrant workers and occupation in Thailand (1995)

Coastal Zone/Province	Estimated No.	Main Activity
Coastal Zone 5	74,168	
Ranong	27,898	fishery, pier, industry
Phangnga	26,290	fishery, rubber orchard, construction
Phuket	14,000	rubber orchard, construction, fishery
Krabi	4,550	palm orchard, rubber orchard, construction
Trang	1,000	fishery, construction, labour, factory
Satun	430	fishery, shrimp farming, construction

Source: Chalamwong, 1996 p. 16 (Appendixed Table 2.3) presented in "Coastal Fishing Communities in Thailand" By ANGKARB POONNACHIT-KORSIEPORN. FAO Regional Office for Asia and the Pacific, Bangkok Thailand. RAP Publication 2000/06
http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/AC790E/AC790E02.htm