

IMPACT OF TSUNAMI ON FISHING, AQUACULTURE AND COASTAL COMMUNITIES IN MALAYSIA¹

By

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Abstract

This paper highlights the socioeconomic impacts of the 26th December 2004 tsunami on fisheries, aquaculture and livelihoods of coastal communities in Malaysia. Data for the discussion were collected in the months on January to February 2005, based on a rapid assessment survey of communities impacted by the tsunami in the states of Kedah (including Langkawi Island) and Penang. In March 2005, and recently in September 2006, another rapid follow-up survey was conducted in Kedah to assess recent progress, development and remaining issues facing the impacted communities. The socioeconomic analysis focuses on accounting the loss and damages to human lives, properties, fishing equipments, aquaculture enterprises. Financial estimates of damages are provided. Impacts on livelihoods cover loss of employment, income and psychological trauma experienced by the impacted populations. Issues, responses and disaster management by various assisting agencies and NGOs are also discussed and recommendations for better disaster management are provided.

Keywords: tsunami, socioeconomic impacts, loss, damages, well-being, disaster management

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1. Introduction

On 26th December 2004, several countries on the Indian Ocean were hit by tsunami. This phenomenon was triggered by a massive earthquake with the recorded magnitude of 9.0 on the Richter scale, with the epicentre just off the west coast of North Sumatera, Indonesia. Malaysia was affected by tsunami besides Indonesia (Acheh), Sri Lanka, Thailand, India, Maldives, Myanmar, Bangladesh, Somalia, Seychelles, Tanzania, Kenya and Yemen. Approximately 224, 685 death were reported, 174, 729 confirmed dead and 49, 956 still missing (IFRC, 2005). This tsunami had claimed 68 lives in Malaysia, mostly in Penang, besides Langkawi Islands, Kota Kuala Muda, Perak and Selangor.

The 26th December 2004 tsunami was a direct consequence of the magnitude 9.0 earthquake which happened on the western coast of North Sumatera at 00:58:53 UTC, or 8.59 am Malaysian time. The earthquake, which happened on the tectonic boundaries of the subduction zone, between Indian plate and Sunda plate, was believed to have triggered a 1200 km slip of the faultline, from the tectonic plate boundary near North Sumatera up till Andaman Islands. The instantaneous megathrusts along the slip zone and the relative movement of the Burmese plate approximately 15 m southwest lifted the sea bed a few meters from its original position (USGS, 2005a, p 31). This surged out in a high energy ellipse-like shape towards east and west. In deep sea waters, the seismic sea wave propagated at great speed, approximately 500 to 1000 km per hour. However, when it reached shallow waters, the friction with the sea bed allowed it down and it began to form a crest. The morphological change in this extraordinary wave is commonly known as a 'tsunami'.

The tsunami wave which propagated into Straits of Malacca experienced a gradual reduction in speed as the sea depth changes from 2500m to 500m, and eventually to 100m. Generally, the direction of the tsunami propagation into the Straits of Malacca was between 110° and 135°, with the speed of not more than 100 km per hour. When the tsunami wave neared Peninsular Malaysia's western coastline, the bathymetry condition diffracted it between 80° to 100° towards the east. This wave speed was further reduced up till the point it crashes onto the beach at approximately 30 to 50 km per hour.

The north-western shores of Peninsular Malaysia experienced the tsunami surge 3 to 4 hours after the earthquake. It was reported that the wave reached the Langkawi shores at 12.40 pm, 3 hours and 40 minutes after the earthquake. The shores of Penang and Kota Kuala Muda experienced the surge approximately an hour after that.

Recently, Java Island was struck by tsunami on July 17, 2006. The first waves, which arrived at about 4.15 pm local time (New Straits Times, July 18, 2006), had caused a massive destructions along 180 km of coast line in Pangandaran, a

tourist points, which had damaged houses, resorts, hotels, restaurants, power, phones lines, fishing boats, cars, furniture, paddy fields and claimed hundreds lives (The Jakarta Post, July 19, 2006). The Indonesian government had failed to warn people on the coming of deadly waves, which had been received earlier from Pacific Tsunami Warning Center and Japan's Meteorological Agency. Foreign tourists are among the deaths.

This paper discusses the socio-economic impact of the 26th December 2004 on fishing, aquaculture and coastal communities in Malaysia. The analysis focuses on accounting of damages and loss to human lives and properties, fishing equipments, aquaculture projects and also impact on community well-being, including loss of sources of income and enterprises. Finally, some aspects and issues of disaster response and management are assessed and recommendations for improvements are provided.

The data used in the analysis were collected from a rapid assessment survey conducted by researchers from the Institute for Environment and Development (LESTARI) in the months of January and February of 2005, funded by the Academy of Sciences Malaysia. The data were compiled in a book edited by Ibrahim and Mazlan (2006). In March 2006, and recently in 5th September 2006, a post-tsunami rapid survey was conducted in Kota Kuala Muda to assess their present condition and to gauge their responses of the affected respondents on the tsunami experience and socio-economic well-being.

2. Affected Areas and Population

The Northern States of the west coast of Peninsular Malaysia have been badly affected by tsunami. Among the state affected were Kedah, Penang, Perlis, Perak and Selangor. Penang and Kedah (including Langkawi) suffered the most damages on property and livelihood from the impact of tsunami.

Penang

Penang is a state located at the northern part of Malaysia. In Penang, the affected areas were in Balik Pulau District i.e. Kg Perlis, Kuala Jalan Baru, Kuala Sg Pinang, Kg Pantai Malindo, Kg Permatang Damar Laut, Kg Pulau Betong, Kg Aceh, Kg Sg. Batu, Kg Teluk Kumbar and Pantai Pasir Panjang (Kem Bina Negara). While at the northern coast of the island, Tg Bungah, Tg Tokong, Batu Ferringhi, Teluk Bahang and Pantai Miami were affected. Those who experienced direct impact of the disaster were the fishing communities.

In 2003, Penang has a fishing population of 2178, comprising 974 Malays, 1104 Chinese, 51 Indians and 5 others (Malaysian Department of Statistics, 2003, p.91) Among the fishing villages which suffered the most as the result of the tsunami in Penang were Tanjung Bungah, Tanjung Tokong and Batu Ferringgi in the north-eastern district, Kg Pulau Betong and Kg Kuala Sungai in the south-

western district and Kg Kuala Muda in the north Seberang Perai district. A total of 2733 people in Penang were badly affected. Most of the victims in the northeastern and north Seberang Perai districts were Malays, while in the southwestern district; the majority of them were Chinese with some Malays. 98% of fishermen in Penang are coastal fishermen or traditional fishermen and most of them purchased their boats and fishing equipment using their own savings, while others borrowed money from their relatives. 70% of the fishermen in Penang are full-time fishermen while the rests are part-timers (Fisheries Department, 1998, p.96).

Kota Kuala Muda

Kota Kuala Muda district is situated south of Kedah, bordering the Sungai Muda in the south and the district of Bukit Mertajam, Penang in the north. A total of 5 villages situated on the shoreline between Tg Selat in the north and Kuala Sungai Muda in the south were affected by the tsunami. These are Kg Kuala Sungai Muda, Kg Kepala Jalan, Kg Masjid, Kg Paya, and Kg Pulau Sayak. Besides, two other areas affected are Kg Huma and Tg Dawai. Fishermen were badly affected by tsunami. Many boats were sunk and destroyed including their fishing equipment, to the extent that they could no longer go out to the sea, and therefore, their sources of income were deprived. Among the traditional fishing villages affected were Kampung Tepi Sungai, Kampung Keda, Kampung Kepala Jalan, Kampung Masjid, Kampung Padang Salim, Kampung Hujung Matang, and Kampung Sungai Derhaka. Almost 60% of the fishermen in Kota Kuala Muda are young men below the age of 40, and the other 40% are those above 40. They are either coastal or traditional fishermen, who normally go out to sea as early as 6 am and will return around 11 am to 12 pm (Ibrahim & Mazlan, 2006,p 77)

Langkawi Island

The affect of tsunami waves in Langkawi is not restricted to the west coast only as several locations on the east of the island were also affected. Other areas affected by the waves included Teluk Datai beach, Telaga Harbour, Tanjung Rhu – Pasir Hitam in the north, Kuah – Kelibang at Selat Kuah and Selat Bagan Nyior – Pulau Tuba area. However, the areas most affected were between Kuala Teriang and Kuala Melaka and around Kuala Chenang, Bukit Malut and Kelibang. There areas included Pulau Rebak, Kuala Temoyong, Kg Bakau and Kuala Kuah.

Perak

Perak did also experience severe damages from tsunami. The worst affected areas were fishing villages in Tanjung Piandang and Bagan Datoh. One Fishermen Cooperative Landing Centre in Bagan Datoh was badly damaged. Death tolls reported in Perak were 3 people.

3. Socio-economic Impact of Tsunami

As a result of tsunami, a total of more than 8,000 people were either made homeless or had their livelihoods disrupted. Damages included loss of income, destruction to fish cages, fishing vessels and gear, as well as other assets.

The analysis on socio-economic impact includes accounting damages and destruction of human lives and properties, eg death of family members, destruction to homes and work-related equipment, and property and impacts on community livelihood, eg loss of income, employment, enterprises, etc

i) Death and Injury

In Penang, the tsunami disaster claimed 52 lives, the largest death toll in Malaysia. Most of the victims were among picnickers at the beach and sea when the tsunami strikes. 23 bodies were found in the northeastern district (Batu Feringgi and Tanjung Tokong beaches), 27 bodies in the southwestern district (Pantai Telok Bahang and Pantai Pulau Betong beaches) and 2 bodies in the north Seberang Perai district (Telok Air Tawar beach). In terms of ethnicity of the dead victims, 37 were Malays, 13 Chinese and 2 Indians. 206 people suffered various injuries, of which two were admitted at Penang General Hospital, while others received outpatient treatments.

The number of deaths reported in Kota Kuala Muda, Kedah, was 12. This involved two children aged 5 and 11 respectively, a 15 years old teenager, an adult male aged 50, and 8 elderly in the range of 54 to 74 years old. Nine died at the scene while three others at the hospital. Numbers of injured were 27 people most of them received treatment at Sungai Petani Hospital.

According to the statistics provided by Langkawi District Officer, 874 families were displaced in Langkawi during the tsunami disaster, involving 4098 persons. One month after the disaster, there were still 23 families consisting 87 people still living at Kompleks Kota Tani temporary relief centre. One death was reported, a disabled elderly woman, from Kuala Teriang (Ibrahim & Mazlan. 2006.p.119).

ii) Damages and Loss of Property, Assets and Equipments

In Penang, damages involved houses, boats, and aquaculture projects. Most of the coastal population, especially who lived less than 100 m from the sea, suffered loss of homes, property and fishing equipment (see Table 1). Homes were unsafe to live, while loss of personal property were reported; vehicles, furniture, jewellery, clothing, important documents such as identification cards,

driving licenses, birth certificates, land titles, bank account books, children school books, boats and fishing equipment such as fishing nets, engines etc.

Table 1: Property loss and damage in Penang.

Types of Destruction	Quantity and Damage	
	Quantity	Value (RM million)
No. of people affected	2733	-
Houses (total)	615	-
Destroyed	296	0.02
Damaged & repairable	319	0.01
Boats (total)	1161	-
Large	102	8.16
Small	1059	26.5
Jetty	41	1.56
Aquaculture projects (total)	79	13.8
Salt water fish cages	67	-
Brackishwater ponds	4	-
Fresh water ponds	1	-
Cockle and oyster platforms	7	-

(Source: SERI 2005, and surveys from January to February 2005)

In Kota Kuala Muda, Kedah, villagers close to the shore experienced loss of shelter and property. Damages included houses, vehicles, paddy field, boats, and aquaculture projects (see Table 2).

In Langkawi, damages included houses, fishing boats and facilities, luxury boats for tourism, and some government premises. Damages of luxury boats were estimated to be about RM 6 million (see Table 3).

Table 2: Property loss and damage in Kota Kuala Muda.

Types of Destruction	Quantity and Damage	
	Quantity	Value (RM million)
No. of people affected	1000	-
Houses (total)	511	
Destroyed	113	3.4-4.5
Damaged & repairable	398	4.0-6.0
Vehicles		
Car / van / lorry	198	4.14
Motorcycle	507	1.52
Bicycle	315	0.10

Paddy Field	52.3 ha	0.16
Boats (total)	438	
Large	34	2.72
Small	404	10.1
Jetty	1	0.04
Dragnet	-	4.33
Aquaculture projects (total)	13	
Salt water fish cages	11	-
Fresh water ponds	2	-
Cockle and oyster platforms	-	-

(Source: Kuala Muda District Office (2005) and surveys from January to February 2005)

Table 3: Property loss and damage in Langkawi.

Types of Destruction	Quantity and Damage	
	Quantity	Value (RM million)
Houses	179	2.31
Fishing boats & facilities		5.18
Small boats	455	-
Big boats	25	-
Engines	376	-
Fishing nets	331	-
Equipments	67	-
Platforms	75	-
Fish cages	24	-
Luxury boats		
Rebak Marina	1	0.50
Telaga Harbour Park	11	5.50
Government premises	-	-
Police stations	-	0.04
School buildings	-	0.02
Rural clinics	-	0.45
Mosques	-	0.35
JPS infrastructure	-	0.86
JKR infrastructure	-	0.90

Note: JPS = Department of Irrigation and Drainage
JKR= Public Works Department

iii) The Impact on Community Well-Being

The tsunami had affected the sources of income of the impacted population, who mainly depended on sea as their source of income. Besides, they also suffered psychological impact from the tsunami incidents.

Fisheries and Aquaculture

An estimate of 7721 fishermen were affected by the tsunami who lost an estimated value of RM 29.3 million in facilities (boats and gears); 232 fish farmers lost around RM 23.9 million worth of facilities and standing crop. Some 4,696 people were evacuated in Kedah and 1,600 in Penang. Details of the number of fishermen affected and value of loss reported are given in Table 4 below.

Table 4: Total fishermen and fishing vessels affected

State	Total Reg fishermen	No. of Fishermen affected	Number Affected Fishing Vessels and Reported Loss					
			Big Fishing Vessels (Inboard Engine)		Small Fishing Vessels (Outboard Engine)		TOTAL	
			Total	Reported Loss (RM)	Total	Reported Loss (RM)	No Of Fishing Vessels	Reported Loss (RM)
Perlis	5464	409	31	1,014,250	178	954,700	209	1,968,950
Kedah	5,473	4,100	330	3,848,320	1,170	5,822,855	1,500	9,671,175
Penang	3,025	2,486	87	2,529,680	1,343	10,027,126	1,430	12,556,806
Perak	7,166	716	223	2,698,145	254	1,310,769	477	4,008,914
Selangor	5,868	10	4	17,000	6	13,300	10	30,300
Total	26,996	7,721	675	10,107,395	2,951	14,131,320	3,626	28,236,145

Source: Fisheries Development Authority Malaysia and Annual Fisheries Statistics 2003 (Vol. 1)

In aquaculture, it is estimated that economic damage to the aquaculture sector was in the region of RM27.1 million. This affected 232 fish farmers (Table 5).

Among the major areas affected were in Kuala Muda, Langkawi, Kota Setar, Penang (Pulau Betong, Sungai Udang and Pulau Aman). A more detailed breakdown of impact by operation type is shown in Table 6.

Table 5. Number of aquaculture farmer affected by state.

State	Number of farmers affected
Perlis	1
Kedah	114
Penang	86
Perak	31
Total	232

(Source: www.worldfishcenter.org 2005)

Table 6: Coastal Aquaculture Operations Affected

STATE	PERLIS		KEDAH		PENANG		PERAK		TOTAL	
ACTIVITIES	Unit/ Ha	No.	Unit/Ha	No.	Unit/Ha	No.	Unit/Ha	No.	Unit/Ha	No.
Hatchery				1		1				2
Fish Cage culture (3X3)m	-	-	1,539 units	100	12,087 units	66	5,519 units	25	19,145 units	191
Shrimp/fish/crab ponds	-	-	4.5 ha.	3	30 ha.	5		-	-	8
Oyster/mussels/Cockle		1	54.97 ha.	9	196.33 ha.	14	40.50 ha.	6	291.80 ha.	30
Pen culture	-	-	1 unit	1	-	-	-	-	-	1
Estimated losses (RM)		10,400		4,715,397		13,747,146		8,646,800		27,119,744

(Source : Department of Fisheries, Malaysia)

Extensive damage and loss to fish cage were also reported in Kuala Muda, Kedah, Sungai Udang, Penang and Krian, Perak. Damage included complete destruction of cages, lost of stock and infrastructure. Current loss for fish cage culture sites stands at RM23.7 million. Total losses for the state of Kedah was estimated at RM3,720,681.00, while in Penang RM11,681,146.00, and Perak RM8,310,000.00. Nevertheless there were a small number of shrimp and fish farms were affected by the tsunami which involved an area of 34.5 hectares and monetary lost of RM1,180,700.00. These included damage to pond infrastructure and losses of stock. Most of shellfish operations affected were those growing cockles, green mussel and oyster. 30 fish farmers were involved, including 16 cockle farmers (291.80 ha.) and 14 oyster and green mussel farmers (269 rafts). Total loss were reported at RM1,709,416.00. Only one fish pen culture operation was damaged in Langkawi, Kedah. It was a complete destruction of the whole structure and stocks of fish. Total damages were estimated at RM367,500.00.

Two private hatcheries were reported damaged. Both belonged to Tiger Prawn PL located in Penang and Kedah. A total loss of RM50,000.00 and RM100,000.00 were reported respectively. The reported loss includes damages to some of the infrastructure at site.

Loss of Income

In Penang, the tsunami tragedy caused temporary loss of income to the affected fishermen. for several months due to the damaged boats and fishing equipments. Before the tragedy, the average income of crew members was between RM 400 and RM 800 per month, whereas the income of boat owners was between RM 1200 and RM 3000 per month. After the tsunami, most victims depended on external aids while others used their remaining savings (Ibrahim & Mazlan.2006.p. 96). After a few months of the incident, some fishermen whose boats did not suffer damages returned to the sea. They reported that their income was as much as before the tsunami strike. In fact, they did not face any difficulties in selling their catch since there were still demands from wholesalers when there was insufficient supply of fish in the market resulted from many fishermen that were unable to go out to the sea (Ibrahim & Mazlan. 2006.p.97).

In Kota Kuala Muda, immediately after tsunami those who relied heavily on coastal activities as their main source of income have lost their earnings. Normally, the average income of a member of a boat crew who does not own a boat was between RM 550 to RM 850 per month, while fishermen who own boats generally earn more than RM 1500 per month, depending on the season and daily haul (Ibrahim & Mazlan. 2006.p.77).

Life has worsen for many of the fishermen, since many did not have any other side-income, while their wives are mainly full-time homemakers.. Consequently, they have to be highly dependent on the governments' and public's support to survive on the living. After two months of the tsunami, most of the fishermen had yet to go out to sea as they did not have resources to repair their damaged boats and fishing equipment. Many still wait for the interest-free financial loan offered by government to fund their boat repairs. Meanwhile, many of residents are repairing their houses so that their families can live more comfortable and safer.

For those fishermen whose fishing boats and equipments were not damaged, they were able to go out to sea. However, marketing the catch was made difficult since rumours said that the catch was unsafe to be eaten due to tsunami and also fish caught might had fed on the remains of tsunami victims. Many had avoided eating fish caught from Kota Kuala Muda area and changed their diet to only beef and chicken meat. The vast decline in Kampung Sungai Muda's

fishermen's catch and the damages of jetty had also affected bustling price-whispering practice between fishermen and wholesalers at the jetty. The practice has temporarily moved to the southern part of the river, namely Kota Kuala Muda, Seberang Prai (Ibrahim & Mazlan.2006.p.78).

The tsunami had also disrupted the sources of income for fishermen in Langkawi. Among the affected villages in Langkawi were Kampung Kuala Melaka, Kampung Masjid and Kampung Paya in Kuala Teriang, Kuala Cenang, Kg Bukit Malut, and Kg Bakau. Most of the victims were traditional and coastal fishermen. The average income of fishermen was around RM 500 to RM 600 in Kampung Bakau, RM 600 to RM 800 in Kuala Teriang, and RM 1000 to RM 1200 in Kampung Cenang. Fishermen in Langkawi is different from Penang and Kota Kuala Muda since they have non-specific specialties as they catch various species like shrimps, fish, crabs, and others. Therefore, they have various types of fishing nets. Affected fishermen suffered loss of income for several weeks after the tsunami. However, one month after the incident, those fishermen whose boats were damaged in the tsunami had begun returning to sea with their undamaged friends' boats. The income they gained were less as compared to the time before the incidents. The sale of fish in Langkawi was not affected and fish demand remained as usual (Ibrahim & Mazlan. 2006.p.120).

From a recent visit in September 2006, it was observed that the livelihood of fishermen has affected by tsunami has return to normal, with average income between RM800-2000 per month.

In terms of ownership of equipments (boats and nets, etc) , the situation has improved compared to before tsunami. Damaged boats have been replaced through assistance from the LKIM, complete with engines, nets, fish finders, etc. Infact, some crew fishermen who do not formerly possess boats, presently own their own boat and this has boosted their incomes.

Psychological Effect

The immediate aftermath of the tsunami disaster caused immense psychological trauma to the victims in Penang. They experienced excessive vigilance each time they heard about minor earthquakes on the radio. Affected victims were still having flashbacks of horrifying tsunami tragedy. In Tanjong Tokong, a nine-years old child refused to go back to school as he was haunted by the horror of watching his father busy saving his boat until he forgot that his son was still in the house (Ibrahim & Mazlan. 2006. p. 97). A victim who escaped from death blamed himself for the death of his grandchild, simply for not preventing him from going for a picnic on the day of the tragedy (Ibrahim & Mazlan. 2006.p.97).

Mr. Zulfifli of Pondok Upeh, who had lost 5 children in the tsunami still experiencing trauma and sadness about a year after (New Sunday Times, 18 December 2005) While Mr. Azahar Mat of Penaga, who had lost his 5-years old son, is still in sadness while other of his children still reported to experience trauma. Mr. Azahar is now more pious and regularly attend religious congregations as compared to before tsunami (New Sunday Times, 18 December 2005).

For victims at Kota Kuala Muda, Kedah, the tsunami surge also left a deep emotional trauma and psychological scar on the victims caused by the elements of shock, fear and panic from the tsunami strikes. Loss of property and loved ones had further worsened the trauma besides fear of starting anew amidst physical loss.

About a month after the tsunami, a survey of the affected residents reported extreme sadness and fear when recapturing the incident, which they believed to be hauntingly unforgettable experience. A survivor from Kampung Masjid said that he had just came to shore when tsunami wave struck the village and he felt that he would never go out to sea ever again. A child from Kampung Kepala Jalan feared loud noises, such as lorry, since it reminded him of the horrifying sound of the tsunami wave. There were also children experiencing fear of bathing while many experienced nightmares of big waves coming to kill them (Ibrahim & Mazlan.2006.p.78). Elderly who live in Kampung Paya were unable to forget the loud crashing sound of the tsunami wave and the rushing of seawater into their kitchens. After the tsunami, they are placed at an old folks home built close to the shore by the Department of Community Welfare. They experienced worry and fear when hearing breaking waves coming through the rear of their houses.

In Langkawi, the tsunami disaster had a great psychological impact on affected victims. Even after a month from the incident, victims were still haunted by the disaster when they recalled the damages and losses to their houses and income. Victims, particularly children and elderly women, experienced constant fear. Fishermen too, felt fear of the sea when they recalled the incident and make them more cautious when they were out at sea. As for school children, apart from suffering trauma, they also experienced psychological disturbances due to interruptions to their schooling schedule, and loss of schooling necessities, including school uniforms and textbooks.

From recent visit, it was observed that psychologically, most tsunami victims do not experience any trauma any more, especially those who have been relocated into 'people's friendly homes'. For those still staying in their homes in the affected areas, they are still haunted with fears, especially when tsunami or earth quakes hit neighbouring countries.

4. Disaster Response and Management

i) *Rapid Action Programme*

This involve the establishment of operation centres at the district level and in the affected areas to coordinate rescue and aid efforts, transporting the injured and dead to hospital and managing funerals of the dead. Besides, personnel and transportation are also provided to relocate victims to temporary shelters and registering of victims was done. Others included supplying and distributing food and other necessities, machinery and electrical supplies, communication systems, managing VIP visits and preparing latest reports on the victims and situation.

Agencies Involved

Government agencies, private sector and NGOs in Penang, Langkawi and Kota Kuala Muda were involved in tsunami relief. Some of the agencies involved are District Offices, District Councils, Social Welfare Department, Public Works Department, Irrigation Department, Land Office, Education Department, Health Department, Telecoms, TNB, all the head villages. Others involved are Village Welfare and Safety Committees, local leaders, political bodies and rescue agencies at the district level i.e. Royal Malaysian Police, Fire and Rescue Department, the Malaysian Army, RELA, and the Public Defence Department (JPA3).

The principal institutions responsible for planning and coordination of medium-to long-term rehabilitation efforts in fisheries and other resource sectors are Prime Ministers' Department, Department of Fisheries, Fisheries Development Authority of Malaysia and Ministry Of Agriculture and Agro Based Industry.

ii) *Basic Needs Assistance*

Basic necessities included daily essentials were distributed to victims at temporary shelters and in their homes, which consisted of clothes (daily and school uniforms), food, medicine, kitchen utensils, and beddings. Electrical goods and disposable diapers were donated by private sector. The involvement of private sector was also encouraging. . Overall, government, NGOs, and individuals were together contributed in providing the assistance.

iii) *Application of Important Documents*

Besides destroyed property, victims have also lost important documents such as identity cards, driving licenses, land titles etc. Thus, National Registration Department and the Road Transport Department opened special counters to

facilitate application for new documents besides exempting them from any payments.

iv) Counselling Support

Many victims experienced emotional stress and psychological trauma especially those who lost family members. Children and elderly people were the most affected caused by shock, fear and panic experience of victims. To alleviate the emotional burden of the victims, the Ministry of Women, Family and Community Development provided counselling services to the victims for a period of six months beginning the first week of the tragedy. Counselling was also provided under the supervision of a committee involving Health Ministry, the Social Welfare Department and the National Welfare Foundation. Besides, volunteers from Malaysian Red Crescent Society, state religious departments, psychiatrists and psychologists from universities also helped in giving counselling to victims. University of Malaya Medical Centre (UMMC) Trauma and Emergency Centre in KL also provided training to units from several public agencies in handling trauma, epidemics and pandemics.

v) Relocation Assistance

Just after the tsunami, school and community halls were turned into temporary shelters. There were 8 temporary shelters in Kuala Muda, 7 in Penang, and 5 in Langkawi opened for victims.

To serve the shelter needs of the victims, Syarikat Perumahan Negara Berhad (SPNB) is one of the involved companies which was given responsibility to repair, and build transit houses as well as permanent housing for the tsunami victims. (SPNB, 2005)

Table 7.: Allocations of projects by SPNB are as follows:

State	Houses to repair	Temporary Shelter	Permanent Housing
Kedah	200	145	160
Penang	250	100	658
Total	450	245	818

(Source: SPNB, 2005)

In Kota Kuala Muda, the government built 100 units of 3-bedroom transit homes in Permatang Katong. The project was undertaken by Seri Temin Development Corporation (STDC), a subsidiary of the Kedah State Development Corporation (PKNK) at a cost of RM 2.2 million. In Penang, 100 units of 2-bedroom temporary shelters were built near Boon Siew beach at Tanjung Bungah. These shelters are supplied with free water and electricity.

Non-destroyed homes of victims were repaired by Syarikat Perumahan Negara Berhad (SPNB). Through SPNB, Class F contractors were given responsibility to complete the jobs within a month (Utusan Malaysia, 25 January 2005).

vi) National Disaster Fund (NDF)

NDF was launched by News Straits Times, TV3 and 8TV. Until April 2005, the total raised reached RM 72.96 million. Funds were channelled to tsunami victims via federal and state agencies, directly to the families of dead, victims to repair homes and boats, hospitalisation expenses and relocation expenses. Besides, cost of building permanent homes for the victims, repair of infrastructure at the affected villages are provided too. Flood of donations about US \$ 11 billion (RM 41.3 billion) reported by UN. Food aid had been distributed in Tg Bungah, Penang (New Sunday Times, 9 Jan 2005).

Government Assistance Programs

The Malaysian government has promised aid to fishing communities and others affected by the tsunami. The Ministry of Agriculture and Agro-based Industries through its Agencies, Fisheries Development Authority Of Malaysia (LKIM) and the Department of Fisheries Malaysia (DOF), immediately established an Operation Room, in every state affected after the disaster struck. The Operation room coordinated all collection of damage and loss reports and these were submitted to the National Task Force. The fisheries sector suffered a total loss of more than RM57 million.

i) Compensation

As an immediate action, the Government announced compensation for all victims of the disaster. For purposes of compensation, Boat Owners and Fish Farmers were required to register their losses with the Fishermen Association, LKIM or the DOF. An official police report also needed to be lodged (Table 4). Table 8 shows a summary of compensation types and amounts to the tsunami victims.

Table 8: Summary of compensation rate

PARTICULAR	AMOUNT (RM)
Early Assistance	
Death	20,000.00/person
Injured	200.00/person
Relocated families	500.00/member
Partially damaged house	2,000.00/house
Completely destroyed house	5,000.00/house

Educational Assistance/child	
a) Secondary	300.00
b) Primary	200.00
Fishing Industry/boat	
a) Small boat (Outboard Engine)	1,000.00
b) Large boat (Inboard Engine)	3,000.00
Aquaculture	
a) Hatchery	3,000.00
b) Fish Cage culture (maximum 12 cages)	200.00 - 2,400.00
c) Shrimp/fish farm (maximum 2 hectares)	1,500.00 - 3,000.00
d) Shellfish	
i. Cockle (maximum 2 hectares)	500.00 - 1,000.00
ii. Oyster/Green mussel (maximum 2 Raft)	1,600.00 - 3,200.00
e) Pen Culture	1,000.00

(Source: *www.worldfishcenter.org 2005, Ibrahim Komoo & Mazlan Othman (2006)*)

Early humanitarian assistance included monetary, material, counselling, and housing/shelter assistances. . There were 3 levels of financial assistance:

a) 1st phase was RM 200 aid for injured, RM 500 for relocated families, RM 20,000 for every family member who died distributed within the first two weeks following the tsunami incident.

b) 2nd phase was RM 2000 to families' house damages but repairable, while RM 5000 for houses badly damaged and beyond repair.

c) 3rd phase was to be channelled once the respective departments involved completed the process of assessing damages.

RM 1000 were given to small damaged boats, while RM 3000 were given to big damaged boats, distributed within the 2nd week after the tragedy. In addition, the government had approved an interest-free loan worth RM 25 million through Fishermen Fund –to help repair or replace damaged boats and fishing equipment (Utusan Malaysia, 29 January 2005).

Education Ministry provided RM 300 and RM 200 vouchers for secondary and primary school students affected by tsunami, which enable them to continue schooling.

ii) Loan Assistance

As a strategy to revive the fishermen and Fish Farmers livelihood and activities, the government also provides easy financial assistance. There are two financial facilities to accommodate their need, which are as follows:-

a) Fishermen Soft Loan (Table 9)

This loan is only for fishermen and is being handled and coordinated by the Fisheries Development Authority of Malaysia. Applicants are entitled to a maximum of RM 25,000.00, which is interest free and the repayment period is 48 months. After the Tsunami Disaster, the maximum amount has been raised to RM 70,000.00. 53 % of the affected fishermen have so far applied for this facility. Total number of application to date is as shown in the following table.

Table 9: Application for Fishermen Soft Loan

State	Affected Fishing Vessels	Application	
		Number of Applicants	Amount Applied (RM)
Perlis	209	146	1,258,630
Kedah	1,500	669	8,879,686
Penang	1,430	801	11,071,835
Perak	477	336	3,409,049
Selangor	10	-	-
Total	3,626	1,952	24,619,200

(Source : Fisheries Development Authority Malaysia)

b) Agriculture Bank Of Malaysia (Bank Pertanian Malaysia)

Under the 3F(Fund for Food) scheme, applicants can apply for a maximum loan of RM 5 million with an annual interest rate of 3.5 %. The repayment period is 7 years and so far it is understood; only a few applicants have shown interest.

c) External Assistance for Damaged Boats

Besides aids from DOF, external aids were also channelled for instance, funds from United Nations Development Program (UNDP).

Table 10: Boats and Fishing Equipments Aids received from United Nations Development Program (UNDP)

State	Location	Fisheries Aids (RM 000)	Items
Penang	Pulau Betong	51	4 boats and fishing nets
	Kuala Sungai Burung	27	5 boats and fishing nets
	Kuala Muda (Seberang Perai)	111	5 boats, 5 engines and 10 fishing nets
Kedah	Kuala Muda	328	17 boats, 15 engines, 4 sonar, and 30 fishing nets

(Source: BERNAMA, March 2005)

5. Recent Development of Tsunami Victim

In March, 2006, a post-tsunami study was carried out to find the current progress of victims' living conditions, distribution of tsunami-aids, development of new housing area and the progress of fishery and aquaculture activities in the affected areas. Samples were collected from several affected villages in Kota Kuala Muda. Additional information from media were also included in the progress findings. The total of 146 samples were analysed.

Table 11: Socio-demographic profile of respondents in post-tsunami study

Items	N	Frequency	Percentage	Minimum	Maximum	Mean
Age	146	-	-	17	70	46.51
Gender	146	-	100	-	-	-
Male		128	87.7	-	-	-
Female		18	12.3	-	-	-
Ethnicity	146	-	100	-	-	-
Malay		145	99.3	-	-	-
Indian		1	0.7	-	-	-
Marital Status	146	-	100	-	-	-
Unknown		2	1.4	-	-	-
Single		23	15.8	-	-	-
Married		111	76.0	-	-	-
Single parents		10	6.8	-	-	-
Education	146	-	100	-	-	-
Unknown		3	2.1	-	-	-
No education		3	2.1	-	-	-
Primary		79	54.1	-	-	-
Lower Secondary		40	27.4	-	-	-
Upper Secondary		19	13.0	-	-	-
Certificate/Diploma		2	1.4	-	-	-
Number of Households	146	-	-	0	12	4.89
Main Occupation	146	-	100	-	-	-
Fisherman		107	73.3	-	-	-

Businessman/traders/hawkers	18	12.3	-	-	-	
Farmers	1	0.70	-	-	-	
Tailors/handicraftsman	4	2.7	-	-	-	
Housewives	4	2.7	-	-	-	
Government servants/office/retirees	8	5.5	-	-	-	
Security guards/others	4	2.7	-	-	-	
Total Income (RM)	142	-	-	230.00	5070.00	910.70

Source: Post Tsunami Survey, March 2006.

From the table, minimum age of respondents is 17 years old, while maximum is 70 years old. Average age for all the respondents is 46.51 years old. 87.7 % of the respondents are male, while 12.3% are female. Among the respondents, almost all or 99.3 % were Malays, while 0.7 was Indians. Most of them were originally from Kota Kuala Muda (83.4%). In term of marital status, singles make up 15.8% while married with 76%, and the rest 6.8 % were single parents. Majority of respondents completed primary education (54.1%), followed by lower secondary education (27.4%), upper secondary education (13%), without formal education (2.1%) while 1.4% were certificate or diploma holder. The average number of households (excluding respondent) is 4.89 persons varies with a maximum of 12 persons. In terms of main occupation , the majority are fishermen (73.3%), followed by businessman/traders/hawkers (12.3%), government servants/office/retirees (5.5%), 2.7% for respectively as tailors/handicraftsman, housewives, and security guards/others, and lastly farmers (0.7%). Total households income ranges from RM 230.00 to RM 5070.00 per month, with average income of RM 910.70 per month.

a) Permanent Accommodation

Until end of 2005, the tsunami victims still live in temporary shelters. Reconstruction has been generally slow due to the magnitude of the problem. About 600 victims were still living in long houses in Permatang Katong, Kota Kuala Muda, Kedah, while waiting for new houses by Government (New Sunday Times, 18 December 2005).

In Langkawi, victims have already moved into their new houses funded by Government in Taman Batu Ara, Kuala Teriang. Transit house they stayed previously was not convenient, crowded for big families, and smaller compared to the their houses that had been destroyed by tsunami In Penang, Batu Feringhi's tsunami victims are still living in the transit house (New Sunday Times, 18 December 2005).

The recent survey found that 40% of respondents claimed that they are not comfortable with the situation of the new house, while 60% having no problem

with the new housing. Many complaints on the non-strategic location of the new housing area since it is far from the sea for them to earn living and school for their children. Some mentioned their reservation with regards to high cost of living since they have to bear monthly rent for the new house allocated to them. For some they cited the house is too small for big families, at the same time some having neighbourhood problems, limited space for their children to play around and quality of the housing materials itself. Many respondents complained that the area where the new house is located was formerly a swamp area, and may affect the quality of the house.

b) Agencies Involved

From a recent survey done, among the aids were contributed by Malaysian Red Crescent Society (PBSMM), Malaysian Medical Relief Society (MERCY), Jabatan Kebajikan Masyarakat (JKM), Lembaga Kemajuan Ikan Malaysia (LKIM), Persatuan Zakat Selangor, Majlis Amanah Rakyat (MARA), Tabung Bencana Tsunami, NGOs and individuals. Nevertheless many had complaint that they did not received a fair share ever since all sorts of support given to them. Many claimed that certain quarters of the community kept to themselves and deprived others.

c) Issues

i) Uncoordinated Aid between Agencies

Mis-coordination in delivery of aid is among the most frequent complaints among victims. Some private groups sent their contributions directly to victims without consulting officials. Therefore, many people taking advantage by claiming the same aid repeatedly. Many victims were also unaware of the contributions, thus returned home, while contributions were left at the relief centre.

ii) Focus of Aid

Distribution of aid only focused on several fishing villages near the temporary shelter in Kota Kuala Muda. Fishermen from other areas, who were affected by tsunami, did not received comparable aid and attention.. There are those their homes were not damaged. They only received daily necessities but still, they are unable to go out fishing since their boats, engines and fishing gears were damaged.

iii) Lack of Data and Information

Lack of up-to-date data and information on victims and inefficiency of personnel in managing the situation also became a hindrance for smooth

distribution of aid to victims. This situation opened for cases of villagers from other unaffected areas, came to the relief centres and cheated to claim aids meant for tsunami victims. Based on data collected, 79.5% claimed that their house total loss and in repairable state and 88.4% mentioned their boats and fishing equipment lost during tsunami. In term of income, after a year since tsunami, 56.2% had claimed that they be able to recover economically only 43.6% still argued that they still unable to regain to the level of income before tsunami. Therefore half of them still needed support to supplement their lost income.

iv) Attitude of Victims

Some ungrateful victims also disappointed donors and volunteers. Several complaints on food aids donor, dumped donated clothing like rags, and some spoke unpleasantly to visitors and volunteers. Based on observation made while conducting survey, children in this area seem to be prone to ask money from “newcomers”. This situation seem to apparent and they had an impression “every visitors” comes to their housing area with intention to give money.

However, own initiatives by housewives of victims can be seen when sewing classes for housewives are organized at transit homes in Kedah. This will at least improve family income by the involvement of full-time housewives among victims of tsunami (New Sunday Times, 18 December 2005). This effort could be expanded into other activities that will help to improve and sustain the well-being of victims. Government agencies could plan to implement various development programs that can serve on this needs.

From recent visit, it was observed that conflict between community members arises, due to unhappiness over distribution of assistance to victims. Some victims have lost respect for their village leaders, accused of not adequately presenting their rights and claims. There was also accusation of unfair distribution of assistance due to political differences.

For those who have moved to their new homes, they claimed that their wellbeing have very much improved. Their incomes are also more secure. Other than incomes from fishing, there are opportunities for their wives to earn supplementary incomes from the local community and also small-medium scale industry centres.

v) Other problems

From the survey in March 2006, many of the respondents claimed that they still are facing problems from the after-effects of tsunami. About 78.1% of the respondents claimed that they are still experiencing psychological effect such as trauma, fears, tension, shocked, having nightmares while 21.9% claimed that they are feeling well and stable. Some 55.2 % claimed that they are having problems to sustain their living while 44.8% claimed that they have no problem.

Among their common problems and complains are financial-related, inadequacy of fund received, non-equilibrium distribution of tsunami aids, the rises of fuel price, and etc. Out of 146 respondents, 12 of them claimed that they had lost their family members and admitted that the incident affected them very much, amongst them three respondents said that they had lost 2 to 4 members of their family.

vi) Fishery & Aquaculture Sustainability

From the recent survey, 81.7% respondents are involved in the fishery and aquaculture activities. These activities are related to fishing, aquaculture farming, producing trap/bamboo fence, making and repairing fishing nets, trading fishery cage and fish containers, fish purchase and retails. Due to the tsunami, 43.8% claimed that they are experiencing reduction in income ranging from 5% to 60%.

The risk and dangers of tsunami may pose threats to the future of the fishing industry. From the survey, 59.6% of respondents discouraged their children to inherit the fishermen's job, as compared to only 18.5% who encouraged their children to be fishermen, while 21.9% let their children to decide. Those who discouraged their children claimed that it is a 'tough living', physical and needs strong determination. Life as a fisherman is bleak, due to unstable and fluctuating incomes. It is a high risk job, which is exposed to danger, storm or even tsunami. But amongst them (fishermen), only 5.5% did mention that they might resort to change their current occupation and work in factory or start a small business.

Those who encouraged their children to be fishermen agreed that fishing is a traditional and religiously legal (*halal*) job which allow fishermen to work independently, and to sustain a decent living standard. Some claimed that it is their children interests and some hope their children to be a modern fisherman.

6. Conclusion, Policy Responses and Recommendations

The tsunami incident of 24.12.04 shows that natural disaster can happen, and humans can be exposed to various risks and dangers, resulting in calamities, loss of lives, incomes and employment, damages to properties, assets, documents, enterprises, equipments and utensils, etc. The psychological scar and traumatic experiences could linger around long after the incident.

The socio-economic impact study includes accounting and valuation for the loss and damages related to incomes, employment, enterprises, properties, assets, utensils and equipments. The study also analyse disaster responses and management and also assistance by relevant government agencies, private sector and civil societies (CBOs) and related issues. The analysis shows that a lot more needs to be done to improve disaster responses and management,

including better coordination of agencies, private sector and CBOs in providing support and assistance, improving data collection and information on victims and disbursement of assistance, improving counselling service to victims to ease the burden of trauma and to motivate them and family members on survival opportunities and challenges for the future.

Recommendation by the study group (Ibrahim & Mazlan, 2006. p 156-162) focuses on the following areas: disaster risk management, disaster preparedness, reducing vulnerability, post-disaster aid and reconstruction.

In terms of disaster risk management, there is a need for strengthening policy and capacity with respect to: i) National Disaster Management Policy, ii) creating South East Asia Natural Disaster Network, iii) establishing Disaster Risk Technical Committee, iv) enhancing Institution and Human Resource.

The preparedness of various relevant agencies need to be strengthened, through i) institutionalising educational and public awareness on disaster, ii) creating and integrating school education curricula on environmental disaster, iii) creating safe areas at residential coastal areas and recreational beaches, iv) development of disaster early warning system, v) special training for dealing with disaster, vi) providing information on population demography and socio-economy, vii) improving disaster communication at village and local levels.

Reducing vulnerability towards natural disaster could be achieved through, i) better land use planning approach, ii) preservation of mangrove forests and coral reefs, iii) man-made defence systems, iv) guide to coastal development, v) coastal structure design and vi) critical infrastructure guide for earthquakes.

Post-disaster aid could be improved through i) better aid coordination and smart partnership, ii) improved basic information on population at village level and iii) post disaster counselling assistance for victims.

Reconstruction of affected areas need to consider aspects of i) environmental conservation, ii) settlement planning, iii) fishing and other economic activities of fishermen, iv) improvement in community well-being.

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