

## SPECIAL REPORT

### FAO/WFP FOOD SUPPLY AND DEMAND ASSESSMENT FOR ACEH PROVINCE AND NIAS ISLAND (INDONESIA)

5 May 2005

#### Mission Highlights

- The 26 December 2004 earthquake, tsunami and the 29 March 2005 earthquake caused great loss of life, damage and disruption. It strongly affected the primary sector's economy, but did not induce major structural changes within the Provinces. The current estimated cost for the rehabilitation 'Blueprint' is Rp 41.1 trillion (about US\$4.1 billion) over the next five years.
- Before the Tsunami, almost 30 percent of the population in Aceh Province lived below the poverty line, compared with a national average of some 17 percent. Among Tsunami affected districts, Aceh Utara, Bireuen and Pidie had the highest numbers of poor people, closely followed by Aceh Besar and Aceh Barat. Over 35 percent of children under 5 were underweight, compared to 25 percent for Indonesia. The highest prevalence of underweight status was in the Districts of Aceh Besar, Aceh Barat, Pidie and Simeulue. The disaster has aggravated the livelihoods and nutritional status of the poor and of those who used to be better off.
- Households most affected by casualties, loss of assets and livelihoods include: inhabitants of the islands/archipelagos of Nias, Simeulue, Banyak; landless families who previously worked on *tambaks* and severely damaged lands; full-time or near full-time fishermen; part-time fishermen with paddy fields closest to the coastlines; farming families involved in paddy production with major secondary incomes from *tambaks*, and traditional salt producers.
- Many farmers in the most affected areas have lost two consecutive paddy seasons. In the fisheries sector, 2005 output is estimated to fall 50 percent for marine fishing and 41 percent for brackish water aquaculture. The livelihoods of some 331 360 working people, mainly from the agricultural and fishery sectors (i.e., about 123 000 households or 600 000 people), have been directly affected by the disaster and are in need food and other financial assistance in 2005.
- Since rice production in Aceh is expected to show about 200 000 tonnes surplus for the 2005/06 marketing year, local food purchases are encouraged, whenever possible.
- A better understanding of population dynamics will be critical in providing for the resumption of livelihoods by geographic area, including some 'host locations'.
- Very few people will be able to resume economically viable activities while residing in camps or TLCs. The reconstruction of homes, with water, sanitation and electricity, is an essential step in rehabilitating livelihoods, as is the rehabilitation of their productive assets. People should receive (food) assistance to enable them to repair or reconstruct their homes and rehabilitate their livelihood assets. Cash-for-work programmes can also allow people to participate in public works while earning money for private home repair or construction.
- In infrastructure rehabilitation of infrastructure, a combination of cash and food for work could employ more people or extend the period of assistance. Food- plus cash-based projects could be implemented to rebuild community infrastructure such as irrigation canals, village drainage systems, community centres, schools, health posts (posyandu) etc.
- The informal financial sector is resuming operations in many areas. It will be critical to work with banks and small businesses with previous ties to the formal sector: while some grants or 'soft' loans may be needed, donors must avoid practices tending to decrease the local banks' lending capacity, to undermine their long-term relationships with local borrowers, and to reduce prospects for financial services in the Province.



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME



WORLD FOOD PROGRAMME, ROME

## EXECUTIVE SUMMARY

The 26 December 2004 earthquake and ensuing tidal waves was the world's strongest natural event, in terms of energy, since the Krakatoa volcano eruption of 1883. The estimated number of people either dead or missing in northern Sumatra's mainland and northwest islands is 250 000, with over 500 000 internally displaced, many of whom are in refugee or Temporary Lodging camps (TLCs).

The islands off the Northwest coast of Sumatra, which suffered relatively fewer casualties, actually bore the greatest economic brunt of the disaster. The destruction of housing, fishing boats and gear, cropland and plantations, and even fresh water supply, was most widespread; it also struck particularly impoverished populations, with little access to outside relief and reconstruction supplies. These islands remain critically vulnerable, with several subsequent tremors and a new earthquake, on 28 March, severely affecting the island of Nias.

According to 2003 Bureau of Planning estimates, almost 30 percent of the population in Aceh Province were living below the poverty line, compared to the national average of some 17 percent. It is the third worst province in terms of incidence of poverty, after Papua and Maluku, with the share of food in total private consumption being estimated at 64 percent. Over the last few years there has been a drastic increase in the number of people living below the poverty line -- from 595 000 in 2000 to 1.25 million in 2003. BPS further categorized 580 000 people as ultra poor (those who are living far below the poverty line) in the province. Among Tsunami affected districts, Aceh Utara, Bireuen and Pidie had the highest numbers of poor people, closely followed by Aceh Besar and Aceh Barat.

The December disaster strongly affected the primary sector economy, in terms of Regional GDP and employment. However, it did not lead to major structural changes within the Province. Detailed assessments of damage to all sectors, including fisheries, agriculture, livestock, trade and infrastructure have been carried out at District and Provincial levels, and general rehabilitation and reconstruction plans prepared in collaboration with UN agencies and other partners. The Government of Indonesia has completed the final draft of their blueprint for the rehabilitation of the Province. The current estimated cost for the blueprint is Rp 41.1 trillion (about US\$4.1 billion) over the next five years, down from the Rp 45 trillion assessed earlier.

Aceh Province, also known as Nanggroe Eceh Darussalam, NAD, is endowed with a diversified and potentially very rich primary sector. For the purposes of this report, main livelihood systems are organized in geographic areas with somewhat homogeneous ecological and livelihood systems. They are described in terms of direct or indirect impacts from the disaster, and of strategies or specific actions to support the resumption of livelihoods. They include:

- **Kota Banda Aceh and periphery:** great loss of life, of infrastructure, primary sector productive activities –fishing, *tambaks* (brackish water ponds used to raise shrimp, milfish).
- **West coast subsistence and low income production systems:** great loss of life, destruction of low income primary production systems, loss of farm-to-market road for coconuts, oil palm products.
- **West coast middle income, agro-industrial/estate sub-sectors:** little impact.
- **The special case of the islands/archipelagoes of Simeulue, Banyak, Nias:** little loss of life, great impact on infrastructure, livelihoods of very poor and isolated populations.
- **Northeast coastal subsistence and low income production systems:** some loss of life, loss primary sector productive activities –fishing, *tambaks*, and of other artisan activities.
- **Northeast coast middle income, agro-industrial, industrial sub-sectors:** little direct impact, high influx of IDPs.
- **Highlands - Aceh Tengah, other highland districts:** no direct impact, some influx of IDPs, some boost to demand for highland production destined for Banda Aceh.

The types of households most affected by the combination of casualties and loss of assets and livelihoods include, in approximate decreasing order:

- Inhabitants of the islands/archipelagoes of Nias, Simeulue, Banyak.
- Landless families who previously worked on *tambaks* and severely damaged lands.
- Full-time or near full-time fishermen, on both coasts.
- Part-time fishermen with paddy fields closest to the coastlines (typically rainfed, heavily damaged by soil deposits, debris, salt).

- Farming families settled close to the coastlines (paddy fields destroyed, damage to coconut trees/plantations).
- Farming families involved in paddy production with major secondary incomes from *tambaks*.
- Households involved in artisan salt production (mostly Northeast coast).
- Farming families with some damage to paddy fields, now unable to market their production from tree crops (coconut, palm oil products, rubber) due to the destruction of long stretches of the Northwest coast's single road.

In addition, there are individuals from one of the above categories, or even from households rather well-off before the tsunami, who have lost all assets, most relatives, and who will have great difficulty reclaiming land/other assets.

The extent to which people will be able to resume previous or alternative livelihoods varies widely, even among people who are in refugee camps or TLCs, and currently receive food assistance. Some have already resumed productive activities, while others are unlikely to do so for a long time.

On the positive side, there has been much change and progress in some areas since the disaster, and economic activity is resuming rapidly, for example:

- Many farmers are planning October 2005 paddy production.
- Some fishermen have gone back to fishing on a smaller scale or even by sharing boats and nets.
- Some shops have re-opened, even on the West coast, in former or new locations, with credit from wholesalers.
- Urban markets have relocated and operate, although with smaller volumes of trade. There is a critical lack of facilities, such as storage areas for wholesalers' produce.
- Fresh informal credit is being provided to paddy farmers expecting to resume production in 2005.

Overall, 2004 was a good agricultural year for the Province (in most years a significant surplus food producer); food is widely available, and prices, which had surged in the early weeks following the disaster, have returned to more normal levels. Some commodity prices are back to pre-tsunami levels, while others have risen by about 20 percent due to a combination of fuel price rises and higher transportation costs.

This report forecasts NAD rice production for the 2005/06 marketing year showing an anticipated surplus of about 200 000 metric tonnes, which is at 400 000 tonnes, normally. Given the relative large rice surplus available in the region, it is recommended that local purchases be made whenever possible in order to meet food aid requirement in the province in order to avoid domestic food market distortions.

In spite of the overall surplus of rice in Aceh, many farmers in the most affected areas are estimated to have lost two 2005 consecutive seasons (2004/05 main season and 2005 secondary season) of paddy production completely. In fisheries sector, 2005 fish output is estimated to decline 50 percent for marine fishing and 41 percent for brackish water culture. Based on this output and projected population, per capita fish output will be reduced from some 38 kg in a normal to 20 kg.

The nutrition status of the Achenese population, however, continues to lag far behind the national average. In 2003, over 35 percent of children under 5 were underweight, compared to 25 percent<sup>1</sup> for Indonesia. The highest prevalence of underweight status was in the Districts of Aceh Besar, Aceh Barat, Pidie and Simeulue. These results are consistent with the findings of the joint 2002-2003 Food Security Atlas for Indonesia<sup>2</sup>, which analyses food insecurity using 10 District-level indicators. The analysis identified the western districts of Aceh and the island of Simeulue as most food insecure, largely due to food access and food utilization problems.

### **Strategic considerations**

#### 1. Population dynamics

The immediate effect of the disaster was to reduce the coastal population of Aceh Besar, Kota Banda Aceh, Aceh Barat and the less populated Aceh Jaya, either through loss of life, or movements away from the coast.

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<sup>1</sup> Bureau of Planning Statistics, National Socio-Economic Survey, 2003.

<sup>2</sup> National Food Security Council of Indonesia, World Food Programme, 2004.

Little is known about the socio-economic impact of the disaster, especially the number of missing and internally displaced persons (IDPs). Casualties were originally estimated from the number of bodies recovered and witness accounts. The original number of missing being the difference between the original population, survivors, and casualties. The number of refugees can be inferred from the population hosted and cared for in emergency shelters (e.g. UNHCR facilities) or in Government camps, about 600 of which are eventually to be built in the Province. As for many other large disasters, a number of issues must be clarified:

- Some of the missing are being cared for in refugee camps or TLCs. Depending on the location of the camps and other factors, this may or may not allow them to resume livelihood strategies. Some of the missing --many, it is thought-- are being hosted by relatives in other parts of the Province, either close to the locus of the disaster, or very far away, which explains why the Northeast Districts of Pidie, Bireuen, Aceh Utara, which suffered damage but fewer casualties, have a relatively large number of IDPs. People hosted by relatives do not appear on IDP lists, and receive little or no support from the Government or aid organizations.
- Some of the people now in refugee camps or TLCs were not directly affected by the disaster, but had been living in such poverty that they gravitated to the camps. Some of them may actually have been internally displaced and impoverished by the long-standing conflict.

With the Government and partners moving from the Emergency to the Rehabilitation phase, it is becoming critical to better understand these population dynamics, especially in defining the support to be provided for the resumption of livelihoods by geographic area, including some 'host locations'. It is also needed to forestall conflict over land resources: some of the camps in West coast communities, for example, are now sheltering population groups not originally from the area. A number of these people are initiating various livelihood strategies.

## 2. Resumption of Livelihoods and ensuring household/intra-household food security

- The resumption of livelihoods along the poorer parts of the West coast will be very difficult: the coastal plain is narrow, it has been heavily damaged, and much of the road has been destroyed. Some coastal ecosystems are, and will remain, unstable for some time.
- Cash-for-work programs must be more carefully targeted and directed at priority activities since the wage levels are higher than the pre-tsunami opportunity cost of labour in the primary sector. With upward pressure on the cost of agricultural and other casual labour, there are already signs of distortions in local labour market.
- In very few instances can one imagine that people residing in camps or TLCs will be able to resume economically viable activities. The reconstruction of homes, with water, sanitation and electricity, must be the first step in rehabilitating livelihoods. Cash-for-work programs should allow people to participate in housing related public works while earning the necessary money to purchase supplies for home repair or construction.
- Small-scale or artisan activities of the coastal economy, such as salt making, very common on the East coast, may also be supported with basic equipment grants or micro-credit.
- The informal financial sector is resuming operations in many areas where paddy is expected to be grown again in 2005. Local moneylenders are willing to forgive past debts and start anew. The formal financial sector, however, is in a holding pattern for several months: it will take time to establish ownership of current accounts, assess unrecoverable loans from the deceased, for instance. None of the banks are extending further credit to small businesses which went bankrupt and could not repay their debts. Even so, it will be critical not to substitute grants or 'soft' loans to small business with previous ties to the formal financial sector: this would decrease the local banks' lending capacity, undermine their long-term relationships with local borrowers, and reduce incentives to do financial business in the Province.
- Shorelines, estuaries, and coastal vegetation have suffered such damage from the tsunami that further degradation is likely. Stabilizing the coastal environment will require the re-introduction of various types of vegetations, including mangroves, which can help reduce further erosion or even protect against any future tidal waves. However, it will often be incompatible with the rehabilitation or re-establishment of *tambaks*. To enlist the support of local populations in reintroducing mangrove systems, one may first use cash-for-work for this task. Economic benefits from mangrove re-introduction must also accrue directly to local communities, in the form of (a) direct benefits from mangroves, and (b) clearly higher productivity in protected farming areas.
- For marine fisheries, the pressure to resume productive activities rapidly must not overshadow the need for the various downstream components of the supply chain: landing and market sites, cold chain, processing, transport, etc.

- IDPs (in TLCs, make shift camps and living with host families) should receive relief food aid until such time as they can start rebuilding their homes and livelihoods. Once these recovery activities start, relief assistance should take the form of an enabler for these families to spend their time and resources on restoring their lives.
- A lot of recovery and rehabilitation work needs to be done, but except for some of the hardest hit areas on the West coast there may not be a strong case for FFW activities at the moment, in view of the availability of cash-based programmes, the harvest coming in etc. However, a combination of cash and food could either reach more people or extend the period of assistance. This would need to be looked into, and especially in cooperation agreements with agencies like IFAD, FAO, WB or ADB, a food plus cash based project could be conceived in order to rebuild community infrastructure such as irrigation canals, village drainage systems, community centres, schools, health posts (posyandu) etc.
- Community based needs assessments are suggested to be undertaken before activities involving food, cash and other materials are introduced, not only to ensure the correct type of activities, but also to avoid distortion of the local food market. The results of the imminent Market and Labour Survey may provide a sound basis for decisions in this respect.
- A high prevalence of anaemia among children, taken together with low coverage of foods with protein, low consumption of fresh foods and low coverage of micronutrient supplementation indicates that emergency relief had greatest impact on the Macronutrient situation, rather than on Micronutrients. WFP is already planning a school feeding programme and a supplementary nutrition programme for children under five, pregnant women and lactating-mothers. Targeting of the worst affected areas should be done for the MCH component, based on the results of the Nutrition Survey. Since the Nutrition Survey did not find significant difference in nutritional status between ID and non-IDP children, it is recommended that nutrition intervention be targeted to non-IDP children as well. The survey also strongly recommends that Simeulue and Aceh Barat Daya should be targeted on a priority basis on 'blanket approach'.

The area being a multiple hazard hotspot, a comprehensive Livelihoods, Food and Nutrition Surveillance would be critical for better emergency response and preparedness and also to track changes in outcome indicators of the relevant interventions. The state managed Food and Nutrition Surveillance (SKPG) should be revived in the province by building the necessary capacities within the relevant ministries at province and district levels. Efforts have already been made in Nutrition Surveillance by UNICEF, WFP, WHO in collaboration with the Ministry of Health. Similar efforts would be required in agriculture and livelihoods sectors and eventually a unified surveillance system should be established in the province, covering all three components (agriculture, livelihood and nutrition).

## **1. INTRODUCTION**

An FAO/WFP team travelled to Indonesia from 12 through 25 March 2005. For the FAO side it included Dr. Henri Josserand and Dr. Cheng Fang, of the Economic and Social Department. On the WFP side, the assessment mission included Mr. Joan Fleuren, Senior Programme Adviser, WFP Regional Bureau in Bangkok, Thailand; Mr. Dipayan Bhattacharyya, VAM Officer, WFP Country Office, Jakarta; and Ms. Karin McLennan, VAM consultant, WFP Sub-Office in Banda Aceh.

On Friday, 11 March, the joint team held briefing and planning discussions with staff of the FAO and WFP offices in Jakarta, which included Messrs. Rudi Ziegler and Mohamed Saleheen, respectively FAO and WFP Representatives. The joint team proceeded to Banda Aceh on Saturday, 12 March. After local briefings and meetings with the Ministry of Agriculture's Provincial Food Security Agency, the team carried out a number of field visits to Kota Banda Aceh, as well as to the West and North-East coastal areas of the province. For security reasons, neither the hinterland of coastal Districts, nor highland Districts, such as Aceh Tengah, can be visited by UN or other teams working in Aceh. For the same reason, the team travelled jointly at all times, so that FAO and WFP members went to the same field sites. Interviews were done either together or separately, depending on circumstances. With the exception of Meulaboh and Calang, all site visits were carried out jointly with Mr. Zainul Arifin Panglima Polem, Head of the Food Security Agency, NAD.

West Coast and North	Northeast Coast
<b>14 March:</b> Lho'ong <b>15-16 March:</b> Meulaboh <b>17 March:</b> Calang <b>18 March:</b> Banda Aceh	<b>19-22 March:</b> Districts of Lohseumawe, Aceh Utara, Bireuen, Pidie.

Upon return to Jakarta on 23 March, the team organized a joint briefing for FAO and WFP Representatives and for officials of the Ministry of Agriculture's Food Security Agency and Agency for Community Empowerment for Food Security.

The extraordinary nature and impact of the 26 December 2004 earthquake and tsunami in northern Sumatra required various adjustments to the normal FAO/WFP CFSAM process and methodology. This exercise was defined as a "Food Supply and Demand Assessment"; it was carried out at the provincial rather than national level, and its scope was redefined to include:

- A review of the impact of the earthquake and tsunami on lives, productive assets, and infrastructure in affected areas.
- A brief survey of household production, coping and reconstruction strategies.
- A review of trends in population numbers, distribution throughout the Province, in livelihood systems, and their impact on current and near-term food supply and demand Aceh.
- A discussion of options for food security interventions (i.e. food aid, cash, vouchers) and their relative advantages and cost effectiveness.
- Guidelines for the design of a longer-term survey of prices, market conditions and food flows, to be organized by WFP in the province, in collaboration with a local research institute.

## **2. SOCIO-ECONOMIC CONTEXT**

### **2.1 Indonesia**

The Indonesian economy is generally sound; the World Bank projects that economic growth could average 6 percent from 2006 to 2009. Despite high and sustained open unemployment (about 9.5 percent), poverty indicators have decreased compared to the pre- financial crisis levels of 1996.

The value of total damage and losses from the disaster adding up to 2.2 percent of national GDP, it is unlikely to pose a serious threat to the national economy. Macroeconomic projections imply a possible reduction of 0.1 to 0.4 percentage points in GDP growth rates for 2005, relative to baseline forecasts before the disaster. Some of this, however, should be compensated by positive stimulus to the economy from rehabilitation and reconstruction activities. In the end, the overall impact on the national economy is likely to be very small.

Outside Java, North Sumatra is the most populous province, with over 5 percent of the total population of Indonesia. With its 2003 RGDP of US\$96.2 trillion, North Sumatra is also the largest economy off Java after East Kalimantan.

### **2.2 The Province of Aceh**

Northernmost Province of the island of Sumatra, Aceh has a population of about 4.2 million, divided into 16 *Kabupaten* and 4 *kota*. Oil and gas production are the single most dominant sector in NAD, accounting for about 43 percent of Regional Gross Domestic Product (RGDP) as shown in Table 1. Aceh's RGDP growth rate in 2003 was 3.4 percent, about 1 percentage point below the national growth rate. The manufacturing sector relies on a relatively small number of capital intensive industries with high output per labour ratio.

**Table 1 - Economic structure of RGDP by main sector of activity**

Sector	% in Aceh	% as National Average
Oil and Gas	43	10.7
Agriculture	32.2	16.6
Manufacturing	5.6	20.8
Construction	2.7	6.0
Trade	6.4	16.3
Transportation & Comm.	5.1	6.3
Finance	1.2	6.9
Services	2.9	10.4
Other	0.9	6

Source: BPS-Statistics of Indonesia and Aceh

Aside from oil and gas, agriculture (including fisheries, livestock, etc) accounts for about one-third of RGDP. Oil, gas production and manufacturing being quite capital-intensive, at least half of the active population is employed in the agricultural sector. Compared to the rest of Indonesia, the manufacturing, finance and services sectors are much less developed in NAD.

The province of Aceh has long had a net trade surplus with the outside. In 1992, the ratio of exports to imports, in value, was about 25/1. However, between 1992 and 2003, the current value of exports fell to one-half of its original amount, from US\$3 billion to US\$1.4 billion. By then, the ratio of exports to imports was slightly higher 28/1. The composition of trade, however, is highly skewed; exports of mineral fuels and mineral oil products amounted to US\$1.378 billion in 2003, out of a total US\$1.44 billion of exports (nearly 96 percent). Other main export categories include fertilizer (3.6 percent), articles of apparel (0.2 percent )<sup>3</sup>. These numbers are somewhat misleading because they under-represent primary sector exports, most of which flow unrecorded into the Province of Sumatra Utara, for local consumption or export via Medan.

Remittances to and from the Province also give a sense of Aceh's relative wealth compared to other regions of Indonesia. In 2003, US\$3.8 million were sent out through the post office, compared to US\$3.15 million received. The largest difference between money sent and received was in Meulaboh, where outgoing remittances added up to US\$213 000 compared to inflows of US\$39 000.

Together with the eastern-most province of Papua, Aceh has special autonomy status. Because of this, NAD has been granted a greater share of government revenue from its natural resources, including oil and gas, than have other provinces. Because regional and local governments have been receiving revenue sharing from Aceh's gas wealth, in addition to block grant transfers from the central government, the combined budget of Aceh's provincial and district governments grew six times between 2000 and 2002.

In spite of this, the relatively poor state of Aceh's power, transportation and irrigation networks is a reminder of the lack of economic development in a province otherwise endowed with an abundance of natural resources. Due to concerns over conflict and security in the Province, domestic and foreign investment – especially in the primary sector—has dried up. Economic activity declined by 20 percent between 1997 and 2001. According to 2003 Bureau of Planning estimates, almost 30 percent of the population in Aceh Province were living below the poverty line, compared to the national average of 17.4 percent. The share of food in total private consumption is estimated at 64 percent. Among Tsunami affected districts, Aceh Utara, Bireuen and Pidie had the highest numbers of poor people, closely followed by Aceh Besar and Aceh Barat. Table A.2 presents the distribution of income per capita in the non-gas and oil sector, and the proportion of people below the poverty line, by District.

The 28-year conflict has also taken the lives of some 10 000 people and led to the destruction or serious damage of infrastructure, including 900 schools, some dispensaries, etc. Aceh has no lack of education or health personnel, but they often refuse to work in rural areas for security reasons. In past years, bus burning and widespread extortion on Aceh's roads seriously impeded transport and transactions. It is estimated that 35 000 people have been displaced by the conflict. Some of them have migrated to post-tsunami refugee camps or TLCs, but the extent to which they will benefit from rehabilitation and reconstruction activities is unclear.

<sup>3</sup> Aceh in Figures - 2003, BPS, Provinsi Nanggroe Aceh Darussalam, with BAPPEDA.

### **3. DIRECT IMPACT OF THE DISASTER**

#### **3.1 Casualties**

In Aceh Province, close to 250 000 people are either dead or missing as a direct result of the disaster. In terms of mortalities, the combined impact of the earthquake and tidal waves was very uneven, depending on the areas affected. Island residents of Nias<sup>4</sup> and Simeulue, and some fisher folk of the west coast, for instance, relied on traditional knowledge and experience to flee to higher ground just in time<sup>5</sup>. Although housing and crops in coastal areas of Simeulue were extensively destroyed, only seven persons, out of a population of some 78 000 died as a direct result of the tsunami. On the other hand, in some coastal communities (for example, Leupeung or Calang, on the West coast), only one percent of the coastal population survived the disaster.

The number of casualties due to the tsunami has been proportionally much greater among children and women, who were less able to flee in time or survive the tidal waves. According to a recent Oxfam survey in eight affected villages, the tsunami may have killed up to four times as many women as men (findings were similar in Sri Lanka and India). The resulting imbalance is reportedly inducing social tensions in several communities.

Many of the remaining children have lost both parents. A large number of the remaining women have lost husbands or close relatives, and the few productive assets they controlled. They will be hard pressed to resume any livelihood based on land ownership, access to labour for farming, or access to capital to restart a small-scale economic activity, such as food processing/preparation or retailing.

#### **3.2 Psychological impact**

According to the University of Banda Aceh's psychology department and various NGOs, many people suffer from post-traumatic disorders induced both by the tidal waves and the aftermath of the event. The real extent of trauma, however, is not known because so many of the affected population rapidly moved to other areas of the Province, some to Aceh Tengah and other highland districts of the Province.

#### **3.3 Damage and economic losses**

##### Overall Impact on Economy

Paradoxically, islands and archipelagos off the Northwest coast of Sumatra (Nias, Simeulue, Nyak, Singkil) which suffered relatively fewer casualties, bore the economic brunt of the disaster. Due to proximity to the epicentre of the earthquake, the destruction of housing, fishing boats and gear, cropland and plantations, and even fresh water supply, was most extensive; it also hit severely impoverished populations<sup>6</sup>, with little access to outside relief and reconstruction supplies.

Waterfront urban areas and coastal settlements in or near Banda Aceh and along the West coast were also devastated. On the Northeast coast, damage was significant, but more limited to the estuarine areas of Pidie, Bireuen and Aceh Utara Districts.

The Impact on the local economy of NAD was very large. Total damage and losses are reckoned to be equivalent to about 100 percent of the Province's RGDP. The disaster impacted primarily the private assets and revenues of a mostly low income population, with a few exceptions such as urban businesses located at or near waterfront markets in Banda Aceh, or Meulaboh, for instance.

In NAD the transportation sector was affected both in public and private asset terms: 316 km (10 percent of total) of provincial roads, 1 900 km of local roads, and 400 bridges were destroyed or heavily damaged. There was also significant loss of and damage to vehicles<sup>7</sup>. Much of the primary transportation infrastructure in the province is located in coastal areas, since inland areas tend to be steep and high mountains, with a concentration of population and economic activity along the coast. The economic loss in vehicles, US\$160 million, much of it private, was higher than the value of loss to road infrastructure.

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<sup>4</sup> Nias is not strictly speaking part of Aceh, but of Sumatera Utara Province.

<sup>5</sup> Simeulue residents have a hereditary memory of a similar tsunami disaster in 1907 as well as many subsequent earthquakes, and understand that when the sea subsides after an earthquake they need to seek refuge on high ground immediately.

<sup>6</sup> Nias was already the poorest Kabupaten in Northern Sumatra.

<sup>7</sup> 30 000 vehicles, over 7 percent of total registered.



It is estimated that over 600 000 people in Aceh and Nias, about one-fourth of the total working population, have lost their jobs as a result of the disaster. The single most affected sector is that of fisheries and aquaculture (130 000 jobs before the disaster), which accounted for almost 70 percent of coastal employment<sup>8</sup>. For the agricultural sector as a whole, about 300 000 people are likely to be unemployed or underemployed. As a result of the disaster, the open unemployment rate in the districts affected, already higher than the national average, may reach up to 30 percent. Labour demand for rehabilitation activities --at relatively high daily wages<sup>9</sup>-- is strong, but there is often a gap between the skills required for rehabilitation work and those available locally, which means that the most unskilled and poorest members of the labour force may have little or no access to the rehabilitation-related jobs.

#### Overall impact in the primary sector

Agriculture represents a major share of the local economy: it accounted for 32 percent of the provincial GDP and nearly 48 percent of Aceh's labour force before the disaster. Almost all of the 503 coastal villages are rural and 70 percent of their inhabitants relied mostly on agriculture for their livelihoods, food crop production being the main activity, with much smaller contributions from horticulture, tree crops and animal husbandry. The first estimates of damage and longer-term losses to agriculture and irrigation<sup>10</sup> were reckoned at some US\$285 million, almost 80 percent of which are in estimated losses to future crops<sup>11</sup> (43 percent), damage to irrigation infrastructure (22 percent), and permanent land losses (13 percent). In the fisheries, sector, direct damage was estimated at about US\$94 million, almost half of which in the brackish water pond sub-sector. The value of losses in future fish production were assessed at some US\$381 million.

It is estimated that 465 coastal villages and as many as 92 000 farms and small agricultural enterprises have been partially or wholly destroyed. Prior to the disaster, these enterprises provided employment for approximately 160 000 people. Even though some of them have resumed some type of livelihood, the number of people affected in coastal villages is close to 300 000. Many coastal rice growing areas were devastated, with debris and layers of sediment of variable thickness, kind and origin deposited on top soils. Almost everywhere, the direct effects of the earthquake and the tsunami on agricultural lands were both more extensive and more severe along the West coast than among Northeastern coast Districts (see Table 2).

**Table 2 - Summary of land areas affected by the tsunami, by category <sup>1/</sup>**

<b>Areas/Degree of Damage</b>	<b>Total</b>	<b>Minor</b>	<b>Moderate</b>	<b>Severe</b>	<b>Lost</b>
East coast (%)		50	50	0	0
(ha)	8 300	4 150	4 150	0	0
West Coast (%)		10	20	60	10
(ha)	29 150	2 915	5 830	17 490	2 915
<b>Totals, rounded (ha)</b>	<b>37 500</b>	<b>7 100</b>	<b>10 000</b>	<b>17 500</b>	<b>2 900</b>

<sup>1/</sup> Ministry of Agriculture, FAO, Agriculture Sector Framework for Rehabilitation and Reconstruction of the Tsunami affected areas of Aceh and North Sumatra, Indonesia.

On the West coast, the February/March harvest – lost to the tsunami in affected areas—represents a greater share of annual paddy production. Many rural communities in the affected areas lost not only most of their farm assets (seeds, tools, livestock, cash, farm buildings, etc.), but also important agricultural infrastructure such as drainage and irrigation systems, rice mills, processing plants, palm oil terminal installations, agricultural markets, trader shops, research and training institutions, etc. and government extension services. The number of people affected, directly or indirectly by the disaster, among rice farming households, is estimated at nearly 250 000 (Table A.3), mostly in the West coast Districts of Aceh Jaya, the western part of Aceh Besar, Aceh Barat. On the Northeast coast, the densely populated District of Pidie also had large numbers of impacted rice farming households.

<sup>8</sup> Indonesia: notes on reconstruction, BAPPENAS, 2005.

<sup>9</sup> Rp. 35 000/day as opposed to the minimum daily wage of Rp. 20 000.

<sup>10</sup> Damage Assessment, CGI, January 2005.

<sup>11</sup> Apparently not expressed in net present value of future flows.

### Tree crops sub-sector

Main crops in this significant but shrinking sub-sector<sup>12</sup> can be roughly divided into:

- Coastal (coconut).
- Upland (oil palm, rubber, nutmeg, cocoa, fruit –banana, durian, papaya, etc.
- Highland (coffee).

A table showing the estimated total impact of the tsunami on selected tree crops is in the Annex.

Coconut: There are about 85 000 hectares in smallholdings in the province, mostly in local varieties, with a smaller acreage (nearly 6 000 ha) of hybrid coconut. About half of the total was in West coast Districts. Damage was estimated at 23 500 hectares (see table A.1).

Nutmeg: Here too, the overall impact (about 57 percent of smallholder plantations affected, see Table A.1) was felt mostly in West coast Districts.

Palm oil: An estimated 232 000 hectares of oil palm are cultivated in NAD, about one-third of which are managed by smallholders. Damage to oil palm plantation was small overall, affecting mostly smallholder production in Aceh Jaya, western Aceh Besar, small parts of Aceh Barat, either directly, or through the destruction of the main road on parts of the West coast.

Rubber: Total acreage is approximately 115 000 hectares, most of it in the hands of smallholders, with a good proportion in Aceh Timur, and not likely to be affected. In addition, this crop is less attractive than such alternatives as oil palm. Some of the most directly affected areas include:

- Simeulue - 700 hectares, probably very badly damaged.
- Aceh Jaya – 7 700 hectares; difficult to remove any available latex until the West coast road is rebuilt.

Cocoa: Smallholder cocoa production involves less than 20 000 hectares mostly on the Northeast coast.

Coffee: About three-quarters of the nearly 100 000 hectares of coffee are in the highlands of Aceh Tengah District, not affected by the tsunami. Over 6 000 hectares of coffee closer to coastal areas are said to be affected to some extent (1/3 or so) in West coast Districts, as well as in Pidie and Bireuen.

### Impact on Marine Fisheries and Aquaculture

The fisheries sector was a major economic activity in Aceh, contributing 6.5 percent of RGDP and providing direct employment for over 80 000 people, or 16 percent of the total coastal population. Fish output was estimated at 158 578 tonnes in 2003, comprising 133 976 tonnes captured from marine fishery and 24 602 tonnes harvested from aquaculture. Due to the lack of canning facility, most of the fish were consumed locally or exported unprocessed to overseas or to other parts of the country. The sector is relatively more important in terms of household income and food consumption in the following districts, where production per capital ranges from 98 to 62 kg/year: Sabang, Aceh Singkil, Simeulue, Aceh Timur, Aceh Selatan, Aceh Barat, and Bireuen.

Most of the fishing communities plied inshore waters with artisan craft and gear. A large number of canoes and small planked boats (almost 15 000) and inboard motor fishing boats are found along all coastal areas. Commercial fleets are located on the North and East Coast in Aceh Utara (Lhokseumawe), Aceh Timur (Langsa) and Bireuen, and on the West Coast in Aceh Barat (Meulaboh) and Aceh Selatan (TapakTuan).

In the fishery sector, 19 units (0.37 percent) of TPI (places of fish auction) were damaged<sup>13</sup>, and 32 out of 72 units of Fish Landing Base (PPI) scattered in 8 *kabupaten* experienced the impact of the tsunami<sup>14</sup>. On Nias Island, North Sumatra, 1 Fish Landing Base (PPI) was affected by the tsunami. A total of 9 563 out of 16 070 units of the fish-catching fleet in Aceh reportedly got damaged<sup>15</sup>. Most fishpond farms in the Province of NAD over 11 coastal *kabupaten/kota areas* experienced a direct impact of the earthquake and tsunami. An estimated 15-20 percent of fisher folk in the 18 *Kabupaten* died, much of the infrastructure and facilities have

<sup>12</sup> Estate plantations of oil palm were reduced at least by half by the conflict.

<sup>13</sup> Data from UNSYIAH for Aceh Reconstruction, 7 March 2005.

<sup>14</sup> Five in Kabupaten Aceh Besar, 6 in Kabupaten Pidie, 10 in Kabupaten Aceh Utara, and 8 in Kabupaten Aceh Barat.

<sup>15</sup> 3 969 units (41.5 percent) of boats without motor, 2 369 units (24.8 percent) of boat with outboard motor, and 3 225 units (33.7percent) of motor boats sized between < 5 GT and 50 GT.

been destroyed or severely damaged, and most of the community members have lost their houses, fishing boats and gear. The team estimates that well over 400 000 persons belong to the close families of those previously occupied mostly in fishing and brackish water aquaculture.

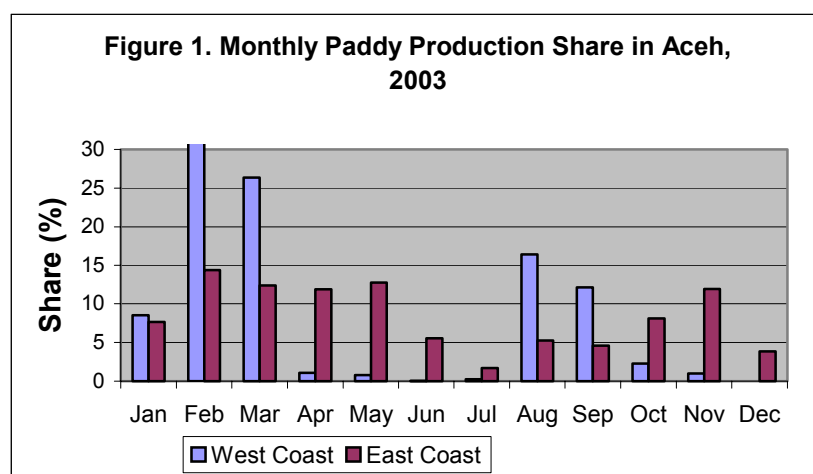
There were about 36 614 ha<sup>16</sup> of brackish water shrimp/fish ponds (*tambaks*), with a greater concentration in the Northeast coast Districts (Aceh Utara, Bireuen, Pidie). Some 25 840 hectares of these are estimated to have been damaged. Nearly 50 000 households and over 200 000 family members used to depend on these *tambaks* for their livelihood. The damage to the brackish water culture ponds is relatively dispersed, the worst affected districts being along the Northeastern coast: Aceh Timur, Aceh Utara, Bireuen, and Pidie. In total, the damage to brackish water aquaculture is estimated at Rp 466 billion (US\$46.6 million), which is about 50 percent of the total damage value to the fisheries sector.

Table A.4 provides a rough ranking of the relative combined loss of marine and aquaculture fisheries, by District. Banda Aceh and the West coast lead the list in terms of the extent of the damage, even though the total economic value of brackish water aquaculture was greater on the Northeast coast.

#### 4. OVERALL FOOD PRODUCTION AND SUPPLY SITUATION IN 2005/06

##### 4.1 Paddy production and supply situation in 2005/06

Paddy cropping pattern and seasonal production are mainly determined by irrigation system and rainfall. Based on the pattern of the monsoon winds, there are two main seasons in a year, referred to as “wet” and dry seasons. The wet season normally runs from October to March and produces some 60 percent of the annual rice crop and half of the annual maize, soybean and groundnut crops. The dry season covers the period of April to August/September when most of the remainder of the annual crop is produced. However, the cropping season/calendar varies by region (Figure 1).



Source: calculated by this mission

#### 2004/05 main season paddy production (planted in October 2004 and harvested in March/April 2005)

**In the affected areas:** the assessment on the impact of disaster on paddy production in terms of affected area and production has been discussed above.

**In non-affected areas:** During the mission’s field visits in the province, team members observed the standing crop in the coast area and discussed with local government officials, especially in Aceh Utara, Bireuen, Pidie, and Aceh Besar. The mission could not access the inland area due to the travel restrictions. However, the Mission assessed the Spot-4 satellite images, NOAA Climate Prediction Centre charts and data, and FAO Artemis GIEWS decadal vegetation indices as well as the local rainfall data. All indicate that the 2004/05 major season in Aceh non tsunami affected areas is normal.

<sup>16</sup> Data from the World Bank.

### 2005 secondary paddy production and prospect for 2005/06 main season

**In affected areas:** The secondary crop is relatively small, and paddy is planted in the area with irrigation schemes. Farmers on the West coast have started to clean drainage canals and repair damaged irrigation schemes, partly under work-for-cash programmes. Discussions with the farmers revealed that most of them are not optimistic that they would be able to regain their soil for restarting cultivation before the October 2005 cropping season. The Department of Agriculture in Lhoksumawe district feels that 80 percent of the affected land could be restored by October so that the farmers could cultivate during the following major paddy season if they can get assistance to clean up the damaged land and get assistance in tools, seeds, fertilizer.

An aggravating factor for farmers is the difficulties some of them face in reclaiming their land/ other assets, and having their claims recognized or enforced. Most farmers, fishermen and traders the Mission interviewed didn't have any financial reserves they could fall back on, and may still have debts at the bank or unofficial money lenders.

Most of the affected areas on the Northeast coast are under rainfed production and not for secondary paddy production in a normal year. Many farmers worry about the impact of salt on land and doubt they can start the production in October for the 2005/06 main season. It is expected that most of the production of the dry season will be lost in damaged areas.

**In non-affected areas:** Few changes are expected for dry season paddy production in non disaster-affected areas. The profitability of paddy production in Aceh has been reported as very good. A ban on imports of rice, including rice destined for World Food Programme projects, that was imposed by the central government in early 2004, was extended to the end of June 2005 (except for a brief period immediately following the Tsunami disaster) in order to protect farmers' prices and income for paddy production. The government introduced a purchase price of Rp 1 330/kg (US\$0.15/kg) for wet paddy. However, paddy price in the west coast is reported to be at Rp 1 600/kg (US\$0.18/kg). Farmers on the Northeast coast have received a slightly higher price at Rp 1 700/kg (US\$0.19/kg) due to its location close to Medan, the major wholesale market for the island of Sumatra. Paddy prices have largely been determined by private traders and rice millers operating in an open local market situation. On 1 March 2005, the GOI increased fuel prices by an average of 30 percent, but so far this has had no impact on rice prices.

Rainfall/irrigation conditions and input supply are normal in non-affected areas.

### Forecast of paddy production in 2005

The Mission estimates 2005 paddy production loss in Aceh from two seasons due to the tsunami at 196 359 tonnes (Table A.5) and 2005 paddy output is forecast at 1.47 million tonnes, some 12 percent below a normal year in Aceh.

### Rice supply/demand balance in 2005/06 (April/March)

The Mission's forecast of the rice supply/demand balance for 2005/06 by district is summarized in Table 3. There is a rice surplus over effective demand/ consumption of some 200 000 tonnes in 2005/06 for Aceh at provincial level. In spite of local crop losses, overall food availability in the affected region is, therefore, more than adequate to cover food needs. Given the relative large rice supplies available in the region, it is recommended that local purchases be made whenever possible in order to meet food aid requirements in the province in order to avoid domestic food markets distortions. The estimated balance is based on the following assumptions: population to grow at annual rate of 1.26 percent; half of missing persons due to earthquake and tsunami actually died in the disaster; a milling rate of 65 percent from paddy to rice. Requirement levels from past years are assumed for food consumption requirement (150 kg/caput of rice), feed, seed (40 kg/ha), post-harvest losses (7 percent), and buffer stock (5 percent of consumption).

**Table 3 - Rice supply and demand balance ('000 tonnes) in marketing year 2005/06 (April/March), by district**

District	Production	Food Use	Total Use	Balance
Banda Aceh	0.7	29.0	30.5	-29.8
Lhokseumawe	3.6	25.7	27.3	-23.7
Aceh Tengah	29.4	41.9	47.3	-17.9
Langsa	5.8	18.9	20.4	-14.6
Aceh Singkil	9.0	19.2	21.9	-12.9
Aceh Jaya	1.0	11.6	13.6	-12.6
Sabang	0.1	3.8	4.0	-3.9
Simeulue	7.9	9.1	11.5	-3.6
Aceh Barat	47.9	27.9	34.3	13.6
Aceh Selatan	52.0	30.4	37.3	14.7
Aceh Tenggara	45.1	23.2	28.5	16.6
Aceh Tamiang	60.7	34.6	42.1	18.6
Gayo Lues	37.1	10.2	15.2	21.9
Pidie	119.9	78.9	96.7	23.2
Aceh Timur	89.5	51.0	63.6	25.9
Bireuen	96.1	55.4	68.7	27.4
Nagan Raya	63.8	21.9	29.5	34.3
Aceh Barat Daya	61.9	17.7	25.5	36.4
Aceh Utara	140	80.1	99.4	40.6
Aceh Besar	78.3	19.9	29.2	49.1
<b>NAD</b>	<b>949.8</b>	<b>610.4</b>	<b>746.5</b>	<b>203.3</b>

Source: Calculated by this Mission

#### **4.2 Prospect for supply and demand for other major food in 2005/06**

##### Prospect for supply and demand for other cereals in 2005/06

In addition to paddy production, the province produced 67 386 tonnes of maize, 75 286 tonnes of cassava, and 18 697 tonnes of soybeans in 2003. Some 70 percent maize is produced in the district of Aceh Tenggara and production is very limited in other districts and mainly used for feed. The damage due to the tsunami is estimated very small (571 hectares in Aceh Besar, 451 hectares in Nagan Raya, 350 hectares in Pidie, 331 hectares in Bireuen, 331 hectares in Aceh Utara). The maize supply and demand situation in 2005/06 is expected to be unchanged from the situation before the disaster. Damage to cassava and soybeans was also very limited (1 000 hectares of soybeans and 300 hectares of cassava). Soybeans is mainly used for food as tempe/tofu.

##### Prospect for fisheries production and consumption in 2005/06

The Mission assumes that some 20 percent damaged boats can return to production in 2005. Fish output in 2005 is estimated at 67 594 tonnes for marine fishing and 14 422 tonnes for brackish water culture (50 percent and 41 percent below normal). Based on this output and projected population, per capita fish output will be reduced from some 38 kg in a normal year to some 20 kg in 2005. The worst affected districts in fisheries sector include Sabang (per capita fish output down from 105 kg to 53 kg), Aceh Barat (from 61 kg to 13 kg), Aceh Besar (from 44 kg to 20 kg), and Banda Aceh (from 40 kg to 9 kg).

##### Prospect for livestock production and consumption in 2005/06

Aceh is one of the few provinces in Indonesia where livestock numbers are still increasing. Most of the large and small ruminants (cattle, buffaloes, goats, sheep) are concentrated on the Northeast and north coasts, with smaller numbers found on the West coast. But poultry (meat and eggs) are popular on the west coast (Aceh Barat and Aceh Besar). Many farmers were keeping a few livestock to cater for their basic daily subsistence needs (milking cows, goats, chicken, ducks, etc.), and many farmers were also keeping buffaloes as farm animal power. Most of these animals were lost in the most affected areas. Some cattle could be observed still alive in the less-affected areas but were seen starving in a desperate search for grazing land are now burnt and rotting due to soil and water salinity.

## **5. IMPACT ON REGIONAL LIVELIHOODS, BY MAIN PRODUCTION OR SOCIO-ECONOMIC SYSTEM**

### **5.1 Summary**

NAD has a diversified and potentially rich primary sector; in describing main livelihood systems, we opted for geographical areas with somewhat homogeneous ecological and livelihood systems. They are then described in terms of direct or indirect impact from the disaster, and of strategies or specific actions to support the resumption of livelihoods. They include:

- Kota Banda Aceh and periphery.
- West coast - subsistence and low income production systems.
- West coast - middle income, agro-industrial/estate sub-sectors.
- The special case of the islands of Nias, Simeulue, Banyak, Singkil.
- Northeast – coastal subsistence and low income production systems.
- East coast - middle income, agro-industrial, industrial sub-sectors.
- Highlands: Aceh Tengah, other highland districts.

### **5.2 Kota Banda Aceh and periphery**

The provincial capital was --and remains-- the centre of economic activity; it came a distant second after Medan in Northern Sumatra as a pole of business activity and was challenged by Leukhsomawe, the main NAD locus of the natural gas and oil based mineral industry. However, Banda Aceh's rising political influence allowed the provincial capital to hold its own in business terms, and even enjoy relative growth. The economy of Banda Aceh and periphery is primary sector and services-oriented (agriculture, fishing, aquaculture, forestry), with some agro-processing, and limited manufacturing. A relatively high number of civil servants, and significant public spending also provided a boost to the economy.

The fishing harbour, cargo port, waterfront and downtown areas have been destroyed or suffered major damage with significant loss of private and business property and other assets, loss of business, transport and communications infrastructure, destruction of markets and produce storage areas. Parts of the city are levelled to the ground, whereas many other neighbourhoods show little or no direct impact from the disaster. Still, a number of families in parts of town spared by the tsunami each manage to host up to ten or twelve relatives and social infrastructure and services remain severely disrupted. Some of the surviving shops (especially construction material, clothing, household items, even motorcycles) are doing a brisk business, but most shop owners do not expect this to go on much beyond the end of May: while a small fraction of the population is able to re-equip itself in basic goods, most of them will not be able to do so for a long time.

On the outskirts of town, many paddy fields are unaffected and were harvested in March. Virtually all the *tambaks* located Northeast of the city, however, have been destroyed. At this stage, it is not known how many of the people who worked on these ponds survived and will be looking for alternative means of livelihood.

Most fresh produce markets have relocated to new sites, with smaller and more basic retail display and storage facilities. Wholesalers complain of a lack of access to good parking and unloading sites for their trucks, and a dire shortage of storage capacity. Most traders report little change in current prices for vegetables, fruit, smoked fish, compared to the pre-tsunami situation: the lower demand and poorer quality of produce make up for higher transport and other transaction costs. Some trade routes supplying the city have shifted somewhat. Obviously, the sugar, cement and rice flows from Banda Aceh to the West coast beyond Lamno have been interrupted. The provincial capital's supply of fruit and vegetables has also shifted, as short-haul trade from Aceh Tengah through Bireuen is replacing some of the long-distance trade from Medan (see box below).

*The Medan area not only produces fruit and vegetables, it is also a major collection point and secondary market for vegetables and fruit from the Southeastern highland Districts, and from parts of Sumatera Utara. It was often more practical to rely on the highly developed trade and transport infrastructure in Medan and arrange for a non-stop and relatively fast trip back to Banda Aceh. A typical ten-ton truck specializing in the transport of fruit from Medan to Banda Aceh takes 12 hours to make the trip; the crew have to leave Medan at four in the afternoon to be at the Banda Aceh market around four the following morning. In the old market, they used to sell produce right off the truck, and leave the remainder in a storage building near the main market. At the market's new site, there is no storage, so the truck has to keep the cargo on board and remain in Banda Aceh until all produce is sold to retailers. This -- and generally lower demand -- has reduced the number of weekly trips to Medan from three to two.*

There is an urgent need to reconstruct some unloading and storage areas for the main markets in Banda Aceh. In the meantime, the lack of storage is likely to increase the reliance on smaller-scale transport of fresh produce, and hence promote more proximity trade between Banda Aceh and surrounding areas. This will imply smaller trucks, the wholesalers' increasing reliance on short-haul rental or even public transport to buy produce from Pidie, Bireuen, and the highlands --via the road linking the city of Bireuen to the highlands of Aceh Tengah -- a five-hour drive.

### **5.3 West coast - subsistence and low income production systems**

The subsistence and low income production systems along the West coast included the westernmost and poorer part of Aceh Besar, some of which suffered tremendous casualties during the tsunami event (*Kecamatan* Leupung, for instance). They also include the narrow coastal fringe of Aceh Jaya, characterized mainly by small-scale fishing, estuarial paddy production, smallholder coconut plantations. With an average per capita annual income of US\$270, Aceh Jaya is one of the poorest *Kabupaten* in Aceh Province<sup>17</sup>. These coastal areas, together with Nias and Simeulue, are arguably the worst hit in the whole province, in all respects: very low levels of income, great loss of life, destruction of fishing craft, gear, and paddy land because of their proximity to the shoreline, near total loss of smallholder coconut plantations, loss of coastal road linking them to the rest of the province. Aceh Jaya is by far the District with the lowest anticipated percentage of paddy production in 2005 compared to normal (3 percent, compared to nearly 80 percent overall in Aceh Barat and Nagan Raya). In many places, the fate of some of the original population is still unclear.

Communities located a little further upland, and not involved in fishing (as in Kreung Kala, for instance) have fared better. There has been loss of life, destruction of housing, damage to parts of the farmland and irrigation systems, but surviving families --even if they are still in tent camps--are eager to resume farming and other economic activities. The upland systems tend to combine paddy, fruit trees (durian, banana, coffee, etc.) and some livestock.

Farmers express the following needs: assistance for rehabilitation of irrigation systems, seeds, fertilizer and hand tractors to prepare fields<sup>18</sup>. They estimate they could be done with irrigation rehabilitation work and start the new crop for the main October 2005 planting season. However, Aceh Jaya as a District faces an overall rice deficit in the 2005-2006 marketing year.

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<sup>17</sup> Only two Districts rank lower.

<sup>18</sup> The cost of renting a hand tractor for field preparation is about Rp. 60/m2.

**Kreung Kala's rebuilt village shop**

*The owner used to have a much bigger shop in the same community, but it was completely destroyed by the Tsunami. The new shop is rebuilt on the site of his former house in Kreung Kala, also destroyed, with salvaged material from a secondary residence further upland. He had reportedly bought his former shop with his own money about three years earlier.*

*The new business is a small-roadside one-room shop stocked with basic needs for rural communities. There are few customers, a high proportion being from the military and they have little purchasing power (the former community members are all in the camp set up on higher ground). The shop owner also has 0.5 hectares of paddy fields, actually his main source of income, and he expects to start farming again soon. He also has coffee and banana trees, which were destroyed but that he would replant, given access to seedlings. There are many others in the same situation. Alternative tree crops being mentioned include: rambutan, cocoa. He insists on the fact that assistance provided to the community should come directly to them, and in a transparent manner.*

**5.4 West coast - middle income, agro-industrial/estate sub-sectors**

The relatively richer parts of the West coast include the Districts of Aceh Barat – with the city of Meulaboh - Nagan Raya, a District with diversified agriculture and extensive tree crop estates, Aceh Barat Daya with a previously strong fishery and the 'rice basket' of Blangpidie, as well as Aceh Selatan and Singkil, where the fishing sector, though affected by the tsunami, has remained active and now supplies the major part of the West coast in fish. These Districts, with per capita annual incomes ranging from US\$360 to US\$450 are in the mid-range of incomes for the Province. Here too, the expectations are that in 2005, total District paddy production will be nearly 80 percent of normal.

In Aceh Barat, the port city of Meulaboh was and remains the main centre of economic activity on the west Coast of Aceh province. The economy is based on agriculture, especially since the local gold mine shut down in 1994. Fishing and rice production dominate, with some logging, coconut and other tree crop production (rubber and oil palm). Meulaboh has historically been an economic magnet for people seeking employment and business opportunities in the province, but the local economy was hit hard by the Tsunami, which destroyed most of the downtown market and business districts, including several bank branches. In other coastal communities, the single local gasoline/diesel stations have also been destroyed.

The larger estate plantations of rubber and oil palm, as well as more extensive paddy production, are actually in Nagan Raya district, but Meulaboh still acts as an economic magnet for the west coast and outlying islands. A small proportion of the local surplus, mostly fish from the Aceh Barat and Nagan Raya districts, used to flow Northward to Banda Aceh and Aceh Besar districts before the tsunami, but this is obviously no longer the case. Rather, virtually all trade takes place with points further south, including Aceh Selatan, and with Medan, via the road which goes through Aceh Singkil and Sumatera Utara province -- a 12-hour trip on a reasonably good road. Previous to the tsunami, Banda Aceh had been growing in relative economic importance (sugar, cement, and, occasionally, rice came to Meulaboh from Banda Aceh) but Medan still dominates the economy of northern Sumatra. In the post-tsunami era, Medan has strengthened its position, supplying Banda Aceh and Meulaboh with fruit, vegetables, construction and consumer goods, and continuing to serve as the export point for palm oil.

There is little fishing going on in Meulaboh at this time, although the fishermen's cooperative is re-establishing its roster. Most of the fish sold in local markets comes from the sub-district of Blangpidie, in Aceh Selatan. Choice is limited and prices have increased by at least 25 percent since late December. The price of ice doubled after the December 26 earthquake destroyed the Meulaboh ice plant.

Most of the estate plantations on the west coast (rubber, oil palm) are in Nagan Raya, and to a lesser extent, in Aceh Barat districts. Palm oil is currently more attractive than latex and some of the estate companies are switching from rubber to oil palm plantations. A foreign company, SOTFINDO, produces palm oil mostly in Nagan Raya, but the oil is actually stored in Meulaboh, considered a better site for safekeeping. The oil is then transferred to tanker trucks which take the oil back from Meulaboh through Nagan Raya to Aceh Selatan and then across the island to Medan, for export. Nearly one hundred of these tanker trucks are based in Meulaboh, devoted entirely to palm oil transport to Medan.



**Restarting a small business in Lapang sub-district, Meulaboh**

*The family had a three-story building and shop in downtown Meulaboh, near the bus station. The building was totally destroyed by the Tsunami but they were able to salvage about ten percent of the stock. The business has been relocated in a small wooden shop rented for Rp.20 000/day in the outlying suburb of Johan Pahlawan. The shop is stocked with dry goods for everyday needs, obtained on credit from local wholesale suppliers. These wholesalers were also seriously affected by the Tsunami, but they have a stronger and more diversified financial basis, and managed to get credit from yet larger wholesalers and other business partners in Medan. This shop owner, like most of the more formal businesses, had borrowed from a local bank, but with part of a loan outstanding and destruction of the old business, the bank is not willing to extend any further credit.*

*Prices had increased sharply in the first weeks following the Tsunami, but have now fallen back to 'normal' or nearly pre-Tsunami levels. Only sugar is reportedly more expensive (sugar remains one of the few commodities typically imported from Banda Aceh rather than from Medan, and the West coast road has been cut since late December).*

## **5.5 The Special case of the Islands of Simeulue, Banyak, Nias**

### Simeulue

The island population is just over 78 000 divided into eight kecamatan, ranked among the very poorest in Aceh Province. It was the nearest landmass to the epicentre of the earthquake. While damage to property and infrastructure have been severe, human losses were very low (seven people reportedly died); Simeulue residents have hereditary memory of a similar tsunami disaster in 1907, and understand that when the sea subsides after an earthquake, they need to evacuate to high ground immediately. However, about half of houses on the island have been destroyed or so badly damaged as to be uninhabitable. An estimated 20 000 people have thus lost their homes and were forced into temporary shelters.

The island of Simeulue recently acquired the status of *Kabupaten*, and received very substantial investments in public infrastructure, including roads and bridges. Some of the new structures have survived the disaster, but most pre-existing bridges were washed away.

Most villages in Simeulue are on the coast, with fishing as a major occupation. The majority of boats were in port at the time of the tsunami, and many were damaged. There is likely to be significant damage to coral reefs, which will affect fish feeding and breeding grounds in the longer term. Coastal plantations and paddy fields were also contaminated by salt water inundation or washed away. In several villages, half of the breadfruit plants were destroyed and the remainder may die as a result of salt water poisoning. All coconut trees have been either uprooted or show stress from inundation, while virtually all taro and papaya plantations have been destroyed. Simeulue grew about two-thirds of all cloves produced in the Province, and it is feared damage to the clove plantations was also extensive.

While water buffaloes felt the threat and moved inland in time to avoid drowning, much of the smaller livestock perished. However, with no fishing going on, buffalo have been slaughtered to provide animal protein. Many of the fresh water wells have been contaminated; the combination of poor housing, lack of sanitation, inadequate nutrition is posing very serious public health problems on all parts of the island.

### Banyak Archipelago

This small group of islands, with a population of about 7 500 is part of the Singkil *Kabupaten*. Fishing boats have been lost, and fishing grounds disturbed through turbidity and destruction of coral reefs. The Banyak lobster fishery has also been damaged through loss of boats, pots and lobster beds. The remainder of the economy is based on coprah, since some of the islands are uninhabited and used mostly for coconut plantations (coprah normally being processed in Nias). People are reportedly relying on food stress crops commonly used in Indonesia as an indicator of food insecurity. The Banyak group of islands is very close to the epicentre of the 28 March earthquake, and there are unconfirmed reports that an additional 300 persons could have died as a direct result.

## Nias

The island of Nias is included in Sumatera Utara Province. It is the largest and by far most populated (over three-quarters of a million people) off the west coast of Sumatra. The island, which had already suffered from the 26 December disaster, was devastated by the earthquake of 28 March. Over 1 000 people have reportedly perished, with 90 percent of the residents affected by the quake, and 80 percent of homes and buildings destroyed in Gunung Sitoli, the capital. The public health and food security status of the population is extremely critical.

## Northeast coast

Generally speaking, the Northeast coast includes Districts with the highest per capita income in Aceh Province<sup>19</sup> (only Aceh Tengah ranks higher). With diversified agricultural sectors, Aceh Utara, Pidie, Bireuen and Aceh Timur are the most populous Districts of the Province. The oil and gas-based industries of Lohkseumawe obviously add to the Northeast coast's relative advantage over the rest of NAD.

The direct effects of the disaster were also much lower than on the West coast. Total damage to rice paddy involved over 11 600 hectares (with very little classified as 'severe') compared to the 29 150 affected on the West coast. For this reason, anticipated paddy production in 2005/06 is estimated to range from 91 to 96 percent of normal in Pidie, Bireuen, Aceh Utara and Aceh Timur. These are all, in any case, historically rice surplus Districts.

The impact on brackish water aquaculture, more extensive than in the West, was also lighter, ranging from 40-50 percent, as opposed to 100 percent in the West.

Finally, the proportion of people living on the coast in Northeastern Districts (on the average less than ten percent) is much lower than on the West coast (Aceh Jaya: 20 percent, Aceh Selatan: 34 percent).

## Subsistence and low income production systems

There are, however, two important caveats to this relatively positive picture.

First, the Northeast coast Districts do have a narrow coastal belt of low-income households involved in a combination of fishing, aquaculture, paddy farming and artisan salt production. Because the lower income households live closer to the coast, they suffered most from the destruction of private houses and other assets. The impact of the disaster on fishing families in the Northeast was great, with 100 percent of fishing boats and gear lost or severely damaged in Pidie, Bireuen, the fishing port of Kota Lohkseumawe, and Aceh Utara. In terms of marine fisheries, the Northeast and West coast were nearly equivalent (just under 70 000 tonnes per year each), so the number of affected people in marine fishery households on the Northeast coast is consistent with the loss of about 13 000 full-time jobs. Losses to previous employment in brackish water pond culture may reach 20 000.

Secondly, a large number of people moved after the disaster from the West to the Northeast coast, putting additional pressure on Districts with already high population densities. It is not known just how many people moved eastwards (some are in camps, others are not, some people in camps may come from other parts of the Province), but there are more camps and TLCs on the Northeast than on the West side<sup>20</sup>. Pidie, for example, is one of the most densely populated Districts. This area has long had a reputation for being the source of migration within NAD, so that many people had actually left Pidie to resettle on the less populated West coast (e.g. Calang, Aceh Besar), or to seek employment in the Meulaboh area. Others had moved to Aceh Tengah. After the disaster, many of the survivors returned to their original areas, hosted by relatives.

With little opportunity in marine fisheries in the short- and medium-term, destroyed *tambaks*, damage to the low productivity, typically single annual season paddy fields, the poorer coastal populations will be hard put to find gainful employment. Some of them may move inland where additional labour is welcome at harvest time, but in this short-term solution they are likely to compete with returnees. There is some potential in traditional handicrafts or small-scale food processing (machetes, cloth weaving, melinjo crackers), but not much. Another option is to resume/take up artisan salt production.

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<sup>19</sup> Annual per capita income in Aceh Utara, for example, is over twice that of Aceh Jaya.

<sup>20</sup> Another reason is that it is easier to establish camps and to supply them in this part of the Province.

**Salt production, Aceh Utara, Bireuen**

*This artisan activity appears to be quite common along this part of the Northeast coast. People in Matang Tunong reported that in a close cluster of three villages, about 400 people were involved in salt production. The process involves digging shallow pits where sea water stagnates; some infiltration and evaporation do a first concentrate of salt in water. The remainder is poured into 55-gallon drums cut lengthwise; a fire is lit under the drums to boil off water. Each operator can make between 30 and 60 kg of salt per day, which is sold for about Rp. 2 500/kg. The gross returns to such an operation are roughly US\$150-US\$200 per month.*

North-East coast - middle income, agro-industrial sub-sectors

Indonesia is the world's leading exporter of liquefied natural gas, LNG, with about one-quarter of the global market share. The first shipments from the Arun plant in North Sumatra, near the second largest city in NAD, Lohseumawe, took place in 1978 under long-term contracts between state-owned Pertamina and its partners and customers. Early in 2001, Exxon Mobil Indonesia was forced to suspend natural gas production for a four-month period from its onshore Arun, South Lhoksukon and Pase fields, due to deteriorating security. This also forced the Arun LNG plant, the fertilizer plants PT Pupuk Iskandar Muda (PIM) and PT ASEAN Aceh Fertilizer, AAF<sup>21</sup>, and a pulp paper plant to suspend operations as well. Exxon Mobil continued to produce gas from its North Sumatra Offshore (NSO) fields, but onshore production has remained very low, especially since most of the reserves of the Arun gas fields have been exhausted. Indonesia and its partners have turned to alternative sources of gas in Bontang, East Kalimantan, and Tangguh, Irian Jaya.

Given the strong domestic and Asian demand for fertilizer, and the abundant supply of natural gas in Indonesia, the potential for ammonia and urea production is great and the development of the fertilizer industry has been a Government priority. However, the 1999 financial crisis put several large fertilizer projects on hold until recently. The fact that the fertilizer industry has to purchase gas in US dollars (even at a subsidized price) and sells fertilizer in Rupiah to farmers has put additional pressure on several plants. Finally, in Northern Sumatra, the insecurity-related reduction in gas supply has been threatening ammonia and urea production. PIM has managed to keep production of urea in the neighbourhood of half a million tonnes between 1999 and 2003 (ammonia being about one-third of a million tonnes per year in the same period), but there are real concerns about their capacity to go on. PT Asean Aceh Fertilizer (AAF), for one, ceased operations in mid-2004 and its employees were absorbed by the two state-run fertiliser firms PT Pupuk Iskandar Muda, (PIM I, II). Industry sources recently reported that Malaysia, Singapore and Thailand may withdraw from the AAF joint venture due to the prolonged gas supply problems<sup>22</sup>.

The implications for local employment and income are clear. PT Arun, for one, has been providing not only jobs, but also housing, schools, health care. The total workforce, including employees of local contractors providing various services to the plant were reckoned to be nearly 7 000. One can estimate the total workforce in other petro-chemical enterprises at about 3 000<sup>23</sup>.

Highlands: Aceh Tengah

The central highlands District of Aceh Tengah has the highest annual per capita income in NAD<sup>24</sup>. At 47 inhabitants/km<sup>2</sup> it is well below the provincial average of 74. As mentioned above, Aceh Tengah is NAD's main coffee producer, with about 74 000 hectares. The *Kabupaten* also produces most of the cool weather vegetable and fruit for the Province, including onion, garlic, cabbage, carrots, potatoes, green beans, chilli peppers, avocados, and even a good share of the pineapple and oranges produced in Aceh Province. Other highland Districts (Gayo Lues, Aceh Tenggara) tend to have similar production, but on a much smaller scale. Overall, the Province usually has a deficit in vegetable production, the deficit coming from nearby highland districts of Sumatera Utara.

Although remote –and off-limits to outsiders—the District is linked to the Northeast coast by a relatively good road to Bireuen (five-hour journey) and through a longer trip to the Meulaboh area on the West coast.

<sup>21</sup> A joint venture between Indonesia (60 percent), Malaysia, the Philippines, Thailand (13 percent each) and Singapore (1 percent).

<sup>22</sup> AAF has reportedly been losing about US\$30 million per year since 2001.

<sup>23</sup> Employees of PIM in 2003: 1 232.

<sup>24</sup> US\$557/year – *BPS Aceh in Figures*, 2003.

A significant number of refugees from the disaster are reported to have fled to Aceh Tengah, but detailed information is not yet available.

## **6. VULNERABILITY/NEEDS ASSESSMENT**

### **6.1 General**

Various assessments have been undertaken since early January by WFP, UN and NGO agencies, to estimate the damage to livelihoods and assets, and to determine the type of activities needed to restore people's livelihoods and access to food. The Mission used the outcomes of these exercises as well as the experiences of staff in the various WFP sub-offices on the West and East coasts as starting point, and complemented this through interviews with affected people and communities in Banda Aceh, Lhong, Meulaboh, and Calang on the West coast; and Lhoksumawe, Tanah Pasir (Aceh Utara), Bireuen and Pidie on the East Coast. Discussions were also held with Government, UN and NGO agencies in Banda Aceh and their representatives in the affected areas.

### **6.2 Overall food security and livelihood situation**

#### Before the Tsunami

Despite the overall food production levels, the population's access to food was insufficient even before the Tsunami, due to the lack of purchasing power, the remoteness of many areas from markets, and the prevailing civil conflict situation. According to 2003 estimates of the Badan Pusat Statistik (BPS), almost 30 percent of the population in Aceh were living below the poverty line, as against the national average of 17.4 percent. Aceh is the third worst province in terms of incidence of poverty, following Papua and Maluku. The number of people below the poverty line increased sharply, from 595 000 in 2000 to 1.25 million in 2003. The BPS also categorized 580 000 people as ultra poor (those who are living far below the poverty line) in the province. The nutrition situation was also lagging far behind the national average. More than 35 percent of children under 5 were underweight (national average 27 percent)<sup>25</sup>. The highest prevalence of underweight was recorded in Aceh Besar, Aceh Barat, Pidie and Simeulue districts. Inappropriate food practices contributed to child malnutrition.

WFP, in collaboration with the National Food Security Council, GoRI, prepared 'A Food Insecurity Atlas of Indonesia' in 2004-05, analyzing the incidence of household food insecurity on the basis of 10 indicators at district level<sup>26</sup>. The analysis identified the western districts of Aceh and the island of Simeulue as the most food insecure, largely due to problems related to food access and food utilization<sup>27</sup> (Map 1 attached).

#### After the Tsunami

According to the BAKORNAS, GORI, 514 000 people were displaced by the earthquake and tsunami (before the earthquake of 28 March in Nias and Simeulue districts that displaced approximately 200 000 people) and are currently living in make shift camps/TLCs/with host families.

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<sup>25</sup> BPS, 2003.

<sup>26</sup> The indicators used for the Atlas were mainly pertaining to food availability, food access and food utilization. The reference year for the analysis was 2002-2003.

<sup>27</sup> NB: the population density on the East coast is much higher than on the West coast, hence the high absolute number of food insecure people on the East coast.

**Table 4 - Location of Internally Displaced Persons (IDP), as of 18 March 2005**

District/Urban Centre	Total IDP		
	Camps/Host Families	Temporary Living Centres	Total
Banda Aceh	48 360	1 561	49 921
Aceh Besar	91 157	6 328	97 485
Sabang	3 712		3 712
Pidie	74 404	11 456	85 860
Bireuen	46 768	3 035	49 803
Aceh Utara	26 662	450	27 112
Lhoksumawe	952	1 542	2 494
Aceh Timur	13 182	527	13 709
Langsa	6 156		6 156
Aceh Tamiang	3 224		3 224
Aceh Jaya	38 217	2 205	40 422
Aceh Barat	70 804	1 885	72 689
Nagan Raya	16 560	480	17 040
Aceh Barat Daya	3 480		3 480
Aceh Selatan	16 148		16 148
Aceh Singkil		105	105
Simeulue	18 009		18 009
Bener Meriah	648		648
Aceh Tengah	5 288		5 288
Gayo Lues	234		234
Aceh Tenggara	611		611
<b>Total</b>	<b>484 576</b>	<b>29 574</b>	<b>514 150</b>

Source: Report from Lhokseumawe Executing Unit I on 18 March 2005, revision to number of refugees in temporary dwelling, SATKORLAK, March 2005.

Based on the BPS estimate of a working population of more than 2.2 million in various sectors in Aceh, approximately 60 percent are from the worst affected 11 districts and 3 urban centres. Assuming that 25 percent of these districts/urban centres were affected by the Tsunami (i.e., all coastal areas), we estimate that there are more than 330 000 working people, whose livelihoods are affected by the disaster, with almost 50 percent of them from the agriculture and fisheries sectors.

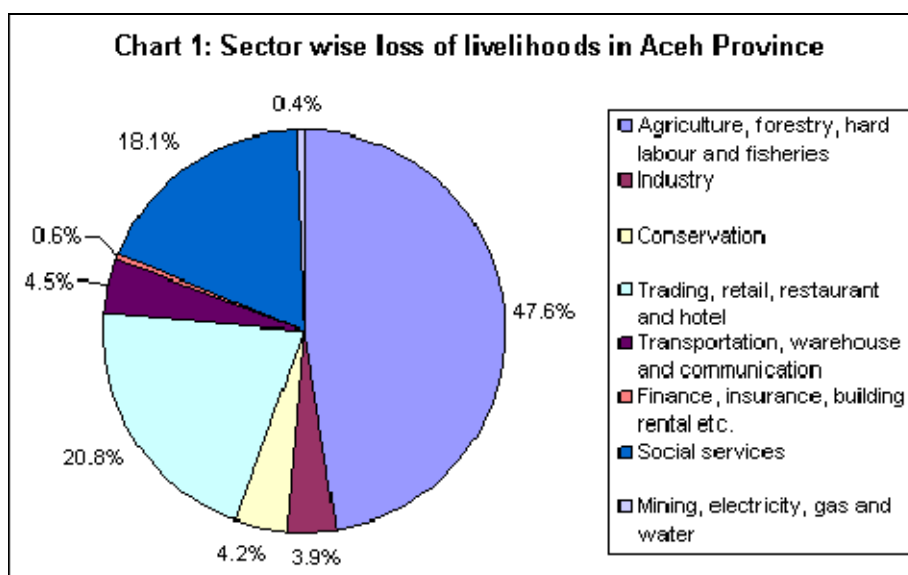
**Table 5: Livelihood group-wise impact on employment (in Aceh province) 1/**

	No. of working people (pre-tsunami)	Estimated no. of people whose livelihoods are affected in coastal villages of 11 districts and 3 urban (with 2% of the work force assumed to be dead and/or missing) 2/
Agriculture, forestry, hard labour and fisheries	1 073 454	157 798
Industry	87 636	12 882
Conservation	93 705	13 775
Trading, retail, restaurant and hotel	468 057	68 804
Transportation, warehouse and communication	101 292	14 890
Finance, insurance, building rental etc.	12 756	1 875
Social services	407 130	59 848
Mining, electricity, gas and water	10 125	1 488
<b>Total no. of working people</b>	<b>2 254 155</b> <b>(out of 820 000 households in the province)</b>	<b>331 360</b> <b>(equivalent to 123 000 households with approx 2.7 persons per household in working population)</b>

1/ This is estimation of directly impacted workers. We also have noticed a significant proportion of people affected indirectly as well.

2/ Based on pre-tsunami employment status, 2003, we estimated the number of people employed in various sectors in the coastal villages (25 percent of the villages in affected districts in Aceh are coastal).

Source: No. of working people data from BAPPENAS document 'Rencana Induk - Rehabilitasi dan Rekonstruksi NAD dan Nias-SUMUT', March 2005.



From Table 5 the Mission concludes that the livelihoods of approximately 123 000 households have been directly affected by the disaster. This further indicates that in Aceh province approximately 600 000 people would benefit from food and non-food assistance that is targeted at improving household and intra household food security.

Although the overall food availability has not suffered any significant setback, the lack of access to food has been aggravated for not only the previously vulnerable population, but also for some of those who were relatively well off before the disaster. Productive assets were destroyed or made unusable, resulting in the loss of livelihoods, both directly (for the owners) and indirectly (for those employed on these assets). Further, people depending on non-primary livelihood sectors, such as small traders and craftsmen, are also feeling the effects of reduced overall economic activity.

In addition to reduced/ lost food production and reduced incomes, food prices rose steeply immediately after the disaster. During the Mission's visit, the prices of most of the commodities were found to be higher than normal, although they are largely stabilized now, except for dried fish. Table 6 shows the pre-tsunami and the current prices in the local markets along the West and East coasts.

**Table 6: Prices of major commodities in local markets**

Commodities	West coast (Rp.)		East coast (Rp.)	
	Pre-Tsunami	Current	Pre-Tsunami	Current
Rice (per kg.)	3 500-4 000	4 000-5 000	3 000-3 500	4 000
Egg (per pc.)	500	700-1 000	500	700-800
Dried Fish (per kg.)	10 000	25 000-40 000	10 000	15 000-25 000
Sugar (per kg.)	3 000-4 000	5 500-8 000	5 000-6 000	5 500-6 500

Source: This mission's assessment.

Most households used to depend on a mosaic of sources of food and income, with agriculture and fisheries being the most important ones, complemented by other activities. The effects of the Tsunami on livelihoods depend on (i) the pre-Tsunami livelihood patterns and (ii) the way the Tsunami hit the various geographic zones (i.e. the West and the East coasts).

#### West Coast Livelihoods and household food security

##### Agriculture

Most households own some cultivable land. From discussions with district level officials and focus groups in villages and towns, it transpired that almost two-thirds of the west coast livelihoods was based on agriculture. Landlessness was very low, and the land-human ratio high.

Farmers of all the coastal villages are affected in various degrees by the Tsunami. Immediate economic losses such as loss of standing crops, the inability to sow paddy in the forthcoming cropping season, the loss

of agricultural implements, seeds, bullocks, and the death of workers within the family, are aggravated by structural damage to the land itself due to soil inundation, leaving thick layers of saline mud unsuitable for cultivation, and destruction of irrigation canals. Recuperating from these losses will take many years.

Another factor that may delay the full recovery of agricultural land is the increase in the daily wage of labourers due to the influx of (cash-based) clean up and rehabilitation activities. Cash-based recovery programmes typically offer a daily wage of 35 000 – 50 000 per day, compared with the prevailing rate of 25 000 before the Tsunami. This would result in reduced availability of labour for agricultural activities and increased agricultural wages. This may, however, be a temporary issue, as it is not certain for how long these cash-based programmes will continue also how long the current high wage rates will continue once the immediate cleaning up work is completed. Higher labour cost combined with lower land productivity could delay the recovery of the affected farmers; and as most of these farmers were net cereal buyers before the Tsunami, their food security may remain a matter of concern.

*Pak Arifin lost 2 members of his family, but wants to go back to his agricultural field to start growing paddy once again. His land in Krueng Kala village, near Lhong in Aceh Besar district is badly damaged and also the village irrigation canal needs repairing. He feels that if the government or some other agency provides a tractor to the village, seed and fertilizer support to all the farmers, and assistance in repairing the canal, they would be ready to resume their cultivation in October. The tractor would help the farmers in mixing their top layer of muddy deposit left by the tsunami with the fertile soil that lies below this layer. A few rain showers would help them washing away the salt deposits. Then the seed and fertilizer support along with the revived irrigation system will be sufficient for them to restart cultivation. Of course they feel that they would need a few years to regain the pre-tsunami productivity.*

*Achmad, a daily wage earner, working in the agricultural field of someone else, on the other hand, has a very uncertain future. The land he used to till is damaged and he doesn't know when the land-owner would resume cultivation. He migrated two years back from his village in the highlands, which was badly affected by the ongoing conflict, with the hope of rebuilding his life in an area that is fertile and less impacted by the conflict. But now he has no option but to wait for better times.*

Informal rural credit markets exist and many farmers usually borrow cash from moneylenders, for reimbursement immediately after the harvest. There are indications that moneylenders, in order to retain their market, are prepared to wipe out the standing debts and to provide fresh loans. In addition to taking credit, farmers resort to alternate coping strategies by working in other sectors as daily workers and by entering into petty trade. In Calang, one of the worst hit areas, the Mission spoke with affected farmer families who had temporarily moved from their land and had opened grocery/vegetable/tools shops, hoping to earn money fast so that they could restore their primary livelihoods.

### Fishery

Depending on the proximity to the coastline, almost 10-20 percent of the households were exclusively engaged in fishery activities. On the West coast, the major practice is that of marine capture fishing. The pre-Tsunami fishery sector accounted for 6.5 percent of the provincial GDP. It is estimated by the Fisheries Department that 15-20 percent of the fishermen died and 65 percent of the boats for marine capture were lost in the disaster. From discussions with fishermen it was found that most of the marine capture fishermen used to employ 5-10 people and an average fisherman could earn Rp 100 000 to 300 000 per trip after meeting all expenses. Almost all the affected fishermen have stopped fishing, mainly due to loss of boats and nets. In some areas, they have resorted to sharing resources as a coping mechanism: various groups of 5-6 fishermen take turns in using the same boat and fishing equipment. The fishermen are particularly averse to the idea of settling in the government-provided Temporary Location Centres (TLCs), as these are mostly far from the coastlines. The advantage of fishermen compared with farmers is that they need only a one-time support to restore their livelihood.

*About 100m from the shore, the head fisherman of the Meulaboh fishing community lives with his 12 family members. His long time familiarity with the ocean saved the lives of his family members. Sensing something abnormal in the ocean's behaviour, he fled from his house with all his family members and he warned his neighbours to do the same. The Tsunami hit the area immediately and after 1 day when he returned to the area, he found that almost half the people in his neighbourhood had died, and most of the houses were destroyed, including his own. Like others, he started living on food aid. He also lost his Rp. 30 000 000 boat and the new pick up van that he bought recently. He used to employ 15-17 men in his boat and hence now 18 families' livelihoods are affected. The head fisherman is not keen to restart fishing until he is assured that his family has ensured access to food for a long enough period of time.*

#### Other affected livelihoods on the West coast

Apart from those whose productive assets (land, boats) were damaged or destroyed, also the livelihoods of those who (partly or totally) depend on them for their employment are affected. Their number is difficult to ascertain, however, as is the degree to which they are affected, as most people have a mosaic of sources of income.

All along the coastal road and within towns and villages, most small traders, mainly owning shops, have lost their means of income. The Mission observed that a handful of them have restored their shops, with fresh stock of goods largely taken on loan from friends/relatives/moneylenders.

*Rachman is a young man, owning a shop in a make shift camp in Calang. He is selling groceries. Before the Tsunami he was a wood trader and well settled in village Lhok, about 3 km from Calang. The village is now badly damaged and many people fled the area and are now staying in camps in and around Calang. He is very happy with the sales proceeds so far and thinks this is giving him enough money to start repaying the Rp. 10 000 000 loan that he took from a friend to start this business. According to him, people are buying a variety of food. Most of the food items are more expensive than before the Tsunami, but not exorbitantly high (except dried fish). Given a chance, he would like to settle in Calang and would continue with this shop.*

With cash flowing in the affected area, mainly through cash for work activities, most of these shops have been able to regain part of their business. The commodity supply chain being disrupted, these traders make all efforts to get goods and commodities from the nearby major markets, even if it takes 2-4 days by boat for a round trip to bring them.

The effects on livelihoods are not limited to those who are affected, directly through the loss of productive/income earning assets or indirectly through the loss of employment opportunities on those assets. The effects of a reduced economic activity are also felt by a wider circle of people. People living in the villages close to the major district towns used to work as daily labourers, mainly in the construction sector. The Mission found that the labourers of a particular village that was least directly affected by the tsunami, are finding it difficult to get jobs in Meulaboh and at the same time do not get the support of the village head - *Kepala Desa* – for their participation in NGO-run cash for work activities. In many villages in the fringe area of the affected zone people are living whose livelihoods are indirectly impacted by the Tsunami.

Some clean up and recovery activities are already taking place, thus at the same time offsetting the loss of livelihoods; but the scope is at this stage not sufficient to compensate all losses of livelihoods. Sometimes CFW opportunities are allocated to households on a rotation basis, so that a maximum number of people can participate.

#### Women's livelihoods

Women contribute significantly to the household income in this area. Apart from participating in households' farming, they were reportedly engaged in cake baking, kitchen gardening, coffee grinding-selling in local markets and tailoring activities prior to the disaster. Now, most of these activities have come to a complete halt and hence the affected households also lost their secondary source of income.



### East coast livelihoods and food security

On the East coast, the impact of the Tsunami and the earthquake was not felt in an uninterrupted belt like on the West coast, but rather in spotted areas clustered around estuaries. High tides entered through the river systems and submerged the surrounding agricultural lands and the fishponds, destroying homestead lands and houses. Compared to the West coast, the East coast districts are densely populated and hence a maximum number of casualties are reported from these areas, only next to Banda Aceh and Aceh Besar.

#### Agriculture

Agricultural land was completely damaged across all estuaries, up to 1-2 km from the shore line. The average landholding in this side of the province is lower than on the West coast, with a lower land-human ratio. Many farmers also own fishponds, and as almost all of these are damaged, their dual source of income has been affected.

#### Fishery

Most of the brackish water fishery sector is damaged due to the Tsunami, affecting fishpond owners and wage labourers. In normal times, most fishpond owners were cultivating shrimp and milk fish, with average proceedings of some Rp. 10 000 000-25 000 000 per hectare.<sup>28</sup>

Some households were also engaged in marine capture fishing and possessed smaller boats. The ones that required only minor repair have already resumed fishing.

#### Other livelihood groups

On the East coast some people who live very close to the coast line are engaged in salt production. Although an accurate estimate of their number is not available, it is estimated around 10 000 in the districts of Aceh Utara, Lhoksumawe, Bireuen and Pidie are engaged in this income generating activity. The degree of loss for this livelihood group is not as extensive as in agriculture and fisheries. The affected salt producers would need minimal support in the form of working capital to restart the production compared to other sectors.

#### Women's livelihoods

Women contribute to households' income through kitchen gardening, preparing cakes and traditional snacks, apart from working on their own farms. With these sources of income as well as homes being destroyed, most of the affected women are currently not in a position to resume productive work.

### The Impact of demographic changes on livelihoods

Affected households did not only lose their homes, assets and livelihoods; many have also lost productive family members, often the main bread winner. As a result many households will have to choose alternate livelihoods that suit the physical ability of the remaining members.

## **6.3 Food access situation and immediate response**

### Impact on Food Consumption

A WFP-led Emergency Needs Assessment Mission (3 January – 1 February), in collaboration with various NGOs, found that particularly on the West coast access to food had been severely impacted immediately after the Tsunami, with 15 percent of households being able to consume one meal per day only, and just 30 percent of households two meals. In urban centres and the East coast the access to basic food was better, but there was limited diversity in diets. Other surveys (UNICEF/CDC, HKI) in the first months after the Tsunami revealed relatively high malnutrition levels in make shift camp settings.

The CFSAM Mission found that the majority of the affected households have access to food aid. Immediately after the disaster on 26 December 2004, the consumption of vegetables and animal protein got reduced drastically. Slowly most of the affected people increased their protein and micro-nutrient intake as they started participating in cash-for-work activities. Moreover, the food aid basket also got more diversified with the inclusion of canned fish, biscuits and noodles. With the partial revival of local markets, people started

<sup>28</sup> It should be noted that due to shrimp diseases, the shrimp culture was already affected before the Tsunami.

buying eggs, dried fish and vegetables. Still, the frequency as well as quantity of consumption is yet to reach the pre-tsunami levels. In certain areas, like Calang (Aceh Jaya) and Tanah Pasir (Aceh Utara), people have less access to cash in the absence of cash for work and are primarily relying on food aid.

Overall, food consumption is below normal in terms of quality and diversity, if not quantity. A survey<sup>29</sup> in Calang, Aceh Jaya, showed that 81 percent respondents received food aid. Almost 50 percent reported to be having less diversified food than before the Tsunami. In normal times, people in Aceh spend on an average some 70 percent of their total expenditure on food, against the national average of 58 percent. This proportion would be even higher when we go down the income ladder. With higher market prices of most of the commodities, people would have to spend even more to maintain the same quantity and quality of consumption. This clearly reflects the vulnerability of an already poor population in the affected areas. People would require a sizeable amount of money to rebuild their homes and livelihoods. Well targeted food aid would be essential to free-up some portion of their income so that they can channel their money to reconstruction.

The Nutrition Surveillance by the Ministry of Health in collaboration with UNICEF, WFP, WHO and NGO's, that recently concluded its baseline survey of the nutritional status of children under 5 and women in the affected areas found that West Coast areas have a higher prevalence of acute malnutrition (represented by height for weight or 'wasting') compared to the East and North Coasts. Aceh Barat Daya, Simeulue, Aceh Utara and Nagan Raya, all have more than 12 percent wasting and hence could be considered as priority districts for immediate nutritional support to children (Tables A.6 and A.7). The survey also found high prevalence of anaemia among children, mainly in the districts of Simeulue, Aceh Selatan, Aceh Jaya, Nagan Raya, Aceh Barat and Aceh Utara (Tables A.8 and A.9). Similarly, the Body Mass Index of women was found to be lower than 18.5 among more than 10 percent women in the districts of Aceh Jaya, Aceh Barat Daya, Simeulue, Aceh Selatan and Aceh Timur (Table A.10). One-third or more women in Simeulue, Aceh Jaya, Aceh Barat, Lhokseumawe, Aceh Utara and Aceh Selatan districts were found to have anaemia (Table A.11). Hence micronutrient deficiency coupled with more than 10 percent acute malnutrition strongly justifies the need for the provision of supplementary nutrition to these vulnerable groups.

### Coping Strategies

People were found to be adopting the following coping strategies as intermediary livelihoods in order to ensure some cash for essential purchases:

- Collecting and selling scrap metals and plastics for recycling industries
- Garbage collecting
- Selling coconuts
- Selling wood
- Opening smaller shops
- Making flax roofing material (mainly by women)
- Menial labour in cash for work scheme implemented by NGOs
- Working on a fishing boat
- On-shore fishing during night time
- Road, infrastructure repair

### WFP Emergency Response

Using in first instance in-country food stocks, WFP started emergency food distribution as part of a regional Emergency Operation that also covered the other countries that were affected by the Tsunami. To overcome the anticipated logistical difficulties, caused by destruction of roads and infrastructure, the EMOP was supported by three Special Operations, providing logistic augmentation, air support and overall logistic coordination. By the time of the Mission in mid March, nearly 590 570 people had received WFP food aid, and a total of 21 665 tonnes of commodities (rice, oil, canned fish, fortified biscuits and fortified noodles) had been distributed (Map 2).

Despite the support of the Special Operations, food distribution had been slower than planned, and not all the targeted beneficiary categories immediately reached (notably the Internally Displaced Persons or IDPs in host families, the host families themselves, and people who had not been forced to leave their homes but who had lost their livelihoods etc). The bulk of the food was distributed to IDPs in make shift camps (some of whom were in the course of March moved to Temporary Relocation Centres or TLCs), and only in the course

<sup>29</sup> Livelihood Survey, Calang – UNOCHA, in collaboration with GOAL, PMI and IRC, February 2005.

of the operation some of those with host families were covered. Among the difficulties in identifying and reaching people were the following:

- Road access was not possible at all, especially on the West coast, which hampered the identification of pockets in need of assistance.
- Once people and their locations were identified, food deliveries were slow, especially of staple foods, due to the reliance on helicopters.
- People appeared to be very mobile, moving from one make shift settlement (camp) to the next or to host families.
- With the exception of SCF/USA, none of the partner NGOs had a presence in the area before the Tsunami, due to the civil conflict, and had to build up their personnel and logistics capacity from scratch.
- The Indonesia Red Cross (PMI) was not fully operational due their own losses inflicted by the earthquake.
- The security situation hampering travel in the some affected areas.

In addition to WFP, other agencies (Government, NGOs and charity organizations) also provided food aid (over 8 000 tonnes).

At the time of the Mission, WFP, in cooperation with UNICEF, was setting up a Nutrition Monitoring Surveillance System, the results of which were expected to be available in the course of April. Among the population at large, it goes without saying that the “traditionally” vulnerable population categories are particularly prone to food insecurity: PNW, children under 5, the elderly and sick, and school children, female headed households.

#### **6.4 Programmatic responses for the rehabilitation phase**

##### The Government’s programme

The GoRI’s Disaster Impact Recovery Plan<sup>30</sup> consists of three main phases:

- emergency response
- rehabilitation
- reconstruction

##### Emergency Response Stage (January 2005 - March 2005)

Assistance during this phase was aimed at rescuing the surviving community members and to immediately fulfil their minimum basic needs. At this response stage, it was also the Government’s aim to arrange decent temporary shelters for displaced families, and quick logistic arrangements to reach the affected population with relief goods. The Emergency Response phase was set at six months. Nevertheless, by Presidential Instruction Number 1 Year 2005, this Response Stage was shortened to 3 months and ended on 26 March 2005.

##### Rehabilitation Stage (April 2005 - December 2006)

The emergency phase is followed by the rehabilitation phase, that is set to continue until December 2006. This phase aims at the rehabilitation of mosques, hospitals, basic social and economic infrastructure, and essential facilities. The main goal of the rehabilitation stage is to enhance public services up to an acceptable level. Also the legal aspects surrounding land rights, and the psychological aspects of the affected populations are proposed to be addressed during this phase.

##### Reconstruction Stage (July 2006 - December 2009)

Work during this phase will aim at reconstructing the towns and villages by involving the affected communities, experts, representatives of non-government organizations, and the business community. Once the adjustment to the spatial structure plan has been completed at provincial level and particularly at *kabupaten and kota* levels, infrastructure and facility construction would begin.

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<sup>30</sup> Rehabilitation and Reconstruction Master Plan for NAD and Nias-SUMUT, March 2005.

### Currently operational Government activities

The GOI plans to provide each IDP in TLCs and those living with host families Rs 3 000 per person per day. To be able to do so, the GOI requested and received WFP's confirmation that WFP would provide all the food needed for these IDPs.

The GOI's RASKIN programme, under which subsidized rice is issued to poor people, was not functioning since the tsunami, but according to BULOG, the GOI Logistics Agency, the programme will be resumed shortly.

At the time of the Mission, the central planning agency BAPPENAS, GORI, through its Planning Department agency in Banda Aceh BAPPEDA, was in the process of compiling a Master Rehabilitation plan, based on the work of 10 sectoral working groups, with participation of UN agencies and NGOs. WFP was active in three Working Groups ("Infrastructure and facilities", "Economy and Employment", and "Social/cultural issues and Human Resources"), accounting for some 85 percent of the total damage estimated by the GOI.

### WFP's assistance to the recovery and rehabilitation phase

WFP's EMOP documentation and its Operational Plan for Aceh indicated that as soon as possible relief aid should make place for or be implemented in parallel with a recovery and rehabilitation programme for the affected population, which should be in support of the GOI's rehabilitation efforts.

In addition to the Nutrition Surveillance System, WFP was also in the process of preparing a Food Market Survey, to assess the functioning of the food market and the potential effect of external food aid. The goal of these various surveys was inter alia to help determine the type and modalities of WFP's assistance to the province's recovery and rehabilitation programme, both in terms of nutrition rehabilitation and rehabilitation of livelihoods and access to food.

In view of the need and the request by the GoRI, the EMOP has been extended by one year. During the remainder of 2005 relief is expected to continue for the bulk of the affected people, especially those housed in TLCs, but to the extent possible assistance will be geared towards rehabilitation activities. At the end of 2005 the emergency operation will be over, and rehabilitation activities will be covered under a PRRO.

As already indicated by various WFP assessment missions, there are various possibilities for WFP assistance to the recovery and rehabilitation phase, but caution needs to be exerted regarding the adoption of "traditional" modalities (such as FFW). Further work, some of it is ongoing already, needs to be done to determine the exact programme mix.

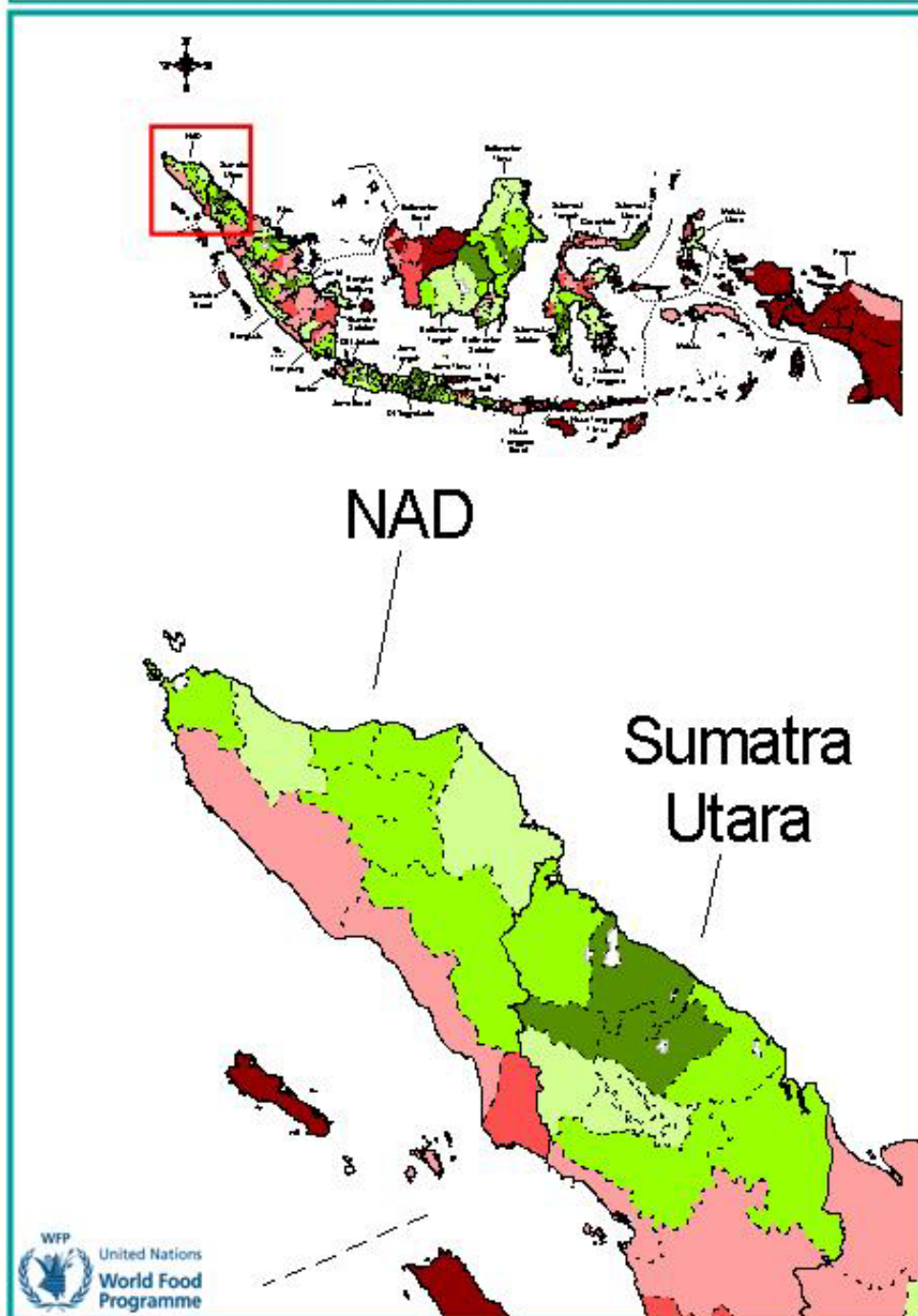
Following are some considerations regarding WFP's assistance to recovery and rehabilitation:

- a. IDPs (in TLCs, make shift camps and living with host families) should receive relief food aid until such time as they can start rebuilding their homes and livelihoods. Once these recovery activities start, relief assistance would take the form of an enabler for these families to spend their time and resources on restoring their lives.
- b. A lot of recovery and rehabilitation work needs to be done, but except for some of the hardest hit areas on the West coast there may not be a strong case for FFW activities at the moment, in view of the availability of cash-based programmes, the harvest coming in etc. However, a combination of cash and food could either reach more people or extend the period of assistance. This would need to be looked into, and especially in cooperation agreements with agencies like IFAD, FAO, WB or ADB, a food plus cash based project could be conceived in order to rebuild community infrastructure such as irrigation canals, village drainage systems, community centres, schools, health posts (posyandu) etc.
- c. Community based needs assessments are suggested to be undertaken before activities involving food, cash and other materials are introduced, not only to ensure the correct type of activities, but also to avoid distortion of the local food market. The results of the imminent Market and Labour Survey may provide a sound basis for decisions in this respect.
- d. Aceh had a relatively high rate of child malnutrition even before the tsunami, and current consumption patterns indicate an even lower intake of protein and micronutrients. WFP is already planning a school feeding programme and a supplementary nutrition programme for children under five, pregnant women and lactating-mothers. Targeting of the worst affected areas should be done for the MCH component, based on the results of the Nutrition Survey.

Since the Nutrition Survey did not find significant difference in nutritional status between ID and non-IDP children, it is recommended that nutrition intervention be targeted to non-IDP children as well. The survey also strongly recommends that Simeulue and Aceh Barat Daya should be targeted on a priority basis on 'blanket approach'.

- e. The area being a multiple hazard hotspot, a comprehensive Livelihoods, Food and Nutrition surveillance would be critical for better emergency response and preparedness. The state managed Food and Nutrition Surveillance (SKPG) should be revived in the province by building the necessary capacities within the relevant ministries at province and district levels. Efforts have already been made in Nutrition Surveillance by UNICEF and WFP in collaboration with the Ministry of Health. Similar efforts would be required in agriculture and livelihoods sectors and eventually a unified surveillance system should be established in the province, covering all three components (agriculture, livelihood and nutrition).

MAP 1: COMPOSITE FOOD INSECURITY MAP OF INDONESIA



Map 2: WFP Indonesia EMOP (10405) Beneficiaries and Cooperating Partners



**LEGEND**

- WFP Sub Offices
- WFP Not Serving
- ▭ District
- ▭ Sub District
- Cooperating Partners and Caseloads:
  - PMI (66,409)
  - CRS (57,780)
  - CARE (99,494)
  - SC-US (194,273)
  - TBD (21,757)
  - ACF (90,782)
  - WVI (52,669)
  - HELP (7,426)

**Table A. 1 - Estimated Damage to Perennial Crops (hectares)**

District	Coconut			Coffee			Nutmeg		
	Total Area	Damage	%	Total Area	Damage	%	Total Area	Damage	%
Sabang	4 160	1 625	39	-	-	-	-	-	-
Aceh Besar	14 318	3 209	22	1 456	517	36	282	-	-
Pidie	11 852	2 515	21	10 177	3 587	35	130	-	-
Bireuen	17 607	3 686	21	729	242	33	245	146	60
Aceh Jaya	4 461	3 160	71	1 020	379	37	175	109	62
Aceh Tengah				73 782					
Aceh Barat	2 766	1 900	69	630	207	33	74	-	-
Nagan Raya	2 729	695	25	1 358	483	36	158	95	60
Simeulue	7 185	3 754	52	87	-	-	675	406	60
Aceh Selatan	9 659	2 002	21	1 591	552	35	7 883	4 720	60
Aceh Singkil	4 922	-	-	46	-	-	39	-	-
Aceh Barat Daya	4 377	986	23	758	275	36	2 433	1 455	60
Aceh Tenggara	868	-	-	3 011	-	-	8	-	-
Gayo Lues	216	-	-	1 562	-	-	-	-	-
<b>Affected Districts</b>	<b>85 120</b>	<b>23 532</b>	<b>28</b>	<b>96 207</b>	<b>6 242</b>	<b>6</b>	<b>12 102</b>	<b>6 931</b>	<b>57</b>

Source: Calculated by Mission based on the data from FAO/MOA and BPS.

**Table A.2 - Population, per capita income, and Below Poverty Line (BPL) in 2003, by district**

District	Population ('000) a/	Per Capita Income (2003 US\$/year) b/	Percent BPL c/
Aceh Tengah	272.5	557	28.90
Aceh Utara	523.7	556	38.20
Lhokseumawe	167.4	549	25.60
Aceh Besar	296.0	525	30.50
Bireuen	361.5	521	30.00
Sabang	24.5	500	32.40
Langsa	122.9	471	16.30
Aceh Selatan	197.7	450	29.40
Aceh Barat Daya	115.4	413	29.50
Aceh Tamiang	225.0	411	26.00
Aceh Timur	331.6	367	31.60
Aceh Singkil	124.8	363	29.50
Nagan Raya	144.0	360	34.70
Banda Aceh	223.8	357	9.70
Pidle	517.7	327	38.90
Aceh Barat	195.0	298	36.10
Simeulue	59.1	286	35.00
Aceh Jaya	98.8	270	32.00
Aceh Tenggara	150.8	144	24.20
Gayo Lues	66.4	114	32.20
<b>NAD</b>	<b>4 218.60</b>	<b>862</b>	<b>29.80</b>

Source: a/ BPS-Aceh 2003; b/ calculated based on data from BPS-Aceh and exchange rate (Rp:US\$) of 8 577; c/ WFP data base.

Note: Poverty Line, US\$0.47 per capita per day for Aceh and US\$0.45 per capita per day for Indonesia. It varies district to district, with max in Aceh Besar of US\$0.54 and min in Simeulue US\$0.45.



**Table A.3 - Affected population, employment, and land in paddy production, by district**

District	Area ('000 ha) <u>a/</u>	Paddy Farmers ('000) <u>b/</u>	Population in Rice Farming Households ('000) <u>b/</u>
Aceh Jaya	8.8	17.6	70.4
Aceh Besar	6.9	13.9	55.4
Nagan Raya	4	7.9	31.7
Aceh Barat	3	5.9	23.8
Pidle	2.9	5.7	22.9
Aceh Timur	2.1	4.2	17
Bireuen	2.1	4.2	16.9
Aceh Utara	1.2	2.4	9.8
<b>NAD</b>	<b>31</b>	<b>62</b>	<b>247.9</b>

Sources: a/ FAO, MOA and MMAF Rapid Assessment Missions; b/ :estimated by this mission.

**Table A.4 - Estimated relative damage to fisheries/aquaculture**

District	Ports (percent)	Boats, Fishing Gear (percent)	Brackish Water Aquaculture (percent)
Banda Aceh	100	100	100
Aceh Besar	100	100	100
Aceh Barat	100	100	100
Aceh Jaya	80	80	100
Sabang	0	50	100
Simeulue	90	20	100
Pidle	100	100	50
Bireuen	50	100	50
Aceh Utara	100	100	40
Lhokseumawe	100	75	40
Nagan Raya	0	50	30
Aceh Selatan	0	50	30
Aceh Barat Daya	0	50	30

**Table A.5 - Forecast of paddy area (ha) and production (tonnes) in 2005**

District	Average (2002-04) <u>a/</u>			Estimated Loss due to the Tsunami <u>b/</u>		2005 <u>c/</u>		
	Area (ha)	Yield (tonnes/ha)	Production (tonnes)	Area (ha)	Production (tonnes)	Area (ha)	Production (tonnes)	% of Normal
Aceh Jaya	13 588	4.08	55 378	13 200	53 796	388	1 581	3
Aceh Besar	38 467	4.29	165 079	10 395	44 610	28 072	120 469	73
Nagan Raya	30 069	4.14	124 361	6 336	26 205	23 733	98 156	79
Aceh Barat	22 755	4.09	93 164	4 752	19 455	18 003	73 708	79
Pidle	44 067	4.6	202 899	4 004	18 436	40 063	184 463	91
Bireuen	35 404	4.56	161 287	2 965	13 508	32 439	147 779	92
Aceh Timur	35 659	4.21	150 208	2 967	12 496	32 693	137 711	92
Aceh Utara	48 723	4.58	223 298	1 714	7 853	47 009	215 444	96
Sabang	43	2.35	101	-	-	43	101	100
Banda Aceh	287	3.82	1 097	-	-	287	1 097	100
Lhokseumawe	1 443	3.82	5 516	-	-	1 443	5 516	100
Aceh Tengah	12 034	3.75	45 180	-	-	12 034	45 180	100
Langsa	2 315	3.85	8 905	-	-	2 315	8 905	100
Aceh Tamiang	22 381	4.18	93 445	-	-	22 381	93 445	100
Simeulue	6 415	3.8	24 369	-	-	6 415	24 369	100
Aceh Selatan	19 340	4.14	79 995	-	-	19 340	79 995	100
Aceh Singkil	3 844	3.61	13 886	-	-	3 844	13 886	100
Aceh Barat Daya	22 664	4.2	95 266	-	-	22 664	95 266	100
Aceh Tenggara	16 868	4.12	69 444	-	-	16 868	69 444	100
Gayo Lues	13 934	4.1	57 118	-	-	13 934	57 118	100
<b>Total</b>	<b>390 300</b>	<b>4.28</b>	<b>1 669 996</b>	<b>46 333</b>	<b>196 359</b>	<b>343 968</b>	<b>1 473 633</b>	<b>88</b>

Source: Calculated by Mission

Note: a/ 2002 and 2003 data are from BPS, 2004 data are estimated by Mission; b/ harvest area is equal to the damaged land area multiplied by intensive cropping index which is based on the irrigation scheme; production is equal to harvest area multiplied by the three-year average yield under the assumption of normal year growing condition; c/ equal to three-year average minus the losses due to tsunami.

**Table A.6 - Nutritional status of children (percent)**

	<b>Underweight n=4025</b>	<b>Stunting n=3993</b>	<b>Wasting n=4007</b>
Aceh Jaya	47.6	43.4	9.1
Nagan Raya	43.5	30.5	12.6
Aceh Barat	33.8	33.9	9.4
Pidie	49.5	44.2	10.3
Lhokseumawe	41.1	31.1	11.7
Aceh Utara	44.4	36.2	14.1
Bireun	36.8	30.8	9.4
Aceh Timur	41.9	37.2	9.0
Simeuleu	49.7	44.0	16.9
Aceh Barat Daya	50.9	40.8	16.8
Aceh Selatan	45.8	54.1	9.9
Aceh Besar	39.3	39.5	7.3
Banda Aceh	32.0	26.6	12.0
<b>TOTAL</b>	<b>43</b>	<b>38</b>	<b>11.4</b>

n = number

**Table A.7 - Nutritional status of children by sub-region (percent)**

	<b>Underweight n=4025</b>	<b>Stunting n=3993</b>	<b>Wasting n=4007</b>
West coast	45.4	41.2	12.5
North coast	35.8	33.5	9.5
East coast	42.7	35.9	10.8
<b>TOTAL</b>	<b>43</b>	<b>38</b>	<b>11.4</b>

n = number

**Table A.8 - Child Anaemia, n=1937 (percent)**

	<b>Anaemia</b>
Aceh Jaya	62.6
Nagan Raya	57.0
Aceh Barat	55.1
Pidie	40.6
Lhokseumawe	53.3
Aceh Utara	57.8
Bireun	25.0
Aceh Timur	37.8
Simeuleu	70.4
Aceh Barat Daya	34.2
Aceh Selatan	59.7
Aceh Besar	36.0
Banda Aceh	39.7
<b>TOTAL</b>	<b>48.4</b>

**Table A.9 - Anaemia among children by sub-region (percent)**

	<b>Anaemia</b>
West coast	56.3
North coast	37.8
East coast	43
<b>TOTAL</b>	<b>48.3</b>

**Table A.10 – Body Mass Index (BMI) of women in affected districts**

District	BMI-categories								Total	
	n	percent	n	percent	n	percent	n	percent	n	percent
Aceh Jaya	57	16.1	259	73.4	30	8.5	7	2.0	353	100.0
Nagan Raya	29	9.6	198	65.8	58	19.3	16	5.3	301	100.0
Aceh Barat	25	8.1	167	53.9	79	25.5	39	12.6	310	100.0
Pidie	23	7.4	197	63.8	71	23.0	18	5.8	309	100.0
Lhok Seumawe	26	8.8	156	52.9	85	28.8	28	9.5	295	100.0
Aceh Utara	21	6.8	195	62.9	71	22.9	23	7.4	310	100.0
Bireun	22	6.8	186	57.4	90	27.8	26	8.0	324	100.0
Aceh Timur	38	11.4	188	56.3	81	24.3	27	8.1	334	100.0
Simeuleu	50	15.6	212	66.0	48	15.0	11	3.4	321	100.0
Aceh Barat Daya	52	15.6	208	62.3	55	16.5	19	5.7	334	100.0
Aceh Selatan	30	12.6	130	54.4	64	26.8	15	6.3	239	100.0
Aceh Besar	22	7.6	161	55.7	87	30.1	19	6.6	289	100.0
Banda Aceh	21	7.4	154	54.4	88	31.1	20	7.1	283	100.0
<b>Total</b>	<b>416</b>	<b>10.4</b>	<b>2 411</b>	<b>60.2</b>	<b>907</b>	<b>22.7</b>	<b>268</b>	<b>6.7</b>	<b>4 002</b>	<b>100.0</b>

n = number

**Table A.11 - Prevalence of Anaemia among Women**

District	Woman with Anaemia				Total	
	number	percent	number	percent	number	percent
Aceh Jaya	56	35.4	102	64.6	158	100.0
Nagan Raya	49	31.2	108	68.8	157	100.0
Aceh Barat	54	33.5	107	66.5	161	100.0
Pidie	44	25.4	129	74.6	173	100.0
Lhok Seumawe	55	36.2	97	63.8	152	100.0
Aceh Utara	86	52.1	79	47.9	165	100.0
Bireun	36	20.8	137	79.2	173	100.0
Aceh Timur	35	18.7	152	81.3	187	100.0
Simeuleu	61	41.5	86	58.5	147	100.0
Aceh Barat Daya	26	16.3	134	83.8	160	100.0
Aceh Selatan	48	43.2	63	56.8	111	100.0
Aceh Besar	44	27.2	118	72.8	162	100.0
Banda Aceh	38	24.7	116	75.3	154	100.0
<b>Total</b>	<b>632</b>	<b>30.7</b>	<b>1 428</b>	<b>69.3</b>	<b>2 060</b>	<b>100.0</b>

## GLOSSARY

Bupati: District level authority  
Desa: village  
Dinas Perthanian (Agriculture Service, District level)  
Kabupaten: District  
Kecamatan: sub-District  
Kota: municipality  
Kreung (Kr): River  
NAD: Nanggroe Aceh Darussalam (Province of Aceh).  
RGDP: Regional (Province level) Gross Domestic Product

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*This report has been prepared by Henri Josserand, Cheng Fang, Joan Fleuren, Dipayan Bhattacharyya and Karin McLennan under the responsibility of the FAO and WFP Secretariats with information from official and other sources. Since conditions may change rapidly, please contact the undersigned for further information if required.*

*Henri Josserand  
Chief, GIEWS, FAO  
Fax: 0039-06-5705-4495  
E-mail: [giews1@fao.org](mailto:giews1@fao.org)*

*Anthony Banbury  
Regional Director, ODB, WFP  
Fax: 0066-2-2881046  
E-mail: [anthony.banbury@wfp.org](mailto:anthony.banbury@wfp.org)*

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