FOOD AND LABOR MARKET ANALYSIS AND MONITORING SYSTEM IN NANGGROE ACEH DARUSSALAM (NAD) PROVINCE

Final Report

Indonesian Center for Agro Socio Economic Research and Development (ICASERD)
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EXECUTIVE SUMMARY

Introduction

Since the tsunami hit Aceh and North Sumatra in December 2004, the World Food Program (WFP) has been assisting the affected population in Nanggroe Aceh Darussalam (NAD) with food aid in collaboration with donors, NGO's and the Indonesian Government. It is likely that the continued relief/assistance, including food, will be needed until major infrastructure and housing projects are complete. As the initial emergency subsides, however, WFP is cooperating with the Government to formulate a strategy for supporting rehabilitation and reconstruction in Aceh. There is a perceived need for the continuation of humanitarian assistance until reconstruction is complete.

As a result of the tsunami, much of the food security analysis undertaken by WFP for Aceh in the pre-tsunami period in 2004 became outdated. This is due to the major changes in vulnerability and local food production that resulted from the crisis as well as the changes in food availability and food access as a result of the massive influx of assistance, both in kind and in cash. As a result, a food and labor market analysis was undertaken by an independent research institute [Indonesian Center for Agro Socio Economic Research and Development (ICASERD)] to inform WFP's decision about the appropriate scale and scope of food-based programming in Aceh, beyond meeting immediate relief needs.

The Impact of Tsunami on Major Food (Rice and Fish) Production

Before the tsunami (2004), total paddy harvest area was 382,043 hectares with total production of 1,544,747 tonnes. According to a soil fertility specialist (expert judgment), it is estimated that the productivity of 2005 will reach only 85 percent of the production level of 2004. Taking into account the performance of paddy production in 2004 (planting areas, harvesting areas and its production) and also the level of damage caused by the tsunami, paddy production in 2005 will be 1,114,715 tonnes or a drop of almost 28 percent on the 2004 production level. The decline, however, will not make NAD a rice-deficit region as it still has a surplus of around 234,650 tonnes. Of the eight districts visited during the study, only Aceh Jaya and Banda Aceh will experience a deficit in 2005, at 8,799 tonnes and 18,547 tonnes respectively.[1]

The fishery sector also plays an important role in the NAD economy. Its share of agricultural GDP in 2003 was 20 percent. The coastal community of NAD relied heavily on fishery as their source of income (livelihood). Fish production has declined but NAD still has a surplus in fish production. Up to April 2005, NAD was reported as having a fish production surplus of 38,595 tonnes. From the eight visited districts, only Aceh Utara experienced a surplus while others were in a deficit ranging from 428 tonnes to 2,568 tonnes.

Major Findings

a. The Impact of Food-Aid on Food Market

Food aid did not provide a disincentive to farmers in the rice production areas in the eastern parts of NAD (Pidie, Bireun, Aceh Utara and other unaffected regions). This was indicated by the

[1] The eight district studied : Kabupaten Aceh Besar, Aceh Utara, Aceh Jaya, Pidie, Bireun, Aceh Barat, Aceh Barat Daya, Kota Banda Aceh

relatively stable price of rice at the farm-gate, which was ranging from Rp.1,300 – Rp.1,600/kg of dried paddy during April-May 2005. Food aid has, however, been a disincentive to the traders, as indicated by the decline of trade volume and profit margin. It should be mentioned that the decline in traders' business is not exclusively a result of food-aid but also because of the damage in transportation infrastructure and fuel price hike.

Rice, fish and other food items are commonly traded not only within NAD but also to North Sumatra. Rice and paddy are transported from surplus areas such as Pidie, Aceh Utara and Aceh Timur on the west coast to various cities especially Medan, Banda Aceh, Meulaboh and Tapak Tuan. The disaster hampered the flow of rice to and from the west coast. In Banda Aceh, in particular, the damage to main market places (Pasar Aceh and Penayong) has moved the main trading places to Pasar Lambaro, Ketapang, Neusu and Ule Kareng. The effect of the tsunami on the rice trade in the east coast areas, however, is relatively small.

Food markets, including rice, are relatively competitive. A lot of traders are involved and marketing areas are quite extensive. The more open transportation system, information and price signals allow goods to flow to other regions, easily resulting in smaller price differentials between regions. After the disaster, almost everything changed dramatically. The flow of goods, especially from the west coast, has been hampered. Hence, the west coast trade has shifted from various cities in NAD to Medan. It also negatively affected the east coast trade. Some traders have gone bankrupt, and food prices in the western regions increased, though only temporarily.

The marketing cost has increased since the disaster happened in NAD. The increased cost was not only due to the increase in the price of fuel and wages, but also because of longer delivery times, particularly along the west coast. The increase in marketing costs for the destination of Banda Aceh and Medan is relatively small but to the main markets on the west coast has increased by up to 50 percent.

Markets are working sluggishly because of: (1) the shrinking market destination (Banda Aceh and *kabupaten* in the west coast); (2) the number of traders has declined significantly, especially in the destination markets; (3) traders do not want to take high risks by maintaining large stocks; and (4) most of the food aid is in the form of rice.

The price of rice rocketed to Rp.10,000-Rp.12,000 per kg in Banda Aceh and Meulaboh within three weeks of the tsunami. That was the critical period. After this period, the rice price was relatively stable (Rp.2,850 – Rp.3,000 per kg). Bulog's market operation and the WFP food-aid program played an important role in stabilizing the price. In addition, the rice market in NAD is open to inflows of rice from other markets (e.g. Medan).

Other food prices after the tsunami were: sugar (Rp.4,000 – Rp.6,000 per kg); wheat flour (Rp.3,600 – Rp.4,500 per kg); edible oil - crude coconut (Rp.4,500 – Rp.6,000/kg). Only bimoli (branded cooking oil) and tiger shrimp tended to increase because of high demand from higher income groups.

b. The Impact of Food-Aid on Consumption Patterns

Food aid was able to stabilize the frequency of intake, which experienced a decline during the first 2 – 3 weeks after the tsunami. Canned fish, however, is not a preferred form of fish for the local people. Internally Displaced Persons (IDP's) were reported to have relatively sufficient stocks of rice (20-40 kg/households). Many of them sold part of their rice stock to obtain cash for the purchase of other daily needs such as sugar, kerosene, fresh fish and other non-food items. This happened because some IDP's did not receive regular living allowances. In addition, the cash for work program could not absorb all the unemployed IDPs.

Before the tsunami, the sources of rice and fish for household consumption in rural areas was primarily from self-production and the Government's *Raskin* program (for rice), while other food products were bought from local markets. After the tsunami, since most households in the affected areas are IDP's, most of the food was in the form of food-aid received from the Government and WFP.

The food aid basket comprises rice, fortified noodles, cooking oil, canned fish and biscuits. The consumption of other food was reported to be very limited. It must be mentioned that the food aid contributed to stabilizing the frequency of staple food consumption in the affected areas in NAD.

c. Wages in the affected areas.

Compared to wage rates in surrounding regions (North Sumatra, Riau and West Sumatra), NAD's rate is slightly higher. In the three provinces mentioned above, the wages were ranging between Rp.20,000 – Rp.30,000/day in agriculture, Rp.30,000-Rp.40,000/day for unskilled non-agricultural labor, and Rp.40,000-Rp.50,000/day for skilled non-agricultural labor. If significantly higher wages are paid under reconstruction activities in NAD, it might create regional imbalance, if continued for a long period and lead to market distortion and artificial inflation.

After the tsunami, the unemployment in NAD increased by more than 150 percent, from 206,000 (4.8 percent) to 528,000 people (13.3 percent). Wages in the agriculture sector both for skilled and un-skilled labor were not significantly different in western and eastern areas (Rp.40,000 – Rp.50,000 per day). But for the fisheries sector, wages in western areas (Rp.75,000 – Rp.150,000 per day) were higher than those in eastern areas (Rp.50,000 – Rp.100,000).

Wages in the non-agriculture sector in western areas (Rp.40,000 – Rp.80,000 per day) were also slightly higher than those in eastern areas (Rp.30,000 - Rp.75,000 per day), for both skilled and un-skilled labor. This wage rate (found at the time when the survey was conducted) is the same as the prevailing rate before the tsunami. There was a significant temporary increase in the wage rate during the 1-2 months following the tsunami when the debris clearing process was at the peak. At that time, labor was paid on a piece-based (*borongan*) system, of approximately Rp.1 – 2 million to clear a damaged house/building.

The wage rates paid under the Cash for Work program (*Padat Karya*) were relatively the same as the labor market wage rate in the non-agriculture sector, i.e., Rp.30,000 – Rp.40,000 per day. This wage rate is not different between the western and eastern areas. There is no strong evidence that the *Padat Karya* program in the affected areas attracted labor from unaffected areas. Labor mobility from the unaffected to the affected areas occured temporarily in the 1- 2 months after the tsunami, especially during the period of clearing.

Recommendations

1. Food aid is required until the rehabilitation program is complete. Withdrawal of food should, however, be done gradually in line with the rate of recovery including the return of IDP's to their original profession and pre-tsunami level of income. Referring to the estimation done by the *Dinas Pertanian Tanaman Pangan dan Hotikulturan* of NAD, the rice production in the

eastern part of the province will not fully recover until 2008, while recovery in the western part is not expected to recover until 2010. Based on these estimations, food-aid might be reduced by 15%-20% each year, depending on livelihood recovery. More accurate figures might be calculated along with on-going monitoring activities.

2. To improve the distribution system of food aid to the beneficiaries, it is important to reassess the IDP's condition. Some of them have already got jobs and no longer need the same level of support as before. Consequently, updating and verifying data of IDP's is important.

3. People's preferences should be considered in the provision of rice-aid. In terms of quantity, rice support might be reduced from 12 kg to 11 kg/capita/month. This is in accordance with the average rice consumption in NAD according to SUSENAS data of 1999 (11.33 kg) and the study result conducted by the Director General of Food Security, Ministry of Agriculture (10.97 kg). The reduction would be justified but the consumption pattern of younger members in the household should be taken into account.

4. Canned fish should be reduced from the current monthly ration of 1.5 kg per person. Most of the IDP's prefer salty fish rather than other processed fish. It should not be completely removed from the food basket, however, as the IDP's also need animal protein. It is also suggested to include 0.50 kg of sugar per capita per month in food-aid items, if possible.

5. In relation to food price and wage monitoring activities, to avoid duplication, it is suggested that the WFP uses the results of monitoring activities conducted by Bulog (NAD regional office), Dinas Indag, Dinas Pertanian Pangan, and BPS. The forms mentioned in the main report are designed to be used in rice production centres (Pidie, Bireun, Aceh Utara); the deficit regions (Takengon, Kutacane) and the central markets (Banda Aceh, Lhokseumawe, Meulaboh, and Langsa). Information on rice and paddy price should be collected monthly/seasonally, while that on wages (agriculture and non-agriculture) could be collected monthly.

6. Without ignoring rehabilitation of rice sector, to help IDP's back to their previous profession, more attention should be given to marine fisheries and brackish water farm sub-sectors which are the sub-sectors most IDP's belong to. The provision of equipment for catching fish is not sufficient in isolation to help marine fishermen who alo need fish landing places and ice factories. Brackish water pond rehabilitation should take into account the sustainable environmental development.

7. In the land rehabilitation program, rice fields should be given higher priority to maintain food (rice) security. Grants and loans should be provided for rehabilitation of moderately and severely damaged land. It is not recommended to rehabilitate the lightly damaged land using loan funds.

8. The involvement of the NGOs and other local foundations like "*pesantren*" (Islamic Educational Foundation) would be very useful. It is expected that they will assist the government in understanding the cultural factors and in encouraging people's participation.

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I. INTRODUCTION

Nanggroe Aceh Darussalam (NAD) is an Indonesian province in the northern part of Sumatra, located in a strategic location at the hub of maritime transportation and global trade. NAD was an international transitory trading center; a place where international shipping met its logistic needs. Unfortunately, political instability meant that potential sources of economic development could not be explored to boost NAD's economic growth. Up to the present time, the NAD economy remains highly dependent on the agricultural sector.

The earthquake and tsunami disaster, on 26 December 2004 focused the world's attention on the situation in NAD. The World Food Programme (WFP), in collaboration with donors, other agencies and the Government of Indonesia (GOI), has assisted the affected population in NAD with food aid. As the initial emergency subsidies, however, WFP and the GoI are formulating strategies for the transition into recovery, rehabilitation and reconstruction activities in NAD. To this end, WFP is studying the appropriateness of introducing medium or longer-term food-based programs in NAD, including the possibility of expanding programs which are currently being implemented in six other provinces of Indonesia.

As more than six months has passed since the tsunami, much of the targeted food-aid analysis undertaken by WFP for NAD needs to be updated. As mentioned above, there have been major changes to local food production infrastructure – affecting the overall supply and availability of food resources – and to people's accessibility to food. There have also been major changes in the vulnerability of the affected population due to loss of livelihood. The massive influx of assistance in kind and in cash is a significant factor to consider in assessing the new level of food availability and accessibility. Based on the above consideration a "Food and Labor Market Analysis in NAD" is required.

The scope of this analysis is divided into four aspects: (1) Overview of NAD Province; (2) Food Situation Analysis, (3) Distribution and Marketing Analysis, and (4) Design Food and Labor Market Monitoring. This preliminary report presents the results of the analysis of those four aspects. The analysis is focused on the performance of food and labor markets before and after the tsunami, especially on food prices and wages (both in the agriculture and non-agriculture sectors), the estimation of food (rice and fish) demand in 2005, flow and distribution of food, and the analysis of marketing margins.

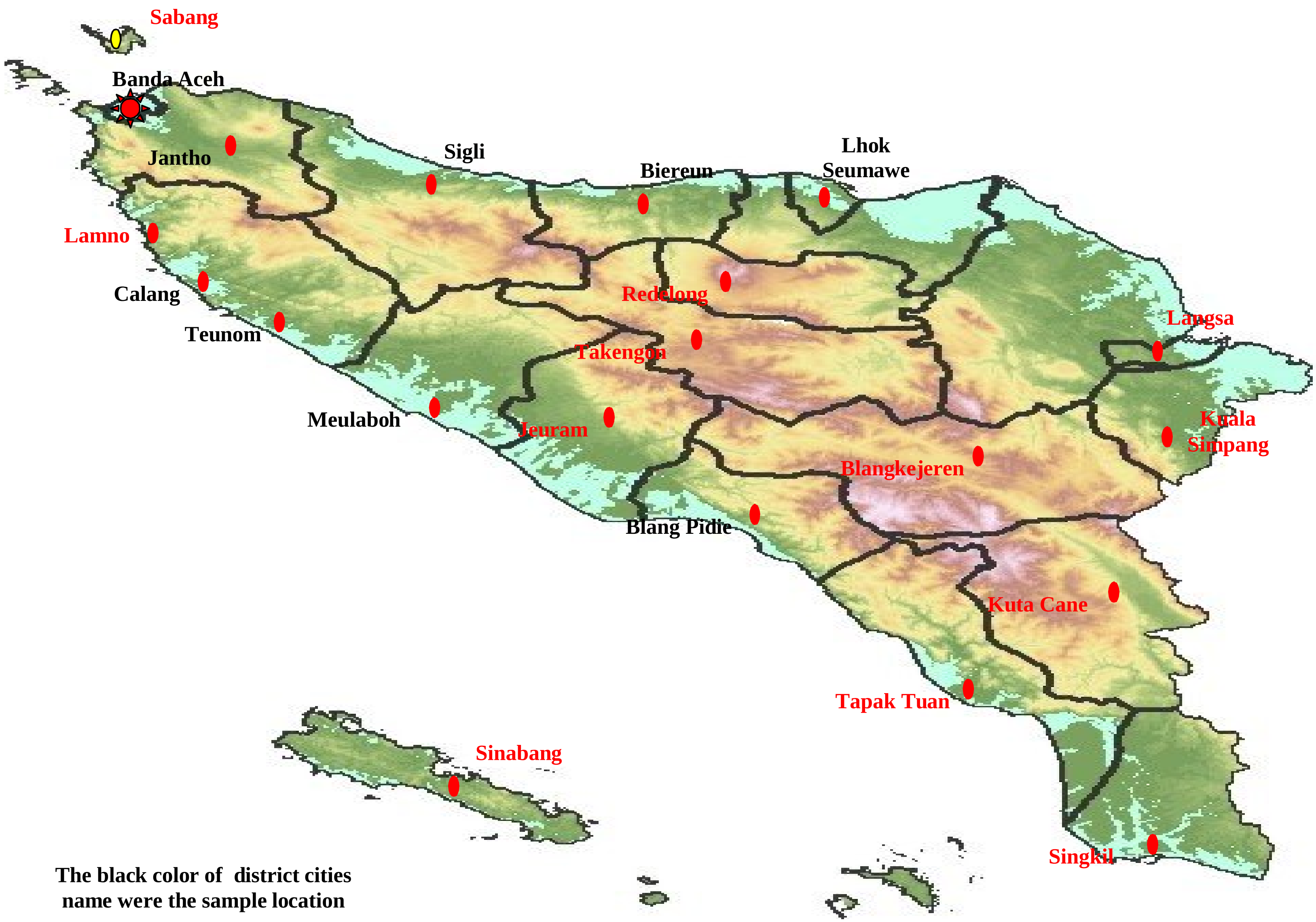
Data collection was conducted from 2-16 May in 8 *kabupaten/kota* representing the western and eastern parts of NAD. The western parts were the worse affected areas and most IDPs were also displaced from these regions. The eastern parts, which is center of rice production in NAD, were, on the other hand, were much less affected than the west. The respondents are the participants of focus group discussions (fishermen, brackish water pond farmers, and non agriculture sector workers), local leaders, traders (wholesalers, retailers), transporters, food processors (RMUs, FPUs)[2] and construction firms**.** Distribution of respondents in each *kabupaten* is shown in Table 1.1.

[2] RMU: Rice milling units, FPU: Fish Processing Units

Table 1.1: Distribution of Respondents by Sampling Locations

Kabupaten/Kota	Kota / Kec	Focused Group Discussion				Local leader	Trader		Trans-port	Food Processor		Construction Firm	Total
		Fisher men	Brackish water	Far mer	Non Agr		Whole sale	Re tail		RMUs	FPUs		
Kota Banda Aceh	Meuraxa	1	-	-	-	1	-	-	-	-	-	-	2
	Kuta Alam	-	1	-	1	-	-	-	-	-	-	-	2
	Baiturahman	-	-	-	-	-	2	-	1	-	-	1	4
	Syah Kuala	-	-	-	-	-	-	-	-	1	-	-	1
Kab. Aceh Besar	P. Bada	-	-	1	-	1	-	-	-	-	-	-	2
	Lhok Nga	-	-	1	-	-	-	-	-	-	-	-	1
	Ingin Jaya	-	-	-	-	-	-	2	-	-	-	-	2
Kab. Aceh Jaya	Calang	1	-	-	-	2	2	2	-	-	1	-	8
	Teunom[1)]	1	-	1	-	1	1	1	-	-	-	-	5
Kab. Aceh Barat	J.Pahlawan	1	-	-	1	2	1	1	1	-	1	1	9
	Kaway XVI	-	-	1	-	-	2	2	-	1	-	-	6
Kab. Aceh Barat Daya	Blang Pidie	-	-	1	-	1	1	1	-	-	-	-	4
	T.Tangan	-	-	1	-	-	-	-	-	1	-	-	2
Kab. Pidie	Sigli	-	-	-	-	1	1	1	-	-	-	-	3
	Mutiara Tmr	-	-	1	-	-	-	-	-	-	-	-	1
	Padang Taji	-	-	2	-	-	-	-	-	-	-	-	2
	Pantai Raja	-	-	-	-	-	-	-	-	-	1	-	1
	Simpang Tiga	1	1	-	-	-	-	-	-	-	-	-	2
	Teneun	-	-	-	-	-	-	-	-	1	-	-	1
Kab. Aceh Utara	Muara Dua	-	-	-	-	-	1	1	1	-	-	-	3
	Smd/Tn.Pasir	-	1	-	-	1	-	-	-	-	-	-	2
	Banda Sakti	1	1	1	1	-	-	-	-	-	-	-	4
Kab. Biereun	Jeumpa	-	-	1	-	1	-		-	1	-	-	3
	Kota	-	-	-	-	-	-	2	-	-	-	-	2
TOTAL Respondent		6	4	11	3	11	11	13	3	5	3	2	72

Remark: RMUs = Rice Milling Units FPUs = Fish Processor Units 1) Including Krueng Sabee



The black color of district cities name were the sample location

II. NAD'S ECONOMICS AND AGRICULTURAL SECTOR OVERVIEW

2.1. The NAD Economy

NAD, like Riau and East Kalimantan, is a province that is rich with oil and natural gas. The contribution of oil and natural gas to NAD's GDP in 1990 reached 77 percent, but by 2003, the contribution of these sectors to GDP had declined to only about 20 percent. Natural gas production can no longer be relied upon as the engine of growth in NAD.

The decreasing rate of natural gas production has affected the natural gas user industries, such as fertilizer industries (PT. Asean Aceh Fertilizer; PT. Pupuk Iskandar Muda) and paper industries (PT. Kertas Kraft Aceh). Some of these industries have closed down and others have reduced their production. Conversely, the contribution to GDP of the agricultural, industrial and service sectors has steadily increased with agriculture's contribution to NAD GDP increasing from 11 percent in 1990 to 28 percent in 2003 (Table 2.1).

NAD's total population is about 4 million people, which is only 2 percent of Indonesia's total population. The unemployment rate is quite high (11.2 percent) which is higher than the national unemployment rate (9.5 percent in 2003). With its low population density and richness in natural resources, NAD has quite a high GDP per capita, in 2003 its GDP per capita was around Rp.8.7 million, higher than the national GDP per capita which was only Rp.7.8 million.

Table 2.1: NAD's GDP 1987, 1990, and 2003 at the 1987 Constant Price (%)

Economic Sectors	1987	1990	2003
Agriculture	14.7	10.5	28.1
Mining (oil and gas)	69.0	76.5	19.6
Industrial/Processing	3.7	2.6	19.7
Services and others sector	12.6	10.4	32.6
Total (%)	100.0	100.0	100.0
(Rp.million)	4,593,350	7,467,038	9,586,814

Source: Aceh Dalam Angka, 1988, 1991, 2004

2.2. The Role of Agriculture

The economic development policy of NAD has been based on two clusters: (1) Areas with industry as the main economic backbone and agriculture as the supporting sector (this includes regions on the east coast; and (2) areas with agriculture as the economic backbone (this includes the hinterland and the west coast). Economically, the two areas were linked with each other. The eastern region, as the major rice production region, is the main market for livestock and fresh fish products while the western region is the main production area of estate crops (such as coconut, rubber, coconut palm, clove, nutmeg) and marine fish and is also the main market for agricultural products from the eastern region). The hinterland is the main production area of vegetables (carrot, cabbage, potato, cauliflower) and other horticultural products.

As mentioned in the section above and presented in Table 2.1., the role of the agricultural sector in the NAD economy has increased significantly. Although its share is decreasing, food crops remained the biggest contributor to agricultural GDP. The increasing contributors are livestock and fisheries (Table 2.2).

Table 2.2: The Structure of NAD's Agricultural GDP (%)

Economic Sectors	1987	1990	2003
Agriculture	14.7	10.5	28.1
Mining (oil and gas)	69.0	76.5	19.6
Industrial/Processing	3.7	2.6	19.7
Services and others sector	12.6	10.4	32.6
Total (%)	100.0	100.0	100.0
(Rp.million)	4,593,350	7,467,038	9,586,814

Source : Aceh Dalam Angka 1991,2004

Table 2.3 shows that the agricultural sector also absorbed the biggest share of NAD's employment (48 percent in 2003). This implies that a sustainable agricultural sector is crucial to NAD's development. This sector is expected to not only play an important role in food availability but also job opportunities that are important for poverty alleviation and rapid economic growth in NAD.

Table 2.3. The Structure of NAD's Employment (2003)

Sector	Number of Employment	
	Persons	%
Agriculture	1,073,454	47,6
Processing Industries	87,636	3,9
Constructions	93,705	4,2
Trade	468,057	20,8
Transportation and Communication	101,292	4,5
Finance and Insurance	12,756	0,6
Services	407,130	18,1
Mining and Quarrying		
Total	**2,254,255**	**100**

Source : Sakernas, BPS, 2003

Rice is the main staple food for the people of NAD while fish is the main source of animal protein. Hence, the performance of the agricultural sector, especially food crops and fisheries, will affect NAD's community consumption pattern. The earthquake and tsunami destroyed a lot of agricultural infrastructure and claimed the lives of more than 100,000 people. The impact of those disasters, especially on the rice and fishery sectors, are explained in the following sections.

2.3. Rice field Areas

Rice-field areas are the most important land resources for food production. NAD's total rice-field area before the tsunami was around 357,000 hectares but the tsunami damaged more than 37,000 hectares of rice-fields (10.5 percent). The possibility of damaged rice-fields returning to productive capacity (utilized) depends on the level of damage. After the tsunami, only 7,070 hectares of damaged rice-fields are capable of being cultivated in 2005. This is the area of rice-field that was only lightly damaged. Most of them are located on the east Coast (Table 2.4).

Table 2.4: Rice-field Areas and Rice-field Damage due to Tsunami by Kabupaten, in NAD, 2005

No	*Kabupaten/Kota*	Rice-field Areas (Ha)	Rice-field damage (Ha)	Rice-field can be cultivated in 2005 (Ha)	
				Mar – June	July - Dec
1.	Banda Aceh	586	-	-	-
2.	Aceh Besar	30,421	6,930	277	416
3.	Pidie	38,796	2,860	572	850
4.	Bireuen	22,948	2,110	424	613
5.	Aceh Utara	38,831	1,220	245	367
6.	Aceh Jaya	9,234	8,850	352	553
7.	Aceh Barat	21,551	2,970	119	178
8.	Aceh Barat Daya	16,269	3,080	123	185
9.	Others	178,288	9,480	718	1,078
Total NAD		**356,510**	**37,500**	**2,830**	**4,240**

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura Provinsi NAD, 2005

In the west coast areas, damaged rice-fields were mostly categorized as severely damaged and totalled more than 17,000 hectares. In the east coast areas, the damage to rice-fields was categorized as light and moderate, with the total area affected of 8,300 hectares (Table 2.5).

Table 2.5: Level of Damage to Rice-fields Due to Tsunami in NAD Province (2005)

No	Coastal/*Kabupaten*	Level of damage (Ha) [1]				Total
		Light	Moderate	Severe	Wiped out	
A.	**West Coast**	**2,920**	**5,840**	**17,520**	**2,920**	**29,200**
1.	Aceh Besar	693	1,386	4,158	693	6,930
2.	Aceh Jaya	885	1,770	5,310	885	8,850
3.	Aceh Barat	297	594	1,782	297	2970
4.	Nagan Raya	396	792	2,376	396	3,960
5.	Aceh Barat Daya	308	616	1,848	308	3,080
6.	Simeuleu	341	682	2,046	341	3,410
B.	**East Coast**	**4,150**	**4,150**	**-**	**-**	**8,300**
1.	Pidie	1,430	1,430	-	-	2,860
2.	Bireuen	1,055	1,055	-	-	2,110
3.	Aceh Utara	610	610	-	-	1,220
4.	Aceh Timur	1,055	1,055	-	-	2,110
Total A + B		**7,070**	**9,990**	**17,520**	**2,920**	**37,500**

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura Provinsi NAD, 2005
Note: Classification of damage is based on the sedimentation
[1] Light: sedimentation < 10 cm; Moderate: 10 – 20 cm; Severe: > 20 cm

The lightly damaged areas can be rehabilitated by farmers individually or by farmers' groups at their own cost. The cost is about Rp.1.0 – Rp.1.5 million per hectare for labor only, which is why they are able to undertake the task by themselves. For moderately and severely damaged areas, however, the rehabilitation will require the assistance of the government or NGOs, because it requires mechanized heavy equipment. The estimated cost for rehabilitation is around Rp.2.0 million up to Rp.2.5 million per hectare for moderately damaged, and about Rp.3.0 – Rp.3.5 million per hectare for severely damaged rice-field. This is the cost for cleaning the field of mud only. The cost to build new rice field (severely damaged), however, is much more expensive, ranging from Rp.25 - Rp.50 million per hectare. The greater cost of rehabilitation will be in the more extensively damaged western area. The estimated total cost of rice-field rehabilitation in the west coast is around Rp.67.16 to Rp.79.16 billion while building new rice-fields will require Rp.58.40 to Rp.146.0 billion. For the east coast, which suffered much less than the west, rice-field rehabilitation needs Rp.12.45 to Rp.15.36 billion. Thus, in total, the rice-field rehabilitation cost for moderately and severely damaged areas is Rp.79.61 – Rp.94.78 billion.

Based on the classification of damaged rice-field areas and the potential of paddy production, the *Dinas Pertanian Tanaman Pangan dan Hortikultura* of NAD estimated the paddy production losses and associated value from 2005 up to 2009 and this is shown in Table 2.6.

Table 2.6: Estimate of Paddy Production Losses and Its Value After Tsunami in NAD Province

No	Coastal/Year	Production losses (Tonnes)	Value (billion Rp)
1.	**East Coast (8,300 Ha)**		
	Year 2005	69,720	69.72
	Year 2006	34,860	34.86
	Year 2007	13,940	13.94
	Total of East Coast	118,520	118.52
2.	**West Coast (29,200Ha)**		
	Year 2005	122,640	122.64
	Year 2006	98,110	98.11
	Year 2007	73,580	73.58
	Year 2008	49,060	49.06
	Year 2009	24,530	24.53
	Total of West Coast	367,920	367.92
3.	**Total 1 + 2**	**486,440**	**486.44**
4.	**Losses during Tsunami**	**192,360**	**192.36**

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura of NAD, 2005

2.4. Rice Production

The amount of rice production depends on planting areas, harvesting areas and productivity. Total paddy production in NAD and in the eight *kabupaten* visited in the course of this study is presented in Table 2.7 and Table 2.8. Based on planting areas, harvesting areas, production in 2004 and also considering the damage resulting from the tsunami, the paddy production in 2005 were estimated. This estimation, however**,** do not calculated neither seasonally nor monthly production figure, because lack of data before Tsunami period. Therefore, the estimation is only the average of production in the year 2005 (Table 2.9.).

The paddy production in NAD in 2005 has been estimated using several assumptions (see the notes at the bottom of Table 2.9). Using the judgment of a soil fertility specialist (expert judgment), it is assumed that the productivity for 2005 will be 85 percent of productivity in 2004. The productivity of land with sedimentation (and salinity) of less then 10 cm (lightly damaged areas) is around 70 percent up to 100 percent of normal pre-tsunami conditions in the years following the tsunami.

Table 2.7: Planting Areas, Harvested Areas, and Paddy Production NAD, by *Kabupaten* (2002-2003)

No	*Kabupaten/Kota*	2002			2003		
		PA (Ha)	HR (Ha)	PR (Ton)	PA (Ha)	HR (Ha)	PR (Ton)
1.	Banda Aceh	510	508	1,941	190	174	664
2.	Aceh Besar	39,943	39,307	166,590	37,500	37,334	161,711
3.	Pidie	55,704	47,200	200,662	42,135	40,953	178,882
4.	Bireuen	36,074	32,610	137,648	42,334	40,675	175,157
5.	Aceh Utara	55,231	49,427	210,474	50,492	43,639	188,679
6.	Aceh Jaya	-	-	-	21,871	13,342	54,514
7.	Aceh Barat	47,169	33,440	136,960	42,706	17,079	70,115
8.	Aceh Barat Daya	-	-	-	22,537	22,253	93,781
9.	Others	87,901	112,739	459,890	154,726	152,187	624,033
Total NAD		**322,532**	**315,231**	**1,314,165**	**414,491**	**367,636**	**1,547,536**

Notes:
PA = planting areas; HR= harvesting areas; PR = production; - = data is not available
Source: Dinas Pertanian Tanaman Pangan dan Hortikultura Provinsi NAD, 2004

Table 2.8: Planting Areas, Harvesting Areas, Productivity, and Paddy Production in NAD Province by *Kabupaten* (2004)

No	*Kabupaten/Kota*	PA (Ha)	HR (Ha)	Productivity (Ku/Ha)	PR (Tonnes)
1.	Banda Aceh	186	147	52.59	773
2.	Aceh Besar	40,978	37,427	43.16	161,527
3.	Pidie	43,135	41,041	43.51	178,572
4.	Bireuen	40,876	40,745	42.92	174,886
5.	Aceh Utara	45,271	43,695	43.10	188,326
6.	Aceh Jaya	13,743	13,348	40.74	54,375
7.	Aceh Barat	19,067	17,146	40.90	70,133
8.	Aceh Barat Daya	23,924	22,271	42.03	93,612
9.	Others	154,862	152,921	39.90	622,543
Total NAD		**382,042**	**368,741**	**41.89**	**1,544,747**

Notes: PA = planting areas; HR= harvesting areas; PR = production

Based on those assumptions, paddy production in NAD in 2005 will decline almost 28 percent from that of 2004 - with productivity in 2005 of 0.85 of productivity in 2004 (Table 2.9).

Table 2.9. Estimated Planting Areas, Harvesting Areas, and Paddy Production in NAD Province by *Kabupaten* (2005)

No	*Kabupaten/Kota*	Plant. Areas Mar -Dec (Ha)[1)]	Harvs. Areas Mar –Dec (Ha)[2)]	Production Mar–Dec (Tonnes)[3)]
1.	Banda Aceh	0	0	0
2.	Aceh Besar	22,798	20,746	76,109
3.	Pidie	37,358	35,490	131,254
4.	Bireuen	21,867	21,801	79,534
5.	Aceh Utara	38,219	35,544	130,215
6.	Aceh Jaya	1,339	1,299	4,498
7.	Aceh Barat	18,878	16,990	59,066
8.	Aceh Barat Daya	13,497	11,202	40,020
9.	Others	169,595	152,635	517,662
	Total NAD	**326,109**	**313,065**	**1,114,715**

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura Provinsi NAD, 2005

Note: 1) Planting areas in March – Dec 2005 = Rice-field areas – Rice-field damage areas + rice-field can be cultivated in March – Dec 2005

2) Harvesting areas in March – Dec 2005 = Rice-field planting areas in 2005 * %age of Harvesting areas to planting areas in 2004

3) Production in 2005 = Harvs. Areas in 2005 * (0.85 * productivity in 2004)
Paddy Production in January and February 2005 = 0

2.5. Fishery

The fishery sub-sector plays an important role in NAD's economy. Its share of agricultural GDP in 2003 was 20 percent while the share of agriculture in NAD's GDP (excluding oil and gas) was 40 percent. Fish consumption in NAD was quite high and coastal communities of NAD relied heavily on fishery as their source of income (livelihood), see Table 2.10.

Table 2.10: Fish Consumption Per Capita in NAD (1999-2003)

Year	Stock (Tonnes)[a)]	Export (Tonnes)	Inter island (Tonnes)	Losses (Tonnes) [b)]	Population (000 person)	Consumption (Tonnes)	Cons/cap (Kg)
1999	137,601.2	752.4	13,796.0	13,760.1	4,144.5	109,292.7	26.4
2000	130,410,0	312.5	10,283.7	13.041.0	4,010.9	106,772.8	26.6
2001	127,757.0	588.4	16.443,4	12,775.7	4,142.1	97,949.5	23.6
2002	120,210.0	913.6	14,443.9	12,021.0	4,166.4	92,831.5	22.3
2003	162,334.2	195.4	18,203.3	16,233.4	4,166.0	127,702.1	30.7

[a).] Stock = production + Import.
[b).] Loses = 10 % of stock
Sources : Dinas Perikanan Prov. NAD 2005.

The number of households involved in the fisheries sector was also high. It was almost 87 thousands household. Open water fishery was the highest, with more than 43 thousands, followed by marine fishery with more than 17 thousands and brackish water with almost 15 thousands households (Table 2.11).

Table 2.11: Number of Household (HH) Participants in Fishery Activities (1999-2004)

Year	Marine fishery (HH)	Open water fishery (HH)	Brackish water pond (HH)	Fresh water pond (HH)	Fish in paddy field (HH)	Floating Net (HH)	Total (HH)
1999	15,706	1,957	18,385	4,820	512	34	41,414
2000	12,151	1,854	18,152	3,602	164	40	35,973
2001	11,839	2,352	17.573	3,405	2,945	39	38,153
2002	10,523	2,356	11,514	5,234	5,552	39	35,218
2003	17,285	43,114	14,859	5,992	5,552	39	86,841

Source : Dinas Perikanan Prov. NAD 2005.

In 2003 there were more than 200,000 people involved in the fisheries sub-sector (Table 2.12). As was the case with households, open water fishery has the biggest share. It was followed by brackish water and marine fisheries.

Table 2.12: Estimated Labor Participants in Fishery Sub-sector Activities in NAD (1999-2005)

Year	Marine fishery (person)	Open water (person)	Brackish water pond (person)	Fresh water pond (person)	Fish in paddy field (person)	Floating net (person)	Total (person)
1999	62,824	3,914	55,155	9,640	1,024	68	132,625
2000	48,604	3,708	54,456	7,204	328	80	114,380
2001	47,356	4,704	52,719	6,810	5,890	78	117,557
2002	42,092	4,712	34,542	10,468	11,104	78	102,996
2003	69,140	86,228	44,577	11,984	11,104	78	223,111
2004[a)]	64,137	86,228	52,470	11,964	11,104	78	226,001
2005[b)]	43,947	86,228	51,213	11,964	9,847	78	203,297

Source: [a)] Estimated based on the Report prepared by Satgas PASU DKP. February 2005.
[b).] Estimated based on the number of fishermen & aquaculture worker loss due to Tsunami from the Report prepared by Satgas PASU DKP. February 2005

The fisheries sector that suffered the most because of the tsunami was marine and brackish water fisheries. The number of boats and the area of brackish water ponds are declining significantly. Table 2.13, 2.14 and 2.15 shows the number of boats and fishery ports before the tsunami and the number of boats remaining after the disaster. Table 2.13 and Table 2.14 shows the damage to each type of vessel in the fishing fleet was more than 50 percent.

Table 2.13: Number of Fishing Fleet in NAD (2002-2004)

Kota/Kabupaten	Canoe (unit)			Outboard motor (unit)			Inboard motor (unit)		
	2002	**2003**	**2004[a)]**	**2002**	**2003**	**2004[a)]**	**2002**	**2003**	**2004[a)]**
1. Banda Aceh	35	35	35	80	80	80	114	114	114
2. Aceh Besar	125	218	201	495	475	435	202	202	202
3. Pidie	641	647	651	338	280	291	213	355	355
4. Bireuen	-	845	849	-	641	650	-	574	592
5. Aceh Utara	228	236	236	381	392	400	1178	816	893
6. Aceh Jaya	-	-	-	-	-	-	-	-	-
7. Aceh Barat	541	645	650	194	198	201	618	871	847
8. Aceh Barat Daya	-	568	559	-	163	163	-	140	140
9 Others	2,561	4,064	4,164	1,699	1,253	1,276	1,645	3,628	3,748
Total NAD	**4,131**	**7,258**	**7,345**	**3,187**	**3,455**	**3,496**	**3,970**	**6,700**	**6,891**

a) Preliminary figures.

Source : Dinas Perikanan Prov. NAD. 2005

Table 2.14: Number of Fishing Fleet Vessels Damaged and Remaining up to April 2005

Kota/Kabupaten.	Canoe (Unit)		Outboard Motor (Unit)		Inboard Motor (Unit)	
	Damaged [a)]	**April 2005**	**Damaged[a)]**	**April 2005**	**Damaged a)**	**April 2005**
1. Banda Aceh	70	0	68	12	100	14
2. Aceh Besar	382	0	526	0	295	0
3. Pidie	467	184	247	44	276	79
4. Biereuen	495	354	78	572	956	0
5. Aceh Utara	161	75	385	15	402	491
6. Aceh Jaya	70	0	136	0	26	0
7. Aceh Barat	919	0	131	70	815	32
8. Aceh Barat	229	330	131	32	100	40
Daya	2,453	1,711	540	736	473	3275
9 Others						
Total NAD	**5,246**	**2,654**	**2,242**	**1,481**	**3,473**	**3,931**

Source: [a)] Satgas PASU DKP.

Table 2.15: Number of Fishery Ports/Fish Auction (TPI), Cold Storage and Ice Factories in NAD (2002-2004)

Kota/Kabupaten	Fishery Port/TPI (unit)			Cold Storage (unit)			Ice Factory (unit)		
	2002	2003	2004	2002	2003	2004	2002	2003	2004
1. Banda Aceh	1(1)	1(1)	1(1)	-	1	1	4	4	4
2. Aceh Besar	1(1)	1(1)	1(1)	1	3	3	5	3	3
3. Pidie	1(1)	1(1)	1(1)	-	-	-	3	3	3
4. Biereuen	-	-	-(2)	-	-	-	-	2	2
5. Aceh Utara	-(1)	1(1)	2(2)	-	-	-	5	-	-
6. Aceh Jaya	-	-	-	-	-	-	-	-	-
7. Aceh Barat	1(-)	1(-)	1(-)	-	-	-	4	4	4
8. Aceh Barat	-	-	-	-	-	-	-	-	4
Daya	4(3)	5(3)	5(3)	3	5	5	5	7	7
9 Others									
Total NAD	**8(7)**	**10(7)**	**11(10)**	**4**	**9**	**9**	**26**	**33**	**33**

Notes : number in bracket is number of TPI
Source : Perikanan Dalam Angka 2003

According to the survey conducted by the *Dinas Perikanan* of NAD, more than 15,000 hectares of brackish water ponds were damaged due to the tsunami. In Banda Aceh, Aceh Besar, Aceh Jaya and Aceh Barat 100 percent of their brackish water ponds were wiped-out (Table 2.16).

Table 2.16: Area of Brackish Water Pond in NAD (2003-2004)

Kota/Kabupaten	Area (Ha)		
	2002	2003	2004
1. Banda Aceh	667	724	541
2. Aceh Besar	902	1,006	1,020
3. Pidie	5,056	5,056	3,176
4. Biereuen	5,153	5,147	4,962
5. Aceh Utara	9,564	10,520	10,520
6. Aceh Jaya	-	-	-
7. Aceh Barat	337	289	289
8. Aceh Barat Daya	-	-	-
9 Others	18,713	13,855	13,855
Total NAD	**40,302**	**36,597**	**34,363**

Source : Dinas Perikanan Prov. NAD. 2005

The number of brackish water ponds and boats left after the tsunami is provided in Tables 2.17 and 2.18. They show that the approximate brackish water pond area available after the tsunami was around 18,000 hectares whereas number of boats was 8,000 units.

Table 2.17: Approximate Brackish Water Area Remaining After Tsunami

Kota/Kabupaten.	Level of damage (%)[a]	Approx. damaged area (Ha)	Approximate Area by April 2005 (Ha)
1. Banda Aceh	100	541	0
2. Aceh Besar	100	1,020	0
3. Pidie	50	1,588	1,588
4. Biereuen	50	2,481	2,481
5. Aceh Utara	40	4,208	6,312
6. Aceh Jaya	100	-	-
7. Aceh Barat	100	289	0
8. Aceh Barat Daya	30	-	-
9 Others	40	5,542	8,313
Total NAD		**15,669**	**18,694**

a) Based on the estimation done by Dinas Perikanan Prov. NAD, 28 January 2005.

Table 2.18: Approximate Number of Catching Boat and Brackish water Pond Available by April 2005

Kota/Kabupaten	Number of boats April 2005 (Unit)			
	Canoe	Outboard Motor	Inboard Motor	Total
1. Banda Aceh	0	12	14	26
2. Aceh Besar	0	0	0	0
3. Pidie	184	44	79	307
4. Biereuen	354	572	0	926
5. Aceh Utara	75	15	491	581
6. Aceh Jaya	0	0	0	0
7. Aceh Barat	0	70	32	102
8. Aceh Barat Daya	330	32	40	402
9. Others	1,711	736	3,275	5,722
Total NAD	**2,654**	**1,481**	**3,931**	**8,066**

It is estimated that fish production in 2005 will decline 43.2 percent as shown in Table 2.19 and account for just 73,500 tonnes (marine and brackish water). The one positive outcome of the tsunami and the decline in the number of boats is that it will give the natural resources (marine potential) an opportunity to recover.

Table 2.19: Approximate Marine and Brackish Water Fish Production, in NAD (2005) in tonnes

Kota/kabupaten	**Canoe**	**Outboard Motor**	**Inboard Motor**	**Total Marine Fish**	**Brackish Water Fish**	**Total**
Banda Aceh	0.0	86.4	189.0	275.4	0.0	275.4
Aceh Besar	0.0	0.0	0.0	0.0	0.0	0.0
Pidie	165.6	316.8	1,066.5	1,548.9	635.2	2,184.1
Bireuen	318.6	4,118.4	0.0	4,437.0	992.4	5,429.4
Aceh Utara	67.5	108.0	6,628.5	6,804.0	2,524.8	9,328.8
Aceh Jaya	0.0	0.0	0.0	0.0	0.0	0.0
Aceh Barat	0.0	504.0	432.0	936.0	0.0	936.0
Aceh Barat Daya	297.0	230.4	540.0	1,067.4	0.0	1,067.4
Others	1,539.9	5,299.2	44,212.5	51,051.6	3,325.2	54,376.8
Total	**2,388.6**	**10,663.2**	**53,068.5**	**66,120.3**	**7,477.6**	**73,597.9**

Table 2.20: Fish production in NAD (2002 – 2005)

Kota/Kabupaten	**Production (Tonnes)**			
	2002	**2003**	**2004**	**Estimate 2005[a)]**
1. Banda Aceh	9,762	8,270	9,340	275.4
2. Aceh Besar	12,785	12,355	12,541	0
3. Pidie	14,524	13,443	13,121	2,184.1
4. Biereuen	18,644	21,250	20,250	5,429,4
5. Aceh Utara	28,757	15,854	17,850	9,328.8
6. Aceh Jaya	0	0	0	0
7. Aceh Barat	12,042	12,011	11,340	936.0
8. Aceh Barat Daya	5,382	6,385	6,412	1,067.4
9. Others	53,379	72,306	70,843	54,376.4
Total NAD	**155,275**	**161,874**	**163,701**	**73,597.9**

[a)] calculated based on Table 2.17

2.6. Number of Farmers

Human resources are another important factor in the rice production process. In this regard, farmers are the key element. In NAD Province, the population of farmers before the tsunami was 71,000 people. After the tsunami, however, there were only 53,352 farmers left as 17,632 farmers either died or are listed as missing. As detailed in Table 2.21, some 27 percent of farmers in the western region died or are missing while the corresponding figure in the eastern region was less than 2 percent.

Table 2.21: Number of Farmers Before and After Tsunami by *Kabupaten* (2005)

No	Coastal Areas/*Kabupaten/Kota*	Number of farmers (persons)	
		Before Tsunami	**After Tsunami**
1.	**West Coast**	**64,344**	**46,823**
	Aceh Besar	34,750	20,524
	Aceh Jaya	15,591	12,352
	Aceh Barat	5,801	5,565
	Nagan Raya	1,050	1,050
	Aceh Barat Daya	140	140
	Simeuleu	7,192	7,192
2.	**East Coast**	**6,640**	**6,530**
	Pidie	2,044	1,943
	Bireuen	3,647	3,647
	Aceh Utara	861	852
	Aceh Timur	88	88
3.	**Total 1 + 2**	**70,984**	**53,352**

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura Provinsi NAD, 2004

III. FOOD (RICE AND FISH) SITUATION

3.1. Rice Balance

Assuming that rice consumption is stable at 126.7 kg/capita/year and 2005's productivity is 0.85 of that of 2004, as presented in Table 3.1., it is expected that NAD will still produce a rice surplus in 2005 although it will be smaller than that of 2004. This is because demand will decline as a result of the drop in population from 4.1 million to 3.9 million even though around 37,000 out of 357,000 hectares of rice field has been damaged. This suggests that if distribution infrastructure could function efficiently, NAD will have no problem with rice availability. Damage to infrastructure, however, may prevent this from happening.

Table 3.1: Rice Balance in NAD (2002 – 2005)

Items	2002	2003	2004	2005[3)]
1. Production				
a. Paddy (tonnes)	1,314,165	1,547,536	1,544,747	1,114,715
b. Rice equivalent (tonnes)[1)]	854,207	1,005,898	1,004,086	724,565
2. Export – Import (tonnes)	-	-	-	-
3. Food availability (1 +2) (tonnes)	854,207	1,005,898	1,004,086	724,565
4. Rice consumption (kg of rice/cap/year)[2)]	126.67	126.67	126.67	126.67
5. Number of population (person)	4,349,100	4,415,500	4,104,187	3,867,650
6. Total Need (4 x 5) (tonnes)	550,900	559,311	519,877	489,915
7. Marketed surplus (3 – 6) (tonnes)	303,307	446,587	484,206	234,650

Note:
1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999, SUSENAS data for 2002 is not available
- : Data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004

Of the eight *kabupaten* visited in the study, only Banda Aceh and Aceh Jaya experienced a rice deficit. In fact, Banda Aceh is traditionally a rice deficit region. The detail of each *kabupaten's* rice balance is presented in Appendix Table 1 to Appendix Table 8. Interestingly, Aceh Utara and Aceh Barat that were always in deficit prior to the tsunami, are estimated to have a surplus in 2005. This is because the area under rice production in 2005 declined significantly but the population declined more. As mentioned before, however, this should be interpreted carefully. This does not necessarily mean there is no problem with those *kabupaten*. The damage to distribution infrastructure might give a different outcome.

Table 3.2: Rice Marketable Surplus in NAD, 2002-2005, by *Kabupaten/kota* (tonnes of rice)

Kabupaten/Kota	2002	2003	2004	2005 [1)]
NAD Province	303,307	446,587	484,206	234,650
1. Banda Aceh	- 29,313	- 30,943	-31,767	-18,547
2. Aceh Besar	63,458	59,608	58,550	17,110
3. Pidie	64,377	49,819	49,232	14,729
4. Bireuen	40,783	64,545	63,748	3,508
5. Aceh Utara	- 13,914	- 30,567	- 33,254	30,397
6. Aceh Jaya	-	21,960	21,700	-8,799
7. Aceh Barat	13,469	- 31,430	- 32,869	27,151
8. Aceh Barat Daya	-	45,225	44,917	4,984

[1)] Estimated number

3.2. Fish Balance

As is the case with rice, it is estimated that NAD will continue to have a fish surplus in the short to medium term. Table 3.3 presents information on fish surpluses in NAD for the period 2002-2005. During 2002-2004 the surplus ranged from 37,000 to 52,000 tones, part of which was traded to other regions. Even after the tsunami, NAD is projected to maintain a fish surplus of more than 38,000 tonnes in 2005. Despite the loss of almost 11,000 fishing vessels (including canoes, outboard motors and inboard motors) and damage to 15,700 hectares of brackish water ponds – including the total loss of brackish water ponds in Banda Aceh, Aceh Besar, Aceh Jaya and Aceh Barat – there is still a significant fleet of fishing vessels in Aceh Utara, Aceh Timur, Aceh Tamiang, Aceh Selatan and Aceh Singkil.

Table. 3.3: Fish Balance in NAD (2002 -2005)

Item	2002	2003	2004	2005 [1)]
1. Production (ton)	155,275	161,874	163,701	73,598
2. Export (ton)	187	195	197	0
3. Stock (1+2) (ton)	155,088	161,679	163,504	73,598
4. Fish consumption (kg/cap/yr)	27	27	27	27
5. Population (person)	4,349,100	4,415,500	4,104,187	3,867,650
6. Total Needs (4 x 5) (ton)	118,078	119,881	111,511	35,002
7. Marketable Surplus (3 – 6) (ton)	37,010	41,798	51,993	38,595

[1] estimated number

As described in Table 3.4, Pidie and Bieuren will have the most significant deficit in fish at more than 2,000 tonnes each. This is not because they experienced the most damaging effects of the disaster, but due to the high population in those *kabupaten*. The damage to brackish water ponds in those *kabupaten* was 50 percent (compared to others that experienced 100 percent damage) and the number of damaged fishing vessels is relatively similar to others. The details of the fish balance of each *kabupaten* is presented in Appendix Table 10 to Appendix Table 15).

Table 3.4: Fish Marketable Surplus in NAD (2002-2005) by *Kabupaten/kota* (tonnes of fresh fish)

Kabupaten/Kota	**2002**	**2003**	**2004**	**2005** [1]
NAD Province	37,010	41,798	51,993	38,595.7
1. Banda Aceh	1,806	96	944	-1,331.0
2. Aceh Besar	4,831	4,234	4,253	-1,921.5
3. Pidie	2,740	1,589	1,199	-2,007.1
4. Bireuen	9,949	12,441	11,332	-2,568.1
5. Aceh Barat [2]	-3,831	-4,151	-4,737	-427.6
6. Aceh Barat Daya	2,611	3,575	3,567	-493.4
7. Aceh Utara	26,848	27,281	27,729	3,221

Notes:
[1] Estimated number
[2] including Aceh Jaya

3.3. Food Aid Situation

At the national level, food-aid distribution is coordinated by a national agency called *Badan Koordinasi Nasional Penanggulangan Bencana dan Penanganan Pengungsi* (BAKORNAS PBP). Figure 3.1 describes the storing and distribution system of the food-aid.

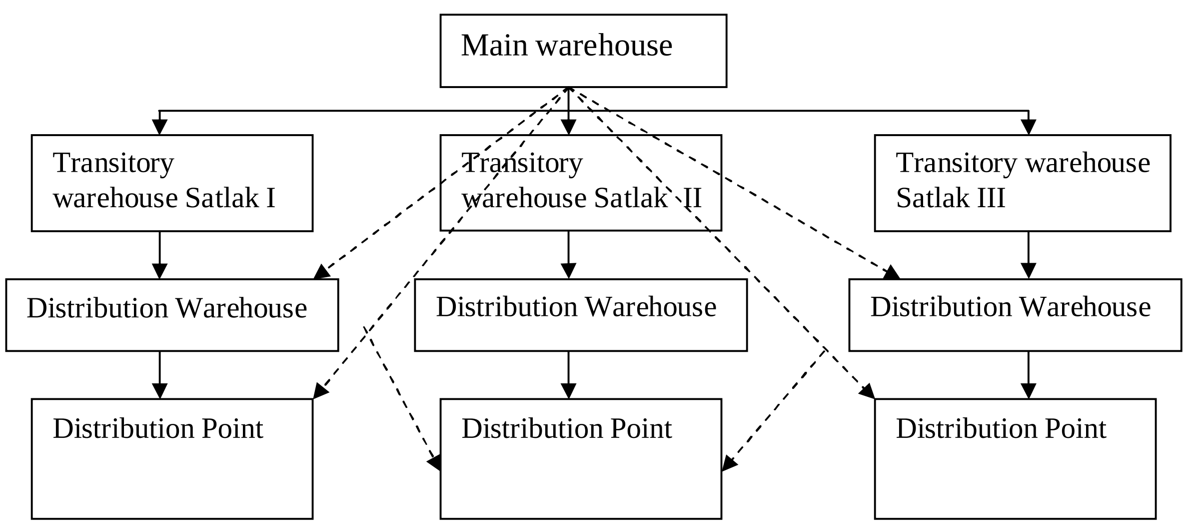


Figure 3.1: Warehouse Distribution System

There are three levels to the food-aid warehousing system, namely: (1) a main warehouse which is located in Medan, (2) transitory warehouses in each *Satlak (Satuan Pelaksana),* and (3) distribution warehouse. In addition, from the distribution warehouses the food-aid was delivered to distribution points for 5 days, 10 days or 30 days request. Satlak I covers Lhokseumawe, Pidie, Aceh Timur and Medan; Satlak II covers Banda Aceh and Malahayati; Satlak III covers Meulaboh, Teunom, Calang and Lamno. Staff employed in the distribution warehouses are the staff of the *Dinas Sosial*, PT. Pos, Pemda/Dolog, Local NGOs and refugee representatives.

The process for the distribution of food-aid is described in Figure 3.2. There are two streams to the food distribution mechanism; the administration line, and food (physical) distribution line. The administrative mechanism operates as follows: firstly, the IDP requests aid from *Satlak* and then secondly, *Satlak* reports to *Satkorlak* at the provincial level. Dinsos/UN-WFP/NGOs then informs *Satkorlak* on the availability of food in stock, and finally the delivery order comes from *Satkorlak* to Dinsos/UN-WFP/NGOs. The distribution line mechanism is as follows: (1) DINSOS/UN-WFP/NGOs delivers food to the *Satlak* (I, II, III) warehouse, (2) *Satlak* (I, II, III) distributes to the food distribution warehouse, and (3) the distribution warehouse distributes to beneficiaries (refugees). In emergency conditions food distribution will be made from DINSOS/UN-WFP/NGOs directly.

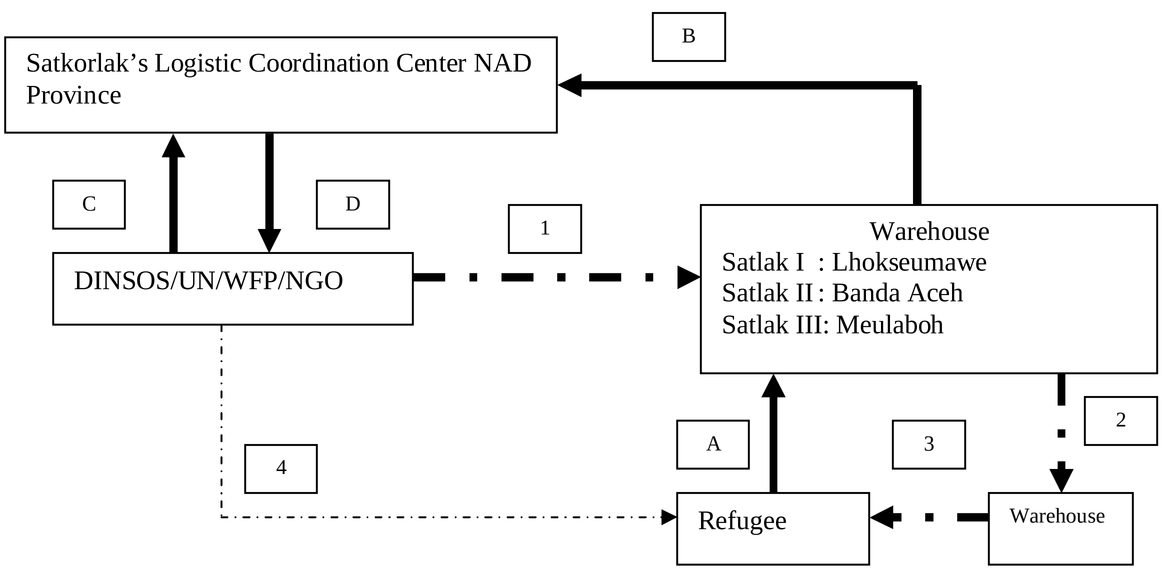


Figure 3.2: Food Distribution System

Although there is a guideline (*juklak*) for food distribution as described in Figure 3.2, there are still some constraints: (1) limited infrastructure to distribute aid, (2) weak coordination means the aid is received late by refugees, and (3) unregistered refugee movement creates difficulties in estimating the aid required**.**

There are some field findings related to food-aid distribution that need to be given attention. They are, among others: (1) NGOs and/or community donors distribute aid directly to refugees without reporting to *Satkorlak*, or report to *Satkorlak* after the aid has already been distributed, and (2) a lot of food-aid had piled up near Blang Bintang Airport although a lot of refugees had not yet received food aid. This led to: (1) uneven aid distribution to beneficiaries, and (2) it was hard to get accurate data regarding the amount, type and sources of aid that had already been distributed and received.

Based on the data from BAKORNAS PBP, the total volume of rice that had already been distributed up to 28 February 2005 was 8,632 tonnes. Based on a Bulog report of 21 February 2005, the amount of rice that had already been distributed from the Bulog warehouse through PMI, Vice Governor, Bupati/Walikota, DinSos and TNI/Polri was 6,224.6 tonnes. The details of the aid are presented in Table 3.5.

Table 3.5: The Amount and Kind of Food Aid Distributed in NAD (As at 28 February 2005)

No.	Food Items	Units	Total
1.	Rice	tonnes	8,632
2.	Noodles	Box	79,341
3.	Salted fish	Kg	44,703
4.	Vegetable oil	Box	49,472
5.	Sugar	Kg	3,576
6.	Soybean sauce	Bottle	3,212
7.	Chili sauce	Bottle	200
8.	Canned fish	Box	37,792
9.	Milk	Box	96,189
10.	Mineral water	Box	12,021
11.	Biscuits	Box	59,093

Sources : BAKORNAS PBP, 1 March 2005

Since 1 March 2005, there has been an agreement regarding the logistics of food distribution between the various stakeholders as follows: (1) rice and extra food is distributed by WFP, and (2) cash money for living allowance (*Uang untuk lauk-pauk - Jadup*) is distributed by the government through the Ministry of Social Affairs (Departemen Sosial). The cash is transferred directly to the account of the *kabupaten/kota*, and then the *Camat* and *Kepala Desa* will distribute it to beneficiaries. Food aid distributed by the WFP totalled 12 kg of rice, 0.8 kg of vegetable oil, 0.99 kg of noodles and 1.5 kg of canned fish (equivalent to 10 small cans) per person per month. The living allowance (*Jadup*) was Rp.3,000 per person per day.

The criteria for the beneficiaries who receive food aid are: (1) refugees who stay in relocation camps, (2) refugees who stay in the house of relatives, and (3) refugees who stay in the emergency camp. The total number of refugees in NAD Province is 556,638 persons who are located in 21 *kabupaten/kota* with the largest numbers in Pidie and Aceh Barat with 82,000 and 73,000 respectively (Table 3.6).

Table 3.6: Number of Refugees in NAD Province (May 2005)

No.	*Kabupaten/Kota*	Relatives' houses	Camp	Relocation Camp	Total
1.	Banda Aceh	40,989	4,651	4,903	50,543
2.	Aceh Besar	23,468	20,243	14,945	58,656
3.	Pidie	58,290	14,524	8,718	81,532
4.	Bireun	34,955	10,097	4,893	49,945
5.	Aceh Utara	13,078	15,435	1,997	30,510
6.	Aceh Jaya	6,378	31,839	2,205	40,422
7.	Aceh Barat	15,473	55,331	1,885	72,689
8.	Aceh Barat Daya	240	324	480	564
	Total NAD	**255,898**	**174,668**	**43,752**	**556,638**

Source : Daily Report of *Satkorlak* NAD Province, 17 May 2005

Food aid that has been distributed by WFP per month for a number of selection *kabupaten* (Kabupaten Aceh Jaya, Lhokseumawe, Bireun and Aceh Utara) is detailed in Table 3.7 below.

Table 3.7: Food Aid Distribution by WFP in Several *Kabupaten* in NAD Province, (2005) in kg

No.	Food Items	*Kabupaten/Kota*			
		Aceh Jaya	Bireun	Lhokseumawe	North Aceh
1.	Rice	245,880	481,728	165,384	570,804
2.	Canned fish	30,735	60,216	20,673	71,351
3.	Vegetable Oil	12,294	24,086	8,269	28,540
4.	Biscuits	-	36,130	12,404	42,810
5.	Noodles	20,285	39,743	13,644	47,091
	Number of Beneficiaries	20,490	40,144	13,782	47,567

Notes: - Distributed on May 2005 for Aceh Jaya (Source: WFP in Calang)
- Distributed on April 2005 for Bireun, Lhokseumawe, North Aceh (Source : *Satlak* I : Lhokseumawe)

In the food aid delivery system, WFP collaborated with 15 domestic and international NGOs including Muhammadiyah, PMI, CARE Australia, World Vision International, Save the Children, CRS (Catholic Relief Services), ACF (Action Contre la Faim), Help Germany, Mercy Corps International and TBD.

Food aid was received from either domestic sources or foreign countries: rice from Bulog, Japan (rice was bought from USA) and Thailand; noodles from Indonesia; canned fish from the USA and Thailand; biscuits from Indonesia and India and vegetable oil from Germany. WFP's food stock up to 13 May 2005 is provided in Table 3.8.

Table 3.8: Food Stock of WFP (As at 13 May 2005)

Region	Rice	Canned fish	Vegetable Oil	Biscuits	Noodles	Sugar
Banda Aceh	6,083.81	112.89	691.09	370.22	161.79	-
Calang	247.59	94.80	48.11	0.70	36.86	-
Jakarta	397.00	0.00	0.00	0.00	1.07	-
Lamno	80.70	13.79	0.48	3.35	9.19	-
Lhokseumawe	1,610.10	112.70	101.78	146.26	84.51	-
Medan	7,620.27	0.00	521.46	88.00	273.04	4.00
Meulaboh	1,569.36	68.44	376.19	81.99	63.93	-
Simeulue	220.00	60.00	20.00	0.00	0.00	-
Total	**17,828.83**	**466.22**	**1,759.11**	**690.52**	**630.39**	**4.00**

In tonnes
Sources : Daily Report of Satkorlak NAD Province, May 17, 2005

WFP also distributed food (biscuits) to school children (*school feeding program)* in 7 *kabupaten/kota* which covered 150,000 children, once a month. In the procurement of biscuits, WFP collaborated with DANONE, a biscuit producer.

Based on a daily report from *Satkorlak* on 17 May 2005, living allowances (*uang Jadup*) for March 2005 have been distributed by the government to 20 *kabupaten/kota* in two tranches; Rp.39,447,810,000 in the first tranche and Rp.38,880,040,000 in the second tranche. In total, an amount of Rp.78,327,850,000 in living allowances has been distributed.

There are a number of other findings that should be handled discretely. Firstly, it was regrettably found that some people and also domestic and international NGOs are not fully confident in the Government's performance in the distribution of food aid and, as a result, delivered food directly to beneficiaries. Among the many reasons given are: (a) there were cases where aid in the form of high quality rice was found to have been sold by some government officers and substituted with lower quality rice before being distributed to beneficiaries, and (b) administration procedures were too rigid.

Secondly, although *uang jadup* has been distributed since March 2005, as of May 2005 some refugees has still not received the *jadup,* even though the *jadup* was highly needed to fulfill daily requirements like kerosene, sugar, egg, student transportation etc. There were also complaints that in March 2005, *uang jadup* that should have been distributed was Rp.99,000 per person, but each refugee was only receiving Rp.90,000. The organizer argued that the discrepancy was transportation and administration cost.

Thirdly, some refugees, especially those staying in relatives' houses have started to resume their normal business activities (such as trading, construction etc) and no longer need food aid. In addition, there are refugees who do not want to join the cash for work program because income from trading activities is higher**.**

3.4. Impact of Food Aid on Consumption

Rice is a staple food for households in NAD, both rich and poor and for those who live in urban areas or rural areas. Prior to the tsunami the consumption participation rate (the proportion of households consuming the food product) for rice reached 95 percent. The consumption participation rate of noodles is higher than for cassava. In addition to rice, most households in NAD consume fresh fish, sugar and cooking oil. A more detailed set of data on consumption participation rates for some commodities is presented in Table 3.9. Due to security problems BPS did not collect data for NAD to include in the 2002 SUSENAS.

Table 3.9: Consumption Participation Rate of Food Consumption in NAD, 1999 (%)

No.	Food items	Urban	Rural
1.	Rice	95.0	100.0
2.	Maize	0.4	1.4
3.	Cassava	13.7	27.1
4.	Noodle	41.1	31.8
5.	Chicken	6.5	4.8
6.	Eggs	78.3	69.3
7.	Fresh Fish	89.1	94.8
8.	Processed Fish	33.0	58.3
9.	Edible oil	93.3	97.4
10.	Sugar	93.7	95.4

Source : Susenas, 1999

There has been a long-term consistent pattern of the consumption of rice as a staple food consumption item. This is due to a number of reasons: (1) the culture of consuming rice has been maintained from generation to generation, (2) the image or social perception is that rice has a higher status than other staple foods, and 3) the taste of rice has been highly suitable for the people of NAD (taste preference).

Meal frequency before the tsunami was 3 times/day. In the early post–tsunami period (first – second week), the frequency of consumption in west coast areas declined (to 1-2 times/day), while in the east coast areas the frequency pattern remained relatively constant (3 times/day). Some refugees in the mountain areas eat cassava, banana or coconut. Food (rice) aid had an impact on consumption by normalizing the frequency of a household's staple food consumption in the province (Table 3.10).

Table 3.10: Frequency of Staple Food Consumption in NAD Province

Situation	West Coast Areas	East Coast Areas
Before Tsunami	3 times	3 times
Early January 2005 After Tsunami	1-2 times	3 times
Mid- May 2005 After Tsunami	3 times	3 times

Before the tsunami, the sources of rice and fish for household consumption came generally from self-production, especially in rural areas as well as food aid programs like *Raskin* (for rice) and other food items that they bought. After the tsunami, all of a household's food consumption in the affected areas was obtained from food aid from relatives, government, domestic and international NGOs.

Current household food consumption in NAD Province mostly depends on carbohydrate food, because rice and noodles are the two items of food aid were mostly consumed by refugee. The consumption of other foods was very limited. Table 3.11 shows the situation with the frequency of other food items.

Table 3.11: Frequency of "nabati" and "hewani" Food (except canned fish) and vegetables and fruit in NAD Province

Situation	West Coast Areas	East Coast Areas
Early January 2005 After Tsunami	low	low
Mid-May 2005 After Tsunami	better	better

Food aid that was distributed monthly by WFP included rice, vegetable oil, canned fish and noodles. In addition to this aid, some refugees also received rice-aid through the *Raskin* program and some refugees still have a stock of rice of around 2 - 4 sacks (1 sacks = 20 kg). Rice from the *Raskin* program in NAD Province in 2002 – 2005 is detailed in Table 3.12.

Table 3.12: Distribution of Rice Aid through Raskin Program in NAD Province 2002-2005 (tonnes)

No.	*Kabupaten/Kota*	2002	2003	2004	2005
1.	Banda Aceh	223.4	368.1	4,198.1	3,315.6
2.	Aceh Besar	898.4	971.0	11,507.7	9,088.6
3.	Pidie	997.4	1,376.5	15,815.9	12,483.6
4.	Bireun	421.4	670.7	7,108.3	5,614.1
5.	Aceh Utara	1,025.4	1,289.1	14,863.9	11,739.6
6.	Aceh Jaya	-	146.0	1,687.0	1,332.5
7.	Aceh Barat	442.4	205.1	2,384.2	1,883.0
8.	Aceh Barat Daya	-	194.4	2,252.2	1,778.9
	Total NAD	**6,498.1**	**8,699.0**	**100,000.0**	**78,980.0**

Source: Bulog Regional Division (Divre) NAD

A study conducted by BPS and BBKP NAD Province (2002) stated that rice, vegetable oil and processed fish consumption were lower than those foods which were distributed by WFP (Table 3.13.). The results of interviews with refugees shows that food consumption was less than the food aid that they received. Although the people of NAD do not consume sticky rice daily, this was the type of rice aid provided by Japan was sticky rice. As a result, many of them sold the rice aid and changed to non sticky rice. They also usually consume fresh fish. Some of them do not like to consume canned fish. The type of processed fish that is commonly consumed by them is salted fish**.**

Some of the beneficiaries sold rice and canned fish from food-aid to get cash money. The price of the rice was the same as the market price (Rp. 2,500/kg) with the price of canned fish being Rp.1,500/small can. Cash received from the sold rice or canned fish was used to buy sugar, kerosene, eggs and vegetables. Consideration should therefore, be given to the kind and amount of food aid distributed by WFP.

Table 3.13: Food Consumption in NAD (Kg/cap/month)

Food items	Susenas 1999	BBKP 2002	WFP Food Aid	Interview on May 2005
Rice	11.33	10.97	12.00	7.5 - 12.0
Sugar	0.94	0.93	-	0.94 - 1.5
Vegetable Oil	0.51	0.52	0.60	0.46 - 0.64
Processed Fish	0.70	0.29	1.50	0.9 - 1.2

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IV. FOOD DISTRIBUTION AND MARKETING

4.1. Rice Marketing

4.1.1. Rice Marketing Map

The rice marketing map in NAD can be divided into four regions (a) the west coast, (b) the east coast, (3) Banda Aceh and Medan as deficit provincial markets, and (4) deficit hinterlands consumer markets. Banda Aceh and Medan play an important role in NAD rice marketing. The two cities might be considered as barometers of NAD rice marketing.

The west coast region includes: (a) major rice production regions (Aceh Jaya, Nagan Raya, Aceh Barat, Aceh Barat Daya and Aceh Selatan); (b) production and consumption regions (Lamno, Teunom, Blang Pidie and Tapak Tuan); (c) consumption regions (Simeulue, Singkil, Meulaboh and Calang). Before the tsunami, around 60 percent of the last two regions' rice needs was supplied by the first regions, 35 percent supplied by Banda Aceh and 5 percent supplied by Medan. After the tsunami, since parts of the rice production centers in Aceh Jaya and Aceh Barat were severely damaged, the rice supply for the two regions was still sourced from Nagan Raya, Aceh Barat Daya and Aceh Selatan but Banda Aceh contributed around 30 percent (via sea transportation) while Medan's contribution increased to around 10 percent.

Rice production centers in the east coast regions are Aceh Besar, Pidie, Bieureun, Aceh Utara and Aceh Timur while the production and consumption regions are Jantho, Bereunuen, Bierueun, Idi Rayek and Matang Gelumpang Dua. The consumption regions are Sigli, Lhok Seumawe and Langsa. Rice fields in the east coast regions' production centers were mostly categorized as lightly damaged. Before the tsunami, the production centers of this region such as Aceh Besar, Pidie and Bieruen were the rice suppliers of Sigli, Biereun, Lhok Sumawe and some markets of the eastern part of Aceh like Jantho, Bereunun and Idi Rayek. The rice supply for those areas was around 40 percent of the regions' need. The production centers also supplied around 40 percent of Banda Aceh and Medan's demand for rice. It was reported that around 30,000 tonnes of rice flowed to Banda Aceh yearly from this region, and even more to Medan as it has six times the population of Banda Aceh. Production centers in the east coast also supplied the hinterland (Takengon, Bener Meriah and Kota Cane) at around 20 percent. This region also supplied markets in Medan before and after the tsunami (40 percent before and 30 percent after the tsunami). The rice flow to Medan is possible because of price differences and also the limited milling capacity. Milling capacity of each local RMU was around 5 – 10 tonnes per day.

Banda Aceh and Medan were important rice markets for NAD. West coast production centers supply 35 percent of the two cities' rice needs while east coast production centers supply 40 percent of it. Medan absorbs quite a lot of NAD paddy to mill as it is becoming a good quality rice. It is around 40 percent of NAD's rice production. Banda Aceh – Medan rice trade reachs 25 percent of the two cities' rice needs. Rice flows from Medan to Banda Aceh when there is no harvest in NAD, and the reverse is true when NAD is in harvest time. During the grand harvest period rice flow from NAD to Medan might reach 200 tonnes daily.

The deficit hinterland includes the regions where rice production is less than consumption needs. These regions include Takengon, Bener Meriah and Kuta Cane. Pidie, Biereun and Aceh Utara supply 60 percent of these regions' rice needs; Medan supplies 10 percent and the rest, 30 percent, is locally produced.

The tsunami destroyed some rice production centers, but the rice marketing map did not change as the most seriously damaged rice-fields were experienced by Aceh Jaya, Aceh Barat, and Aceh Besar. Rice supply from west coast production centers declined to 20 percent due to transportation infrastructure and rice-field damage. The rice flow from the east coast production centers also declined to 30 percent and was affected significantly by the scale of rice-aid. A diagramatical representation of the rice flow to and from NAD is presented in Figure 4.1. and Figure 4.2.

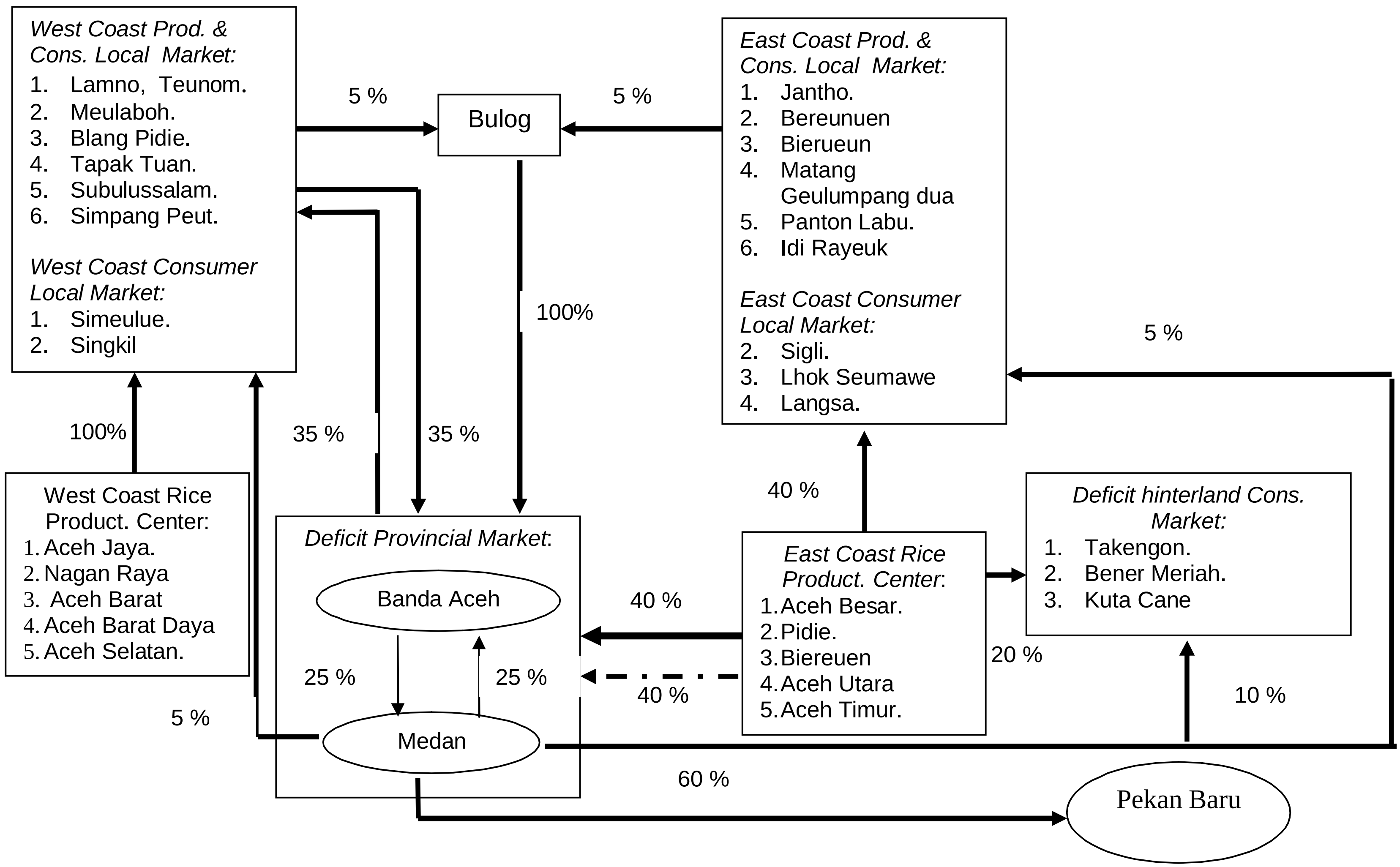


Figure 4.1: Rice Marketing Channel before Tsunami in NAD

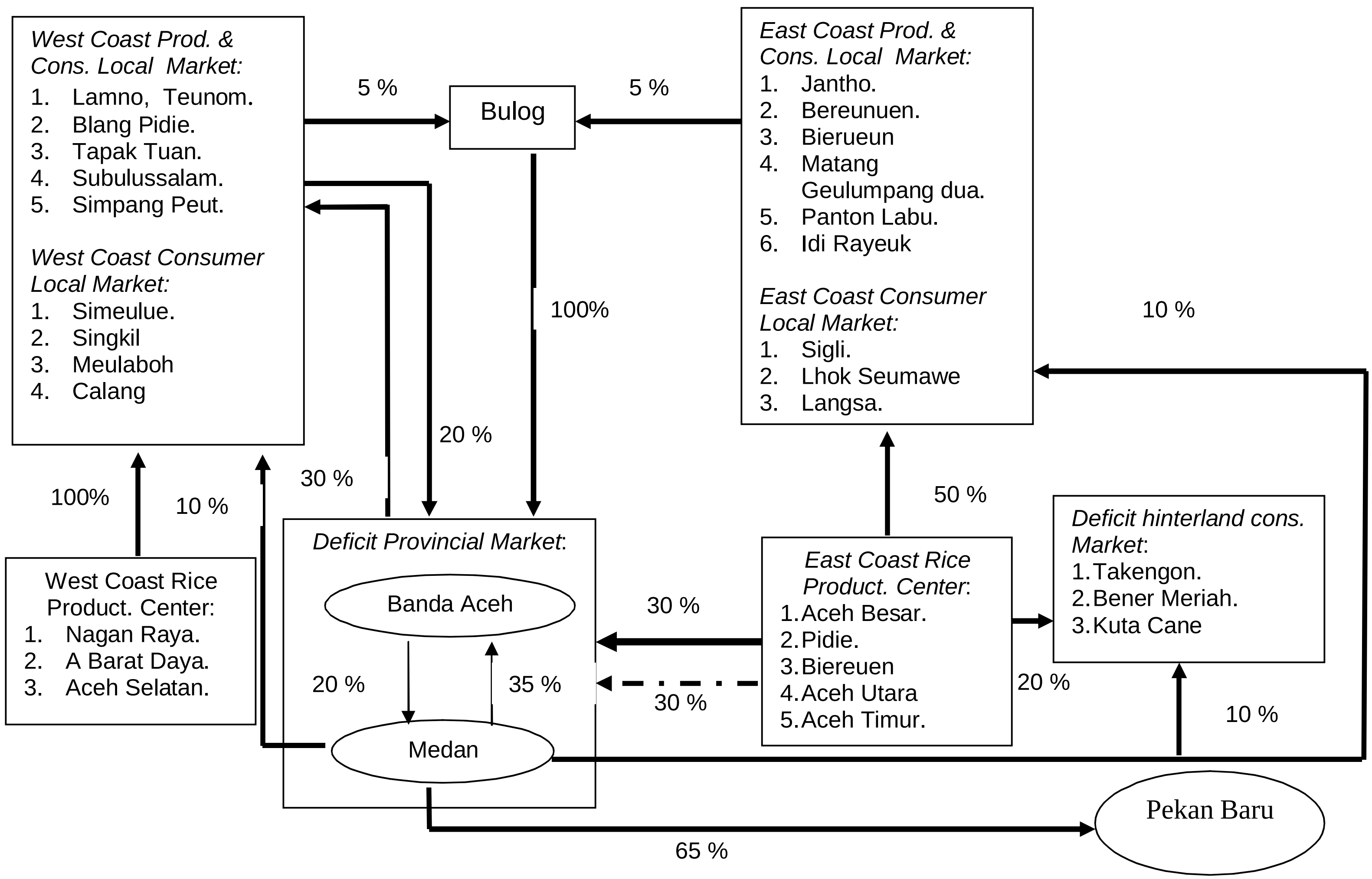


Figure 4.2: Rice Marketing Channel After Tsunami in NAD

4.1.2. Rice Marketing Margin

There are two types of rice trade flow in NAD. Firstly, there is the local trade flow, from rice farmer to retailer, examples of this type of trade can be found in Indrapuri and Blang Bintang. Secondly, there is the trade which involves the paddy-rice process. In this type of trade, rice flows from the east coast to Medan and then back to Aceh. Table 4.1. presents the rice price and the marketing margin of locally traded rice.

Table 4.1: Rice Price and Marketing Margin of Blang Bintang and Indrapuri Rice to Retailers in Banda Aceh, Before and After Tsunami

Item	Before Tsunami		After Tsunami	
	Price (Rp/kg eq. Rice)	% to retail price	Price (Rp/kg eq. Rice)	% to retail price
1. Farm-gate	2,230	74.3	2,540	78.4
2. Collecting trader's selling price	2,310 (25)	77.0	2,600 (25)	80.7
3. RMU's selling price	2,675 (55)	89.2	2,950 (40)	91.1
4. Kab. Wholesaler's selling price	2,800 (59)	93.3	3,070 (48)	94.8
5. B. Aceh Wholesaler's selling price	2,900 (63)	96.7	3,150 (38)	98.2
6. Retail price	3,000 (75)	100.0	3,230 (55)	100.0

Notes: (...) is profit margin

As shown in Table 4.1., the marketing margin (as the difference between retail price and farm-gate price) before the tsunami was Rp.770/kg rice, consisting of Rp.459 (59.6 percent) as the cost margin and Rp.311 (40.4 percent) as the profit margin while the marketing margin after the tsunami was Rp.690 consisting of Rp.475 (67.9 percent) as the cost margin and Rp.224 (32.1 percent) as the profit margin. The detail is presented in Appendix Table 17.

The price and marketing margin of rice delivered to Medan (for milling) and back to Aceh (popularly called "*Beras Arias*") is presented in Table 4.2. below.

Table 4.2: Rice Price and Marketing Margin of "*Beras Arias*" Before and After Tsunami

Item	Before Tsunami		After Tsunami	
	Price (Rp/kg eq. Rice)	% to retail price	Price (Rp/kg eq. Rice)	% to retail price
1. Farm-gate	2,310	61.6	2,615	65.4
2. Collecting trader's selling price	2,460 (50)	65.6	2,770 (50)	69.3
3. RMU's selling price	2,900 (80)	77.3	3,200 (60)	80.0
4. Aceh's Kab. Wholesaler's selling price	3,125 (63)	83.3	3,375 (53)	84.4
5. Medan Wholesaler's selling price	3,250 (83)	86.7	3,500 (73)	87.5
6. B. Aceh Wholesaler's selling price	3,500 (83)	93.3	3,750 (58)	93.8
7. Aceh's Retail price (per zack)	3,650 (85)	97.3	3,900 (75)	97.5
8.Aceh's Retail price (per plastic bag)	3,750 (75)	100.0	4,000 (75)	100.0

Notes: (...) is profit margin

The *Arias* marketing margin before the tsunami was Rp.1,440/kg rice, consisting of Rp.847.5 (58.9 percent) as the cost margin and Rp.592.5 (41.2 percent) as the profit margin. After the tsunami, the marketing margin was Rp.1,385/kg rice, consisting of Rp.912.5 (65.9 percent) as the cost margin and Rp.472.5 (34.1 percent) as the profit margin. The detail is presented in Appendix Table 18.

A number of important points can be drawn from Table 4.1. and Table 4.2. Firstly, after the tsunami, farmers received greater proportion of the retail price (farm-gate) compared to that obtained before the tsunami, both in relative (percentage) and absolute (Rupiah) terms. This confirms that food-aid did not give a disincentive to producers (farmers). This happened with the rice that is locally traded as well as the better quality rice that is transported to Medan and back to Aceh (*Beras Arias*). Secondly, after the tsunami the marketing margin decreased from Rp.770/kg to Rp.690/kg for locally traded rice, and from Rp.1,440/kg to Rp.1,385/kg for "*Beras Arias*". This does not necessarily mean that rice marketing is more efficient after the tsunami. It was more because traders are willing to reduce their profit from Rp.311/kg to Rp.225/kg on locally traded rice, and from Rp.592.5/kg to Rp.427.5/kg for "*Beras Arias*". It should be noted that the profit is not for a single link in the distribution chain (trader) but is shared by all participants (traders) involved in the marketing process, from collecting trader on farm sites to retailers at the consumer sites. The profit received by "*Beras Arias*" marketing operators is greater than that of locally traded rice because "*Beras Arias*" involves more operators in its marketing process.

4.1.3. Market Structure

The market structure before the tsunami was relatively competitive. There were a lot of alternative sources of supply, number of traders, and wide market destinations. Markets in Banda Aceh, *kabupaten* in west coast areas, Medan, Pekan Baru (temporarily) and Riau were the main market destinations. Before the tsunami, the number of rice wholesalers at Pasar Aceh was around 20, Pasar Lambaro and Aceh Besar were 3, while at the *kabupaten* markets (Pidie, Bireuen, Aceh Utara) there were around 10. Trading in western regions was done through individual transactions among traders. After the tsunami, the number of wholesalers declined to only 2 wholesalers operating at Pasar Aceh and 5 wholesalers at Pasar Lambaro. This was because many of the wholesalers went bankrupt. Wholesalers and traders from Medan, North Sumatra played an important role in rice marketing after the tsunami. Supplies declined slightly, the number of traders in major production areas was relatively stable, the number of traders in the west coast significantly declined, and distribution to the west coast was stifled.

Some of main retail markets have already moved to different locations. For example, in Banda Aceh the retail rice market moved from Pasar Aceh and Peunayong to Pasar Lambaro, Ketapang, Neusu and Ule Kareng. The number of rice retailers in Pasar Lambaro, Aceh Besar and markets in other *kabupaten* before the tsunami was around 15-20 while in western regions was more than 20. After the tsunami, at Pasar Lambaro, Aceh Besar and other *kabupaten* markets the number of retailers ranged around 2-15. In the affected areas, the number of retailers declined while in major production areas remained relatively stable. Markets in the west coast of Aceh are not operating yet and there are reportedly only 5 retailers still operating. Transactions were undertaken individually. Retail trade volume declined sharply. It was estimated that only 30-50 percent of traders were left and in the West coast the situation was even worse with no more than 10 percent left.

4.2. Fish Marketing

4.2.1. Fish Marketing Map

Before the tsunami, fish marketing in NAD might be said to be fully integrated. Banda Aceh and Medan are important markets for fish. The marketing map for fish before the tsunami is described in Figure 4.3. The sources of fish traded to the Banda Aceh market were Calang and Sigli and vice versa. Meanwhile, fish trade to Medan was from Calang, Blang Pidie, Tapak Tuan, Langsa, Lhok Seumawe, Bireuen, and Banda Aceh.

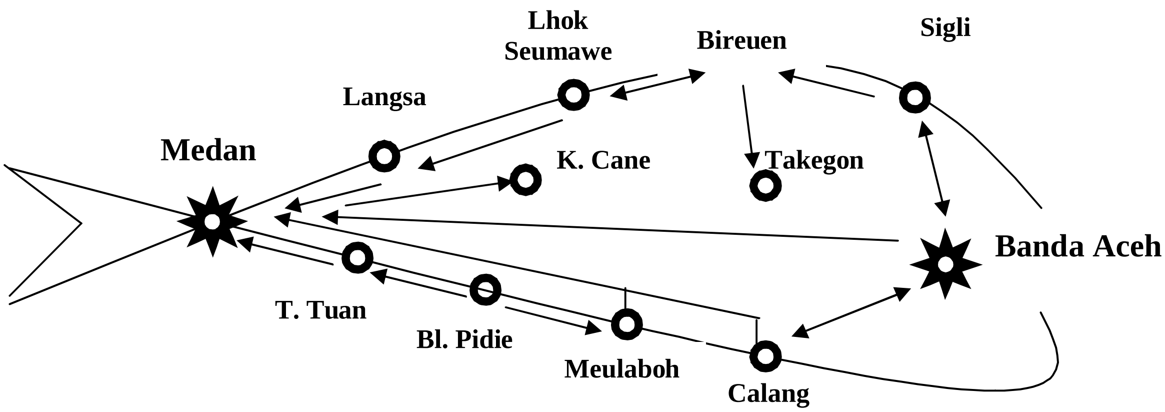


Figure 4.3: Marketing Map of Fresh Fish in NAD before Tsunami

After the tsunami the fish marketing system in NAD changed as a result of the damage to supporting infrastructure. In May 2005, the marketing map for fish in NAD is described in Figure 4.4.

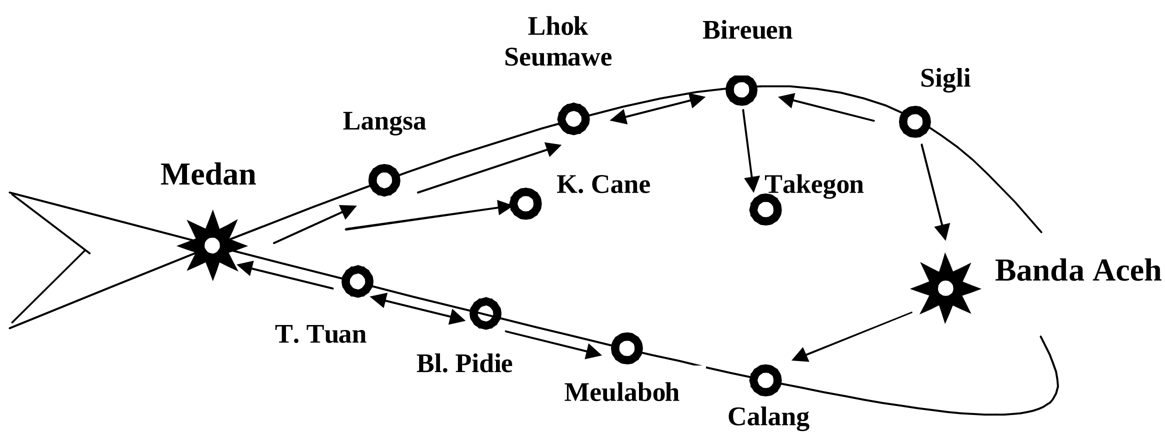


Figure 4.4: Marketing Map of Fresh Fish in NAD after Tsunami

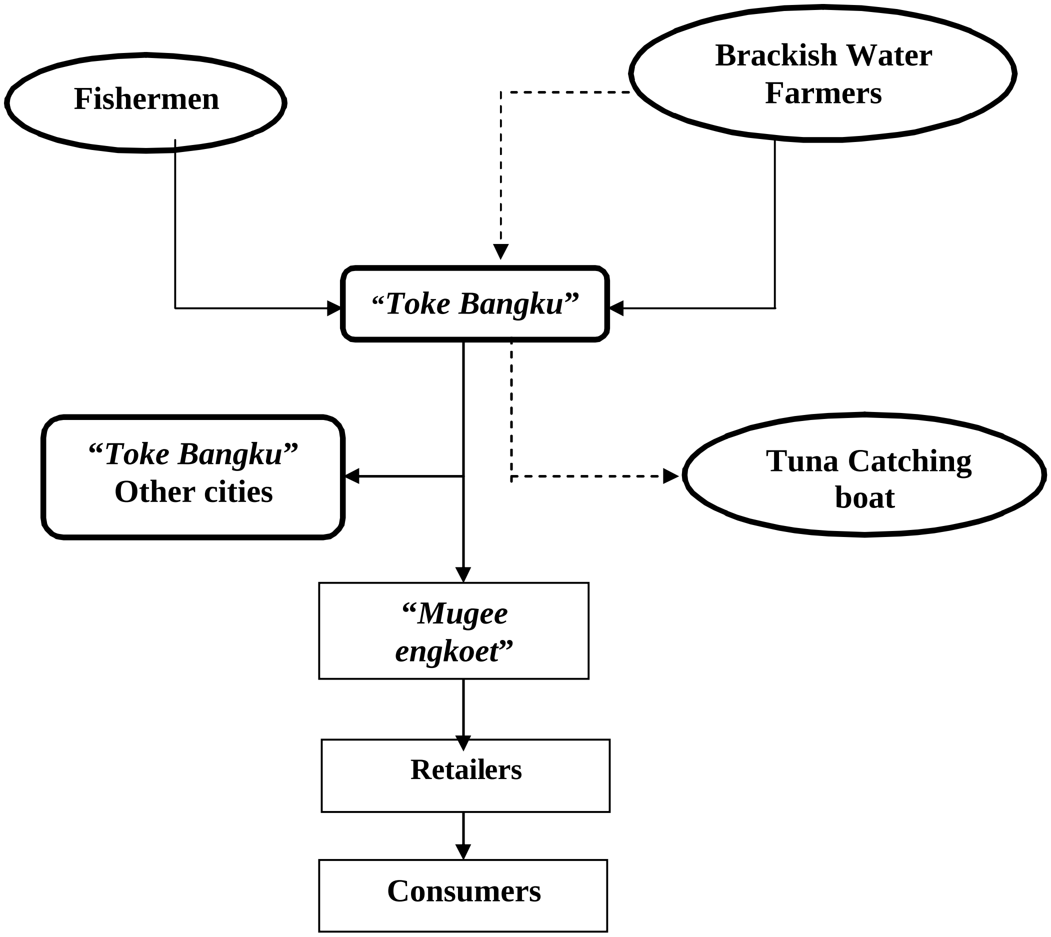
After the tsunami all NAD regions became fish deficit regions. Blang Pidie and Tapak Tuan are the closest source of fish. Fish deliveries from Banda Aceh to Calang averaged about one ton per day while from Blang Pidie to Meulaboh totalled 3 tons per day on average. The ice shortage was also one cause of the decline in the fish trade.

4.2.2. Fish Market Structure

The fish market in NAD was dominated by fresh fish with only a small trade in processed fish. Besides the preference of people to eat fresh fish, the low volume of the processed fish trade was due to the fact that it was only produced during the peak season when the price of fish is low.

Before the tsunami, the role of ”*Toke Bangku*” (a trader and a capital support for fishermen) was very dominant. The “Toke Bangku” in one region has a good business relationship with those in other regions. Besides having business in catching fish,“*Toke Bangku*” usually has an interest in brackish water fish farming as well. “*Toke Bangku*” own at least 10 boats. There was no market segmentation between wholesalers and intermediaries (“*mugee engkoet*”) in fish marketing in NAD due to the perishable nature of the fish trade. Figure 4.5 describes the marketing chain of fish in Aceh before the tsunami.

Since the tsunami disaster, the fish marketing system in NAD has changed. Some “*Toke Bangku*” died because of the tsunami, and the surviving “*Toke Bangku*” do not have enough capital to continue operating. In addition, a lack of ice also causes other problems in fish marketing in NAD. The fish marketing chain after the tsunami is described in Figure 4.6.



Notes : ——► Fresh fish marketing

- - - -► "*ikan umpan*" marketing

Figure 4.5: Marketing Chain of Fresh Fish and Bait Fish in NAD Province Before Tsunami

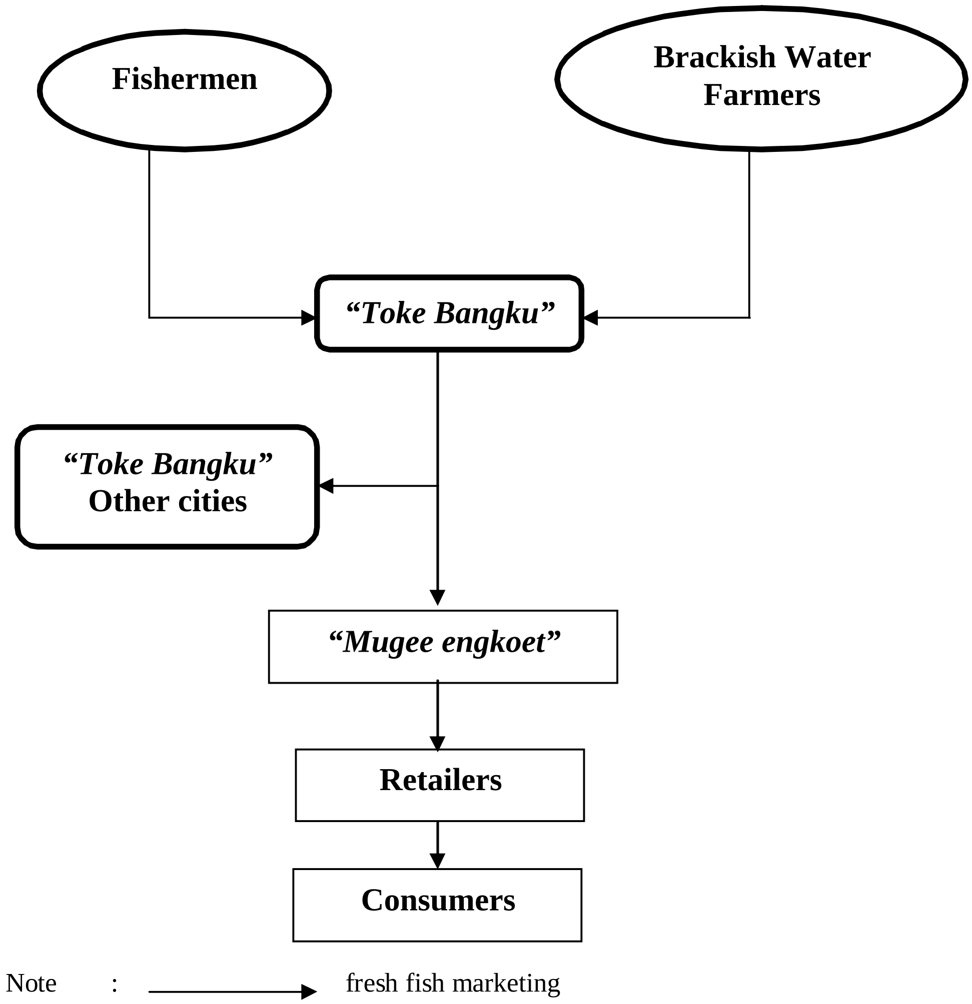


Figure 4.6: Marketing Chain of Fresh Fish in NAD Province After Tsunami

4.2.3. Fish Marketing Margin

Before the tsunami the cheaper varieties of fish (such as fresh shrimp, tuna, *tenggiri* and anchovy) traded to Medan. The important reference prices are the prices in Banda Aceh and Medan.

Table 4.3: Average Price of Fresh Fish in NAD before Tsunami [1]

Type of Fish	Price at landing place (Rp)	Consumer price at local market (Rp)	Price in Medan (Rp)
1. Little tuna (per kg)	7,000 – 8,000	10,000	-
2. Mackerel (per kg)	10,000	15,000	20,000
3. Tuna/skipjack tuna (per kg)	10,000	15,000	20,000
4. Tiger shrimp (per kg)	20,000	30,000	50,000
5. Anchovies (per kg)	17,500	25,000	40,000
6. Shark meat (per kg)	7,500	10,000	15,000
7. Small shark fin (per piece)	125,000	-	275,000
8. Big shark fin (per piece)	400,000	-	550,000
9. Shark skin (per sheet)	100,000	-	200,000
10. Milk fish bait (per head)	300	500	-
11. Milk fish (per kg)	15,000	17,500	20,000
12. White shrimp (per kg)	5,000	10,000	-

Notes:
[1] Price before and after Tsunami are relatively the same

The prices before and after the tsunami are relatively the same as the decline of supply was accompanied by a decline in purchasing power. In Teunom, the price of *tongkol* in the morning was Rp.10.000/kg but declined to Rp.5.000/kg in the afternoon because of a lack of ice to preserve the fish. For that reason many consumers usually buy their fish in the afternoon. The fish sold in Meulaboh originated from Blang Pidie while those that sold in Calang came from Banda Aceh. Fish supplies from eastern regions have started entering the market although these supplies are mostly for the local market.

Brackish water ponds produced shrimp and milk fish which is its main product. Most milk fish are traded to Medan and only a small part is traded in the local market. The price of milk fish is Rp.15.000/kg at the farm level while white shrimp which is mostly sold at the local market is Rp.5.000/kg at the farm level. Information on marketing margins is presented in Table 4.4.

Table 4.4: Fish Marketing Margin in NAD

Type of Fish	Local Market (Rp)		Medan (Rp)	
	Marketing Margin [a]	Profit Margin	Marketing Margin [a]	Profit Margin
1. Little tuna (per kg)	1,000-1,750	1,000-1,250	-	-
2. Mackerel (per kg)	3,000	2,000	8,000	2,000
3. Tuna/skipjack tuna (per kg)	3,000	2,000	8,000	2,000
4. Tiger shrimp (per kg)	6,000	4,000	15,000	5,000
5. Anchovies Medan (per kg)	5,000	2,500	20,000	2,500
6. Shark meat (per kg)	1,500	1,000	5,500	2,000
7. Small shark fin (per piece)	-	-	10,000	140,000
8. Big shark fin (per piece)	-	-	10,000	140,000
9. Shark skin (per sheet)	-	-	10,000	90,000
10. Milk fish bait (per head)	100	100	-	-
11. Milk fish (per kg)	1,000	2,500	3,000	2,000
12. White shrimp (per kg)	3,000	2,000	-	-

Notes:
[a] include transportation, handling, waste, and security costs

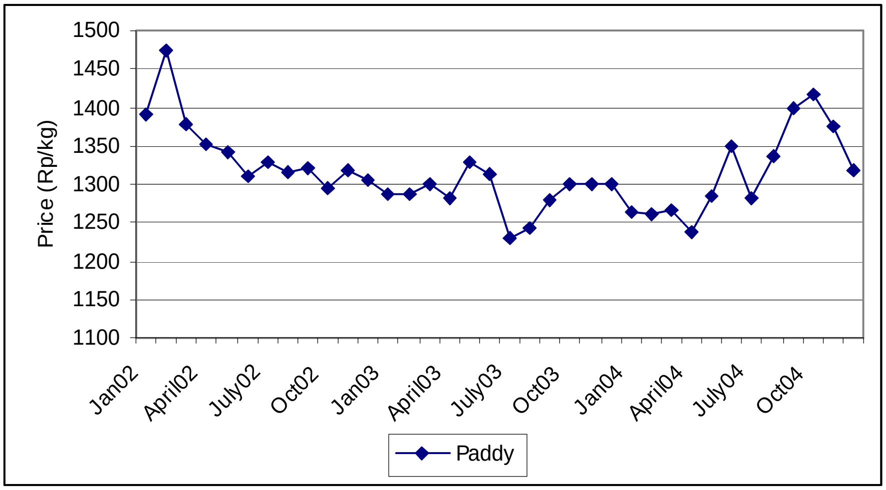
4.3. Prices of Food Commodities

4.3.1 Price of Paddy

Paddy price movement at the farm level is closely related to the farming system or cycle. Prices are usually low during the harvest months due to over supply. In general, the fluctuation of the paddy price during the period of January 2002 to December 2004 was relatively normal. The highest paddy price of Rp.1,473 per kg was reported in February 2002 and the lowest price of Rp.1,229 per kg was in July 2003. During April 2002 to June 2004 the price tended to be at the lower level and ranged between Rp.1,310 per kg to Rp.1,229 per kg (Figure 4.7).

The price of paddy in early April 2005 was Rp.1,750 per kg but by the onset of the harvest season the average price had decreased to Rp.1,300 - Rp.1,600 per kg by the end of April. This price is not significantly different from the pre-tsunami price which suggests that the price of paddy was not affected by the earthquake or tsunami.

At the present time, the average price of paddy in the central production areas of Pidie, North Aceh, South Aceh and East Aceh is about Rp.1,300 per kg. The paddy price in North Aceh was the lowest among the major production areas.



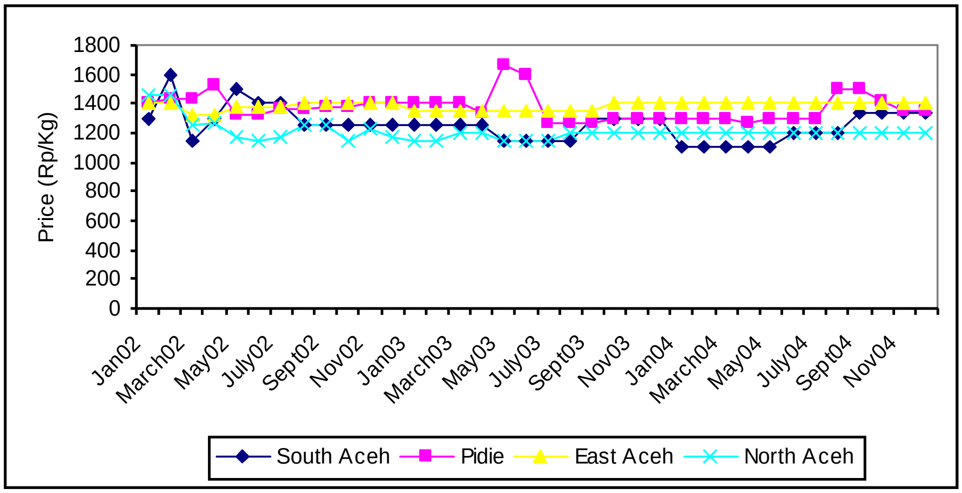
Source: Dinas Tanaman Pangan Dan Hortikultura, NAD.

Figure 4.7: The Average Producer Price of Paddy in NAD (January 2002 to December 2004)

The low paddy price in most production centers was due to over supply and limited demand from local rice milling units (RMUs). Farmers are usually paid by local RMUs but because the payment system is a non-cash system, respondents claimed that it gave no incentive to the producer. Payment in cash is usually done by the traders who have connections with traders and RMUs in North Sumatra (especially Kisaran). Most local RMUs in NAD have no plan to increase their milling capacity because the overhead cost is high. There was a trend for many RMUs in NAD to change the focus of their business to become paddy traders supplying RMUs in Kisaran.

Traders in North Aceh, Bireuen and Pidie claimed that during the harvest season, at least 200 tonnes of paddy is transported to RMUs in Kisaran everyday. Most paddy processed by RMUs in Kisaran is a high quality rice that is then transported back to NAD supplying the medium and high income groups in Banda Aceh, Lhok Seumawe and Meulaboh.

Figures 4.7 and Figure 4.8 shows that there is no significant paddy price fluctuation before the tsunami. The paddy price before the tsunami (November 2004) was around Rp.1,200 – Rp.1,400/kg while after the tsunami was around Rp.1,300/kg (primary data). Price differences among regions are usually the result of differences in their harvesting times.



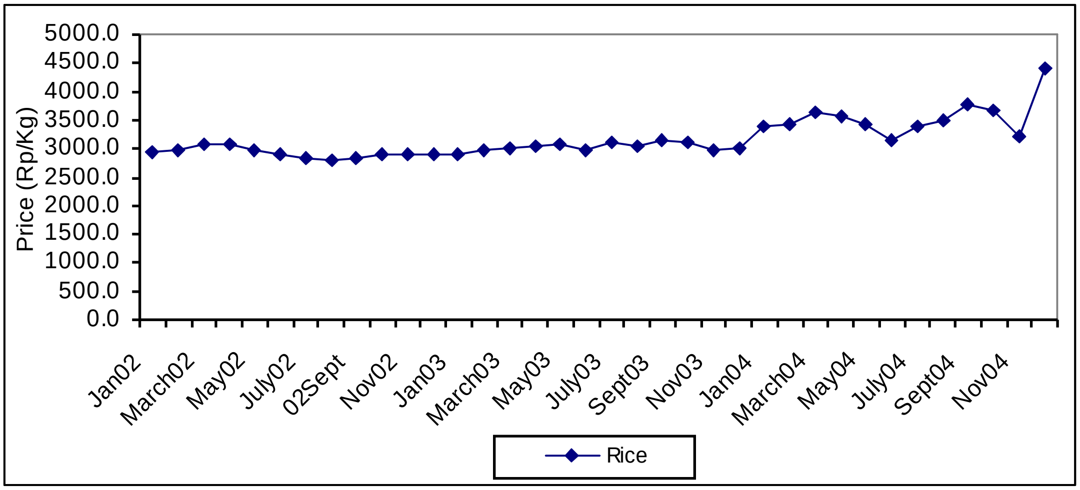
Source: Dinas Tanaman Pangan Dan Hortikultura, NAD

Figure 4.8: The Average Producer Price of Paddy in the Major Production Areas in NAD (Jan 2002 to Dec. 2004)

4.3.2. The Price of Rice

The average price of rice in NAD is reported in Figure 4.9. It shows that between January 2002 and December 2004 the price of rice in NAD was relatively stable. The role of Dolog in stabilizing the price of rice is important, especially during the civil emergency era before the tsunami. Dolog has many warehouses in Banda Aceh (Lambaro and Krueng Raya), Sigli, Lhok Seumawe, Langsa, Meulaboh and Blang Pidie which are important in stabilizing the price of rice.

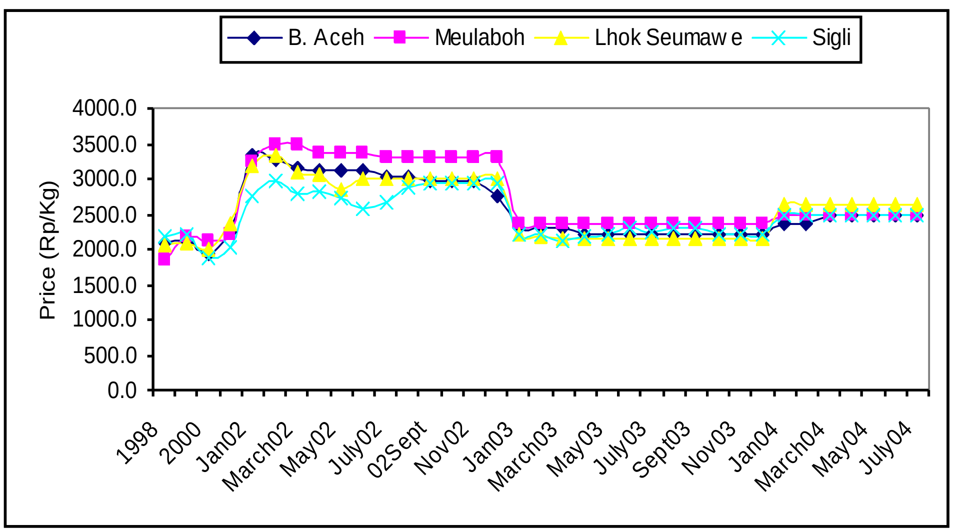
As shown in Figure 4.9, the highest price was Rp.4,418 per kg when the tsunami hit NAD at the end of December 2004. Respondents reported that the price of rice rocketed to Rp.10,000 – Rp.12,000 per kg in Banda Aceh and Meulaboh in the three weeks following the tsunami. This was the result of the destruction of many facilities by the tsunami hampering the distribution of food-aid which is still not functioning effectively to all regions.



Source: Dolog, NAD

Figure 4.9: The Average Price of Rice at Consumer Level in NAD

The role of Bulog and the openness of the NAD rice market to other regions contributed to the stabilization of the price of rice at the consumer level in many cities in Aceh. The medium quality rice of Dolog might have decreased the price of rice at the consumer level in various markets in NAD during the period shown in Figure 4.10.



Source: Dolog, NAD

Figure 4.10: The Average Price of Dolog Medium Quality Rice at Consumer Level in Various Markets in NAD.

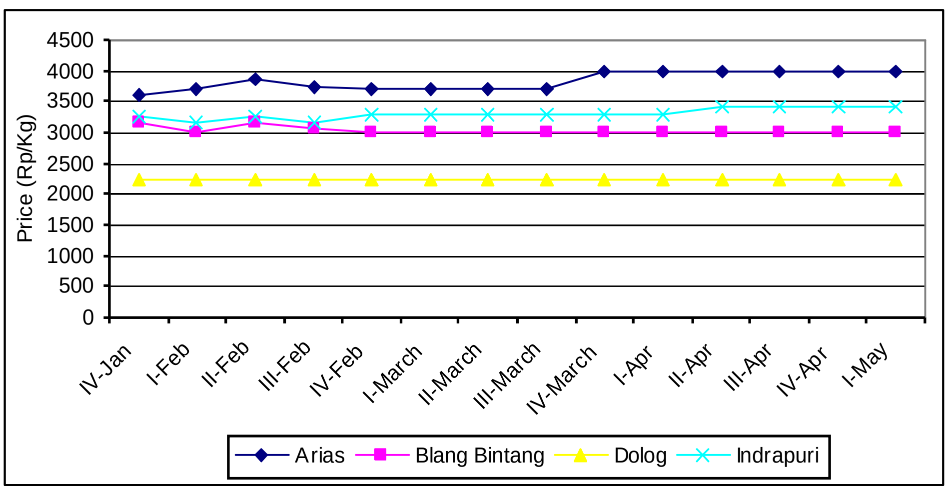
Figure 4.10 shows that Bulog and the openness of NAD rice market play an important role in Banda Aceh, Meulaboh, Lhok Seumawe and Sigli. The average price of medium quality rice at those consumer markets was reportedly Rp. 2,500 per kg. The medium quality rice in those cities is consumed by low-income groups which constitute approximately 70 per cent of the population of NAD.

After the tsunami destroyed various public facilities in coastal cities in Aceh, the price of medium quality Bulog rice and a higher quality rice (Arias, Indrapuri, and Blang Bintang) in various cities tended not to fluctuate. The price of rice remained relatively the same both before and after the tsunami, particularly for good quality local rice. The situation was also supported by a large amount of rice provided to beneficiaries (the refugees) at various refugee camps around the coastal cities of NAD by various international NGOs and the WFP. This contributed to relatively stable rice prices in NAD.

A market survey in April 2005, however, found a lot of rice-aid received by refugees being sold in the market. It was found that the rice was usually sold to restaurants, local food vendors and local market traders. The average selling price of this rice was Rp.25,000 to Rp.30,000 for a bag containing 30 kg of rice. In Meulaboh one trader who bought the refugee's rice sold it again to a trader in Medan.

For the wholesale trade in the local markets, the quantity of rice sold dropped significantly. A rice trader in Meulaboh who usually sold 5 tonnes of rice a week before the tsunami, currently sells only 2-3 tonnes a week. In Banda Aceh, a rice trader at Keutapang market who bought food-aid rice from the refugees sold the rice to local communities around Darul Imarah District of Banda Aceh.

The rice price changes in Banda Aceh (Keutapang and Lambaro markets) at the consumer level are shown in figure 4.11. The price of good quality rice (Arias, Indrapuri and Blang Bintang), and medium quality rice were relatively stable during the fourth week of January 2005 until the first week of May 2005.



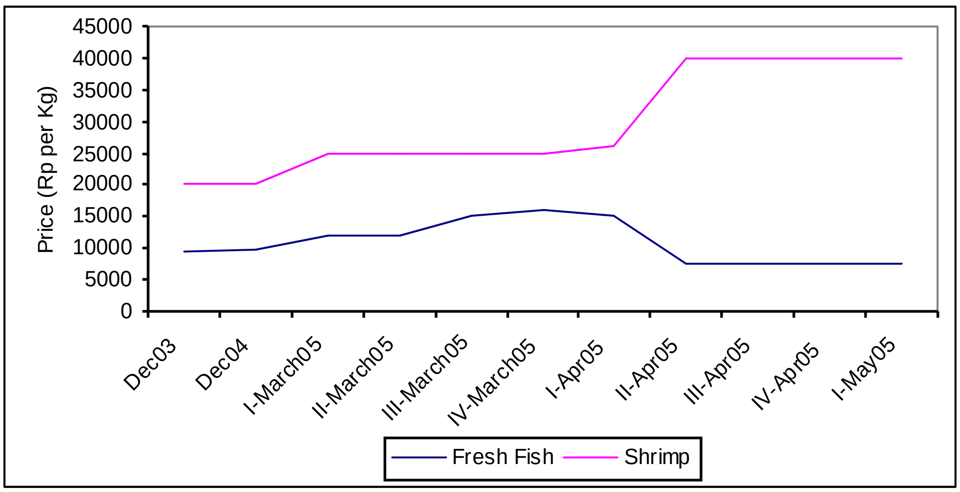
Source: Dinas Perindustrian dan Perdagangan NAD.

Figure 4.11: The Average Rice Price at Consumer Level in Keutapang and Lambaro Market, Banda Aceh

4.3.3. Price of Fish and Other Food Commodities

This section elaborates the price changes for fresh fish and some other food products (i.e. sugar, wheat flour, and edible oil) which are commonly consumed by the people of Aceh. The price of fresh fish examined in this study is limited to small tuna and tiger shrimp. Small tuna are consumed by various income groups while tiger shrimp is consumed by high income groups.

The price of tiger shrimp at the consumer level tended to increase. From December 2003 to December 2004 the average shrimp price at the local market was Rp.20,000 to Rp.25,000 per kg. In April 2005, the average price of tiger shrimp increased to almost Rp 40,000 per kg due to high demand for this product from the relief workers who are working in various cities in Aceh. On the other hand, the price of other fresh fish tended to decline as a result of the low demand from local people with reduced purchasing power. Fishermen and fish vendors in local markets have difficulty increasing fish stocks in the market due to lack of fishing equipment and other means of preserving the fish. The changes in the fresh fish price in Banda Aceh are shown in figure 4.12.

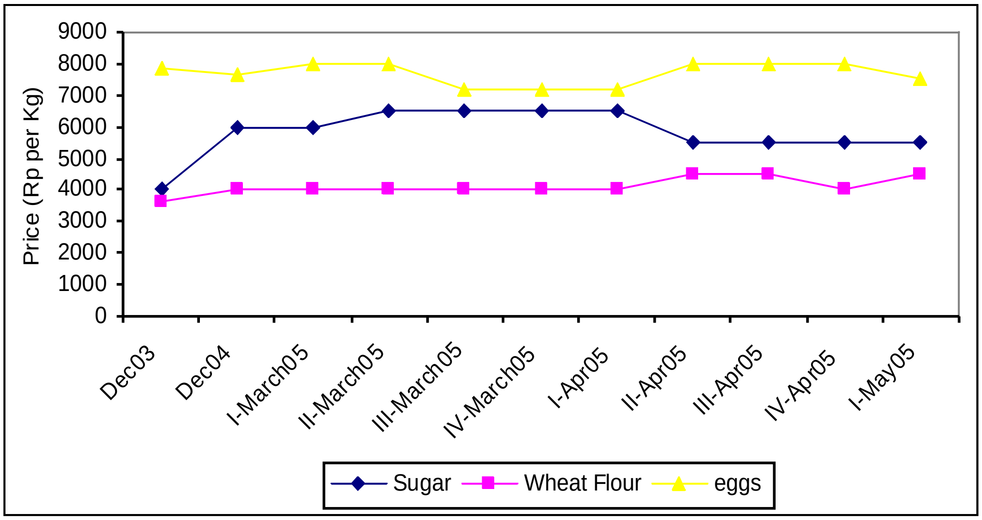


Source: Dinas Perindustrian dan Perdagangan

Figure 4.12: The Average Price of Fresh Fish and Shrimp at Consumer Level in Banda Aceh Before and After Tsunami

The price of other food commodities such as sugar, wheat flour and eggs remained stable before and after the tsunami. All of those products are highly dependent on supply from Medan. A market survey in April 2005 revealed that each day at least two lorry loads of eggs and wheat flour are transported from Medan to Banda Aceh and other cities on the west coast. Referring to Figure 4.13, it can be estimated that the stock of sugar, wheat flour and eggs in local markets were under control. It was reported that in the local market the supply and demand for those commodities was relatively the same before and after the tsunami.

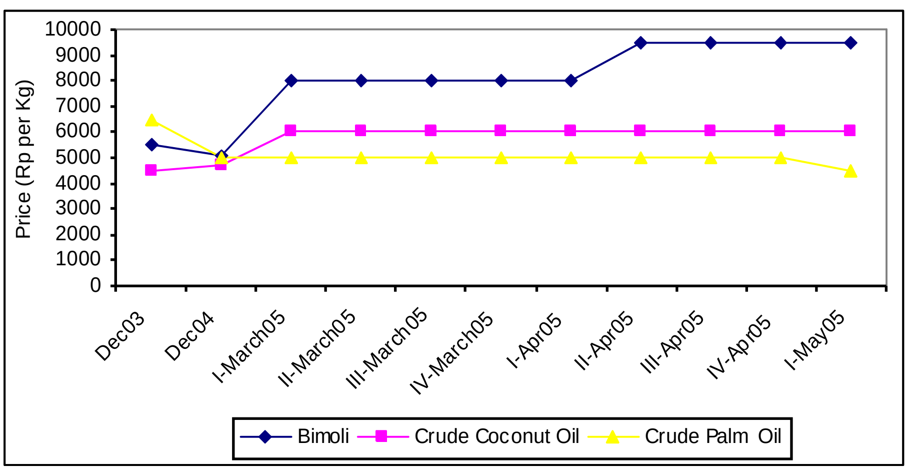
Three types of edible oil were found in the market, namely bimoli, crude coconut oil and crude palm oil. The market segment of bimoli in NAD is the high income group, the crude palm oil market is the street food vendor while coconut oil is mostly consumed by low income groups and households in rural areas.



Source: Dinas Perindustrian dan Perdagangan

Figure 4.13: The Average Price of Sugar, Wheat Flour and Eggs at Consumer Level in Banda Aceh Before and After Tsunami.

Figure 4.14 presents the changes in the edible oil price at the consumer level in Banda Aceh. The price of Bimoli increased while crude palm oil and crude coconut oil prices were relatively stable. The average price of crude coconut oil and crude palm oil in Lambaro and Keutapang markets of Banda Aceh were Rp.6,000 per kg and Rp.5,000 per kg respectively.



Source: Dinas Perindustrian dan Perdagangan

Figure 4.14. The Average Price of Bimoli, Crude Coconut Oil and Crude Palm Oil at Consumer Level in Banda Aceh Before and After Tsunami.

V. LABOR AND WAGES

5.1. The Availability of Labor Before and After Tsunami

The performance of the labor force, unemployment and job opportunity are the main indicators used in labor market analysis. The labor force situation in NAD in 2003, 2004 and the projection for 2005 are presented in Table 5.1. The working age population tended to decline. In 2003, it was 3.3 million persons, while in 2004 it had declined to 2.84 million and, as a result of the tsunami is projected to decline even further in 2005 to just 2.75 million. The cause of the population decline is virtually the same in all *kabupaten/kota*. Political conflict forced many people, including victims of the conflict, to leave NAD. In the west coast areas, the population declined more dramatically than that in east coast areas, especially for the 2004 – 2005 period.

The labor force participation rate - i.e. the proportion of the labor force to population of working age – shows that labor force which was employed in 2003-2004 tended to increase from 50 percent to 68 percent, but the tsunami resulted in a drop to 58 percent. Table 5.1. also shows information regarding unemployment. According to aggregated provincial data, the unemployment rate tended to increase from 6.23 percent in 2003 to 7.24 percent in 2004. Taking into account the number of people who lost their job because of the tsunami, unemployment has reached 21 percent.

The unemployment rate in west and north coast areas was relatively higher than in east coast areas. Field visits found that in the east coast areas economic activity began to recover within 2-3 months of the tsunami. Markets, farmers and some fishermen are back at work. Part of the labor force is involved in *padat karya* (cash for work) program activities implemented by domestic and international NGOs. Participants in the focus group discussions expressed a need for training, and their hopes to obtain work from the post-tsunami rehabilitation and reconstrction programs.

5.2. Labor Market and Wages

5.2.1. Labor Market

Agriculture (food crops) labor markets in rural areas were seasonal. Demand for labor depended on farming activities and the season while the supply of labor remained relatively constant. These conditions force many rural laborers to work in non agriculture activities as seasonal labor. Labor in the fisheries sector, on the other hand, works most of the year with a period of just 2-3 months a year when fishermen are unable to work off-shore. Laborers in the non agriculture sector (industry, trading, constraction, other services) work the whole year.

Table. 5.1. Working Age Population and Labor Force by *Kabupaten/Kota*, in NAD Province, 2003-2005

No.	*Kabupaten / Kota*	2003				2004				2005[1)]			
		Working Age population	Labor Force			Working Age population	Labor Force			Working Age population	Labor Force		
			Employ	Un-employ	Total		Employ	Un-employ	Total		Employ	Un-employ	Total
1.	Banda Aceh	221,126 (100.00)	82,123 (37.14)	18,124 (8.20)	100,247 (45.34)	196,793 (100.00)	81,330 (41.33)	18,330 (9.34)	99,719 (50.67)	152,779 (100.00)	66,545 (43.56)	11,995 (7.85)	78,599 (51.45)
2.	Aceh Besar	249,137 (100.00)	119,628 (48.02)	25,596 (10.27)	145,224 (58.29)	213,775 (100.00)	125,543 (58.73)	26,198 (12.25)	151,741 (70.98)	183,951 (100.00)	115,524 (62.80)	21,905 (11.91)	137,429 (74.71)
3.	Pidie	404,371 (100.00)	229,493 (56.75)	6,851 (1.69)	236,344 (58.44)	338,578 (100.00)	224,585 (66.33)	7,006 (2.07)	231,591 (68.40)	335,970 (100.00)	223,709 (66.59)	6,631 (1.97)	230,340 (68.56)
4.	Bireuen	281,420 (100.00)	132,255 (47.00)	22,237 (7.90)	154,492 (54.90)	240,797 (100.00)	131,399 (54.57)	21,733 (9.03)	153,132 (63.60)	239,961 (100.00)	131,118 (54.64)	21,613 (9.01)	152,731 (63.65)
5.	Aceh Utara	429,809 (100.00)	185,001 (43.04)	29,843 (6.94)	214,844 (49.98)	222,618 (100.00)	114,944 (51.66)	13,614 (6.12)	128,608 (57.77)	221,373 (100.00)	114,676 (51.76)	13,435 (6.07)	128,011 (57.83)
6.	Aceh Jaya	-	-	-	-	40,429 (100.00)	28,751 (71.11)	5,818 (14.39)	34,569 (85.50)	29,394 (100.00)	25,044 (85.20)	4,230 (14.39)	29,275 (99.59)
7.	Aceh Barat	376,033 (100.00)	206,271 (54.85)	18,750 (4.99)	225,021 (59.84)	188,603 (100.00)	109,444 (58.03)	15,009 (7.96)	124,453 (65.99)	181,963 (100.00)	107,213 (58.92)	14,053 (7.72)	121,266 (66.64)
8.	A.Br.Daya	-	-	-	-	120,478 (100.00)	54,308 (45.08)	11,310 (9.39)	65,618 (54.47)	120,010 (100.00)	54,151 (45.12)	11,243 (9.37)	65,394 (54.49)
9.	Others	1,366,573 (100.00)	690,517 (50.05)	86,111 (6.30)	776,628 (56.35)	1,278,900 (100.00)	875,225 (68.44)	91,516 (7.16)	989,431 (75.60)	1,282,046 (100.00)	745,785 (58.17)	87,150 (6.80)	837,747 (65.34)
Total		3,328,469 (100.,00)	1,645,288 (49.43)	207,512 (6.23)	1,852,800 (55.66)	2,840,971 (100.00)	1,619,961 (57.02)	205,722 (7.24)	1,825,683 (64.26)	2,747,447 (100.00)	1,588,536 (57.82)	192,255 (7.00)	1,780,791 (64.82)

Source : Dinas Tenaga Kerja Provinsi NAD, 2003 and 2004

1) Data for 2005 was estimated= population in 2004 – deceased population data from each *Kabupaten/Kota*
2) The proportion of deceased and missing population in each categories based on provincial data:
   a. Working age population deceased and missing = 41.20 %
   b. Labor force deceased and missing = 19.78 %
   c. Employment deceased and missing = 13.84 %
   d. Unemployment deceased and missing = 5.93 %

5.2.2. Impact of Tsunami on Labor Market

The impact of the tsunami on the agriculture labor market is more noticeable in western and north coast areas than that in east coast areas, in line with the severity of damage to agriculture infrastructure (land, irrigation, equipment) in the west. It is estimated that an over supply of labor might occur in the agriculture sector in west coast areas with a lower impact on the east coast. Some farmers have already returned to their farming activities even though in the first year after the tsunami the land productivity will decline due to land damage.

The impact of the tsunami on the fisheries labor market is noticeable in the coastal areas. Almost all of the brackish water ponds have been damaged or lost. Fishing equipment for fishermen have also been lost or damaged resulting in a significant rise in the number of jobless in the sector. The focus group discussion found that some fishermen have not yet returned to fishing some 2-3 months after the tsunami due to the loss of their equipment. Although they have been traumatized by their experience, they wish to return to fishing as they feel this is their profession.

The brackish water pond group discussions considered that lightly to moderately damaged brackish water ponds can be cultivated for one season in 2005 (compared to 3 seasons before the tsunami). The severely damaged brackish water ponds, however, can not be cultivated before they have been rehabilitated and reconstructed. In other words, some of them will lose their jobs and income.

The impact of the tsunami on the non agriculture sector labor market is also noticeable with reduced accessibility and mobility of labor as as result of infrastructure damage. It is estimated that their will be an oversupply of labor in parts of the severely damaged areas in NAD province. In the next 1 - 5 months, some farmers, brackish water pond farmers, fishermen, and non agriculture labor will not have regain jobs in their former professions and will remain highly dependent on aid to survive. The *Padat Karya* (cash for work) program is one solution in the short term to create job opportunities in those areas.

5.2.3. Wages

Based on data in Table 5.2, the provincial minimum wage has tended to increase over time in nominal terms, but has remained relatively stagnant in real terms. Variations of wage occurred among sectors, activities and regions. Wages in agriculture sector both for skilled and un-skilled laborers were not significantly different in west and east coast areas. In the fisheries sector, however, wages in western areas were higher than those in eastern areas. Wages in the non agriculture sector in west areas were also slightly higher than that in eastern areas, for both skilled and un-skilled labor. Wages for the *Padat Karya* program were relatively the same as wages in the non agriculture sector.

Table 5.2: Provincial Minimum Wages, Wages in Labor Market and *Padat Karya* Program in NAD

No.	Items	Wages			
I.	**Province minimum wages** 1)	**(Rp./month)**		**(Rp./mandays)**	
	1. Year 2000	265,000		-	
	2. Year 2001	300,000		-	
	3. Year 2002	330,000		-	
	4. Year 2003	425,000		-	
	4. Year 2004 2)	525,000		-	
	5. Year 2005 2)	635,000		-	
II.	**Labor Market Wages**	**West Coast**		**East Coast**	
	1. Agric.sector	(Rp/month)	(Rp./mds)	(Rp./month)	(Rp./mds)
	a.Sklilled labor 3)	-	40,000	-	40,000-50,000
	b. Un-skilled labor	-	25,000	-	20,000-25,000
	2. Fisheries sector				
	a. Sklilled labor 4)	-	100,000-150,000	-	75,000-100,000
	b.Un-skilled labor 5)	-	75,000-100,000		50,000-75,000
	3. Non Agriculture				
	a. Sklilled labor	-	80,000	600,000-1,200,000	75,000
	b. Un-skilled labor	-	40,000	-	30,000-45,000
III.	*Padat Karya* Program 6)	-	40,000	-	30,000-40,000

Notes:
1) Source : *Departemen Tenaga Kerja dan Transmigrasi* NAD Province
2) Information from focused group interview
3) Wages for tractor operator
4) Wages for *pawang* and vice of *pawang*
5) The unskilled is fishing crew. Their income is calculated by certain share of fishing catch
6) Wages for intensive labor work (*Padat Karya*) of NGOs program.

Compared to other regions (North Sumatra, West Sumatra, Riau) the wage rate in rural NAD was slightly higher, as shown in Table 5.3 below.

Table 5.3: Rural Wage Rate in North Sumatra, West Sumatra and Riau, 2004

	Province and sectors	Wage Rate (Rp/day)	
1. North Sumatra			
	Agriculture	20,000-25,000	18,000-20,000
	Non Agriculture:		
	- Unskilled	30,000-35,000	-
	- Skilled	40,000-45,000	-
2. West Sumatra			
	Agriculture	20,000-24,000	18,000-18,650
	Non Agriculture:		
	- Unskilled	30,000	-
	- Skilled	40,000	-
3. Riau			
	Agriculture	25,000-30,000	22,500-27,500
	Non Agriculture:		
	- Unskilled	35,000-40,000	-
	- Skilled	45,000-50,000	-

Source: Saptana et.al (2004)

VI. THE DESIGN OF FOOD AND LABOR MARKET MONITORING

To develop and to design food and labor market monitoring system, there are 5 (five) important matters to be considered, namely: (1) variables (data) to monitor, (2) monitoring sites, (3) time references, (4) data collecting staff (enumerators), and (5) monitoring mechanism development.

There are three important variables (data) to monitor, namely: (1) rice production (including harvested areas), (2) rice prices (at producer, trader and consumer level), and (3) agricultural and non agricultural wages by activities.

Monitoring sites are: (1) rice production centers at *kecamatan* level, including Kecamatan Jeumpa in Kabupaten Bieuren, Kecamatan Banda Sakti in Kabupaten Aceh Utara, and Kecamatan Hutiara in Kabupaten Pidie; (2) points of entrance and exit of food; (3) food deficit regions, including Kutacana and Takengon; and (4) central markets including Banda Aceh, Lhok Seumawe, Meulaboh and Langsa.

The time reference of each data might be different, depending on the commodities. Data on rice production should be collected monthly and quarterly (seasonally), rice price collected fortnightly and on wages (both agriculture and non agriculture) should be collected monthly. Data collecting staff should preferably be local residents with at least a high-school diploma or equivalent, and well trained in data collecting and interview techniques, reporting and file keeping. The completed and verified questionnaires are sent to the WFP (envelop and stamp provision is preferable in case they are difficult to find at the monitoring sites) for data entry processing done by WFP's special staff.

A suggested form for the questionnaire is in the appendices. As similar monitoring is also conducted by Bulog, Indag office, Dinas Pertanian, and BPS, however, it is better that WFP maximize the use of existing data collected by those institutions. WFP should collect data that is not covered by those institutions (such as the IDP re-employment). Existing data might be used, at least, as a good reference tool.

VII. CONCLUSIONS AND RECOMMENDATIONS

7.1. CONCLUSIONS

A. The NAD's Economic Overview

1. NAD is an Indonesian province that is rich in oil and natural gas resources like Riau and East Kalimantan. The contribution of oil and natural gas to NAD's GDP in 1990 reached 77 percent but by 2003 had declined to only about 20 percent. Natural gas will no longer be the main source of NAD's GDP growth and will be replaced by other sectors, especially agriculture.
2. On the other hand, the contribution of the agricultural, industrial and service sectors are increasing. The contribution of agriculture to GDP increased from 11 percent in 1990 to 28 percent in 2003. In the agriculture sector, the contribution of food crops is the biggest, 32 percent in 2003 although its contribution has declined from 46 percent in 1990. Other sub-sectors which also important are fishery and livestock (20 percent each). The agricultural sector also absorbed the majority of NAD's labor; 48 percent in 2003 which shows that comprehensive and sustainable agricultural sector development is important. The agricultural sector is expected to not only play an important role in food security but also in employment. In other words, rapid poverty alleviation and economic growth will be influenced by agricultural development. Labor employed in agricultural,industrial, and servises sectors is around 1 million or 61% of NAD's employment.
3. NAD is one of Indonesia's rice surplus provinces, a situation that is unaffected by the tsunami. In addition, NAD also produces surpluses of other foodstuffs such as soybean and marine fish. The *kabupaten* producing rice surpluses include Aceh Besar, Pidie, Bireuen, Aceh Utara, Aceh Timur, Aceh Tenggara, Aceh Jaya, Nagan Raya, Aceh Selatan and Aceh Barat while the deficit *kabupaten/kota* are Banda Aceh, Sabang, Lhok Seumawe, Langsa, Aceh Tamiang, Aceh Selatan, Aceh Singkil, Bener Meriah, Aceh Tengah and Gayo Luwes.
4. The tsunami has claimed no less than 150,000 lives and destroyed a lot of infrastructure and other resources. Rice-fields are one important resource that has been seriously affected by the tsunami. Of the 357,000 hectares of rice-fields in NAD prior to the tsunami, some 37,500 hectares (10.5 percent) has been damaged or lost. It is estimated that around 81 percent of this area is moderately and severely damaged, and that only 7,070 hectares of damaged fields (mostly located in the east coast areas) can be cultivated in 2005 with a resulting decline in production and household food security. It is estimated that in 2005 rice production will decline 28%-32% and that, as a consequence, it is estimated that the marketed rice surplus will decline 51%-60%.
5. The lightly damaged rice-field areas can be rehabilitated by farmers individually or by farmer-groups at their own cost. The cost is about Rp.1.0 – Rp.1.5 million per hectare and this only covers the labor cost, which is why they are able to

undertake the task by themselves. For moderately and severely damaged areas, however, the rehabilitation requires the assistance of the government or NGOs, because it needs to be done by mechanized heavy equipment. The estimated cost for rehabilitation is around Rp.2.0 million up to Rp.2.5 million per hectare for the moderately damaged, and about Rp.3.0 – Rp.3.5 million per hectare for the severely damaged land. This is only the cost for cleaning fields of mud. The cost to build new rice field (severely damaged), however, is much more expensive, ranging from Rp.25-Rp.-50 million/ha. Rehabilitation is particularly necessary in areas of the west coast.

6. The estimated total cost of rice field rehabilitation in the west coast is around Rp.67.16 to Rp. 79.16 billion while building new rice-fields will require Rp.58.40 to Rp.146.0 billion. For the east coast which suffered much less than the west, rice-field rehabilitation needs Rp.12.45 to Rp.15.36 billion. Thus, in total, the field rehabilitation cost for moderately and severely damaged areas is Rp.79.61 – Rp.94.78 billion.

7. Marine and brackish water ponds are the most seriously damaged sub-sectors; not only in terms of physical damage but also the number of people who have perished. In 2004, the number of vessels in the fishing fleet (various type) was around 17,700 units, and around 62 percent of them were damaged due to the tsunami. Around 15,700 hectares of brackish water ponds were damaged, and a lot of them were completely destroyed. In four regions the loss rate of brackish water ponds is 100 percent (Banda Aceh, Aceh Besar, Aceh Jaya, and Aceh Barat). It is estimated that the 2005 fish production will decline by 40 percent, turning these fish surplus regions into deficit ones. Moreover, severe damage has also been suffered by many ice factories and fishing ports. In any rehabilitation program, attention should, therefore, not only be given to the provision of catching equipment but also, at the same time, to the rehabilitation of ice factories and fishing ports. It is expected that the quality of fish will be unaffected and farmers will not suffer from reduced prices.

B. The Impact of the Tsunami on Food (Rice And Fish) Production

8. Before the tsunami (2004) total paddy harvest area was 382,043 hectares with total production of 1,544,747 tonnes. According to a soil fertility specialist, it is estimated that the productivity for 2005 will be 85 percent compared to 2004. The productivity of land with less then 10 cm sedimentation (and salinity) which are classified as lightly damaged areas will be around 70 percent up to 100 percent of normal condition in the following years after the damage. Based on this assumption and taking into account the performance of paddy production in 2004 (planting areas, harvesting areas, and its production in 2004) and also considering the level of damage, paddy production in 2005 will be 1,114,715 tonnes a decline of almost 28 percent on the 2004 production level. The decline, however, will not make NAD a rice deficit region. It will still produce a surplus of approximately 234,650 tonnes. Of the eight *kabupaten* studied, only Aceh Jaya and Banda Aceh will experience a deficit in 2005, at 8,799 tonnes and 18,547 tonnes respectively.

9. The fishery sector also plays an important role in the NAD economy. Its share of agricultural GDP in 2003 was 20 percent. Fish consumption in NAD was quite high (30.7 kg/capita in the year 2003) and coastal communities of NAD relied heavily on fishery as their source of income (livelihood). The sectors that have suffered the most because of the tsunami were marine and brackish water pond fisheries. The number of fishing vessels and the area of brackish water ponds has declined significantly. Fishing vessel numbers have declined from 17,732 units (2004) to 10,961 units or by 61.8 percent. Meanwhile, brackish water pond areas declined from 36,363 hectares (2004) to 18,694 hectares, or a drop of 54.4 percent. Banda Aceh, Aceh Besar, Aceh Jaya and Aceh Barat suffered the most damage with losses of almost 100 percent.

10. Fish production declined, but NAD still has a fish surplus. Up to April 2005, NAD was reported as having a fish surplus of 38,595 tonnes. Of the eight *kabupaten* in this study, only Aceh Utara experienced a surplus while others are in deficits ranging from 428 tonnes to 2,568 tonnes. The unaffected *kabupaten*, namely Aceh Selatan, Aceh Timur, Aceh Tamiang and Aceh Singkil are still in surplus.

C. The Impact of Food-Aid on the Food Market

11. Rice, fish, and other foodstuffs are commonly traded not only within NAD but also to North Sumatra. Rice and paddy flows from surplus areas such as Pidie, Aceh Utara and Aceh Timur in the west coast to various cities especially Medan, Banda Aceh, Meulaboh and Tapak Tuan. The disasters hampered the flow of rice from and to the west coast. In Banda Aceh in particular, the damage of main market places (Pasar Aceh and Penayong) has forced the main trading places to move to Pasar Lambaro, Ketapang, Neusu, and Ule Kareng. The effect of the tsunami on the rice trade in the east coast areas, however, is relatively small.

12. Food markets, including rice, are relatively competitive. A lot of traders are involved and marketing areas are quite extensive. The more open transportation system, information and price signals allow goods to flow to other regions easily, resulting in little price differentials between regions. After the disaster, almost everything changed significantly. The flow of goods, especially from the west coast, has been hampered and trade has shifted from various cities in NAD to Medan. There has also been a negative impact on the east coast trade. Some traders have gone bankrupt, and food prices in the western regions have increased.

13. Marketing costs have increased since the disaster. The increased cost was not only due to the increased price of fuel and wages, but also longer delivery times in the west coast in particular. The increase in marketing costs for the destination of Banda Aceh and Medan is relatively small but to main market destinations on the west coast have increased significantly by up to 50 percent.

14. Markets are working sluggishly because of: (1) the shrinking market destinations (Banda Aceh and *kabupaten* in the west coast); (2) the reduced number of traders, especially in the destination markets; (3) traders not wanting to take high risks from having large stocks; (4) the volume of food aid which is mostly in the form of rice with an increased supply to consumers and decreased market demand.

15. The price of rice rocketed to Rp.10,000-Rp.12,000 per kg in Banda Aceh and Meulaboh within three weeks of the tsunami This was the critical period. After this period the price of rice was relatively stable (Rp.2,850 – Rp.3,000- per Kg). Dolog's market operation and food-aid program played an important role in stabilizing prices. In addition, the rice market in NAD is relatively open to rice flows to and from other markets (e.g. Medan).

16. Other food prices before and after the tsunami are: sugar (Rp.4,000 – Rp.6,000 per kg); wheat flour (Rp.3,600 – Rp.4,500 per kg); edible oil - crude coconut (Rp.4,500 – Rp.6,000). Only bimoli (branded cooking oil) and tiger shrimp tended to increase because of high demand from high income group.

D. The Impact of Food-Aid on Consumption Pattern

17. Before the tsunami, the sources of rice and fish for household consumption in rural areas was self- production and government food aid programs such as *Raskin* (for rice) while other food was bought from local markets. After the tsunami, since most households in the affected areas were Internally Displaced People (IDP), most food was in the form of food-aid received from the government as well as domestic and international agencies.

18. Food-aid was able to stabilize eating frequencies that experienced a decline during the 2 – 3 weeks after the tsunami. Canned fish, however, does not suit the taste of most IDPs. IDPs have relatively sufficient stocks of rice (20-40 kg/households). Many of them sold part of the rice stock to get cash money for buying other daily needs such as sugar, kerosene, fresh fish and other non food items. This happened because IDPs do not receive regular living allowances. In addition, the cash for work program could not absorb all the unemployed IDPs.

19. Food consumption is currently dominated by carbohydrates in the form of rice and noodles while consumption of other food items was very limited. It should be mentioned that the food aid contributed to stabilizing the frequency of staple food consumption in the affected areas in NAD.

E. The Impact of Food-Aid on Wages.

20. After the tsunami, the unemployment rate in NAD increased almost three fold, from 206,000 (4.8 percent) to 528,000 people (13.3 percent). Wages in the agriculture sector both for skilled and un-skilled laborers were not significantly different in western and eastern areas (Rp.40,000 – Rp.50,000 per day). For the

fisheries sector, however, wages in western areas (Rp.75,000 – Rp.150,000 per day) were higher than those in eastern areas (Rp.50,000 – Rp.100,000).

21. Wages in the non agriculture sector in western areas (Rp.40,000 – Rp.80,000 per day) were also slightly higher than that in eastern areas (Rp.30,000 - Rp.75,000 per day) for both skilled and un-skilled labor. This wage rate (found at the time when the survey was conducted) is the same as that pre-tsunami. A significant increase happened temporarily i.e. during the 1-2 month period after the tsunami when the clearing process was at its peak. At that time, labor was paid on a piece-based (borongan) system rather than daily. The rate for clearing a damaged house/building, for example, was around Rp.1 – 2 million.

22. Compared to the wage rate in surrounding regions (North Sumatra, Riau and West Sumatra), the rate in NAD is slightly higher. In those three other provinces wages were ranging between Rp.20,000 – Rp.30,000/day in agriculture, Rp.30,000-Rp.40,000/day for unskilled non-agricultural labor, and Rp.40,000-Rp.50,000/day for skilled non-agricultural labor. If significantly higher wages are paid during the reconstruction phase for an extended period, it might create regional imbalances, leading to market distortions and artificially high levels of inflation.

23. Wages for the cash for work program (*Padat Karya*) were relatively the same as the labor market wage rate in the non agriculture sector, namely Rp.30,000 – Rp.40,000 per day. This wage is similar between western and eastern areas.

24. There is no strong evidence that the *Padat Karya* program in the affected areas attracts labor fron unaffected areas. Labor mobility from the unaffected to the affected areas occured temporarily during the 1- 2 months after the tsunami, especially during the period of land clearing.

7.2. RECOMMENDATIONS

1. Helping marine fishermen should be assisted with fishing equipment and with the provision of fish landing places and ice factories. Brackish water pond rehabilitation should take in to account the sustainable environmental development.

2. In the land rehabilitation program, rice-fields should be given higher priority to maintain food (rice) security. Grants and loan should be provided for the moderately and severely damaged land rehabilitation program. It is not recommended to rehabilitate the lightly damaged land using loan funds.

3. Peoples' preferences are important to consider in giving rice-aid. In terms of quantity, rice support should be reduced from 12 kg to 11 kg/capita/month. This is similar to the NAD average rice consumption found in the 1999 SUSENAS data (11.33 kg), the results of a study conducted by the Director General of Food Security, Ministry of Agricultture (10.97 kg) and focus group discussions which

mentioned a number ranging from 7.5 kg to 12 kg. The reduction would be justified, keeping in mind the consumption pattern of the younger members in the households.

4. Canned fish should be reduced from the current monthly ration of 1.5 kg/capita/month butnot eliminated as IDPs need the animal protein that fish provides. Most of the IDP's prefer salty fish rather than other processed fish. It is also recommended to include 0.50 kg of sugar per month in food-aid items. This is based on the 1999 SUSENAS data that reported NAD's sugar consumption as 0.94 kg/capita/month.

5. Without ignoring rehabilitation in the rice sector, to help refugees back to their previous profession, more attention should be given to marine fisheries and brackish water farm sub-sectors which are the sub-sector from where most refugees originate

6. Food-aid is still required until the rehabilitation program is completed. The termination, however, should be done gradually in line with the level of recovery and the return rate of labor to their original profession as well as their level of income. Referring to the estimation done by the Dinas Pertanian Tanaman pangan of NAD, the eastern part will recover its rice production in the year 2008 while the western part is estimated to recover in 2010. Based on these asumptions, food-aid should be reduced by 15%-20% each year. More accurate figures should be calculated as monitoring activities continue.

7. To improve the distribution system of food aid to the beneficiaries, it is important to re-identify the refugees condition. Some of them have already got a job; meaning they do not need as much support as previously. Consequently, updating and verifying data on refugees is important.

8. The involvement of the NGOs and other local foundations like "*pesantren*" (Islamic Educational Foundation) should be encouraged. It is expected that they will help the government in understanding cultural factors that encourage peoples' participation in addition to shortcutting bureaucratic impediments.

9. The *Padat Karya* (cash for work) program is still important and should be continued as unemployment remains high. Priority should be given to the local labor force to avoid social unrest. In addition, the involvement of local consultants and contractors will also partly solve employment problems and social unrest.

10. In relation to food price and wage monitoring activities, to avoid duplication, it is suggested that the WFP uses the results of monitoring activities conducted by Bulog (NAD regional office), Dinas Indag, Dinas Pertanian Pangan, and BPS. The forms mentioned in this report are designed to be used in rice production centers (Pidie, Bireun, Aceh Utara); deficit regions (Takengon, Kutacane) as well as central markets (Banda Aceh, Lhokseumawe, Meulaboh and Langsa).

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APPENDICES

Appendix Table 1: Rice Balance, 2002 – 2005, in Kota Banda Aceh, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	1,941	664	773	0	0
b. Rice equivalent (ton)[1)]	1,262	432	502	0	0
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	1,262	432	502	0	0
4. Rice consumption (kg of rice/cap/year) [2)]	114.3	114.3	114.3	114.3	114.3
5. Number of population (person)	267,500	274,900	282,300	162,262	162,262
6. Total Need (4 x 5) (ton)	30,575	31,375	32,269	18,547	18,547
7. Marketed surplus (3 – 6) (ton)	- 29,313	- 30,943	-31,767	-18,547	-18,547

Note:
1) Conversion factor of paddy to rice is 0.65 %
- : data are not available
2) Based on Susenas Data 1999 (for urban areas);
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 2: Rice Balance, 2002 – 2005, in Kabupaten Aceh Besar, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	166,190	161,711	161,527	76,109	71,632
b. Rice equivalent (ton)[1)]	108,023	105,112	104,993	49,471	46,561
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	108,023	105,112	104,993	49,471	46,561
4. Rice consumption (kg of rice/cap/year)[2)]	138.1	138.1	138.1	138.1	138.1
5. Number of population (person)	322,700	329,500	336,300	234,330	234,330
6. Total Need (4 x 5) (ton)	44,565	45,504	46,443	32,361	32,361
7. Marketed surplus (3 – 6) (ton)	63,458	59,608	58,550	17,110	14,200

Note:
1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 3: Rice Balance, 2002 – 2005, in Kabupaten Pidie, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	200,662	178,882	178,572	131,254	123,533
b. Rice equivalent (ton)[1)]	130,430	116,273	116,072	85,315	80,296
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	130,430	116,273	116,072	85,315	80,296
4. Rice consumption (kg of rice/cap/year)[2)]	138.1	138.1	138.1	138.1	138.1
5. Number of population (person)	478,300	481,200	484,000	511,123	511,123
6. Total Need (4 x 5) (ton)	66,053	66,454	66,840	70,586	70,586
7. Marketed surplus (3 – 6) (ton)	64,377	49,819	49,232	14,729	9,710

Note: 1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 4: Rice Balance, 2002 – 2005, in Kabupaten Bireuen, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	137,648	175,157	174,886	79,534	74,856
b. Rice equivalent (ton)[1)]	89,471	113,852	113,675	51,697	48,656
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	89,471	113,852	113,675	51,697	48,656
4. Rice consumption (kg of rice/cap/year)[2)]	138.1	138.1	138.1	138.1	138.1
5. Number of population (person)	352,556	357,042	361,528	348,937	348,937
6. Total Need (4 x 5) (ton)	48,688	49,307	49,927	48,188	48,188
7. Marketed surplus (3 – 6) (ton)	40,783	64,545	63,748	3,508	468

Note: 1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 5: Rice Balance, 2002 – 2005, in Kabupaten Aceh Utara, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a Paddy (ton)	210,474	188,679	188,326	130,215	122,556
b. Rice equivalent (ton)[1)]	136,808	122,641	122,412	84,640	79,661
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	136,808	122,641	122,412	84,640	79,661
4. Rice consumption (kg of rice/cap/year)[2)]	138.1	138.1	138.1	138.1	138.1
5. Number of population (person)	1,091,400	1,109,400	1,127,200	392,780	392,780
6. Total Need (4 x 5) (ton)	150,722	153,208	155,666	54,243	54,243
7. Marketed surplus (3 – 6) (ton)	- 13,914	- 30,567	- 33,254	30,397	25,418

Note: 1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 6: Rice Balance, 2002 – 2005, in Kabupaten Aceh Jaya, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	-	54,514	54,375	4,498	4,234
b. Rice equivalent (ton)[1)]		35,434	35,344	2,924	2,752
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)		35,434	35,344	2,924	2,752
4. Rice consumption (kg of rice/cap/year)[2)]	-	138.1	138.1	138.1	138.1
5. Number of population (person)	-	97,568	98,796	84,886	84,886
6. Total Need (4 x 5) (ton)	-	13,474	13,644	11,723	11,723
7. Marketed surplus (3 – 6) (ton)	-	21,960	21,700	-8,799	-8,971

Note: 1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 7: Rice Balance, 2002 – 2005, in Kabupaten Aceh Barat, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	136,960	70,115	70,133	59,066	55,591
b. Rice equivalent (ton)[1)]	89,024	45,575	45,586	38,393	36,134
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	89,024	45,575	45,586	38,393	36,134
4. Rice consumption (kg of rice/cap/year)[2)]	138.1	138.1	138.1	138.1	138.1
5. Number of population (person)	547,100	557,600	568,100	81,407	81,407
6. Total Need (4 x 5) (ton)	75,555	77,005	78,455	11,242	11,242
7. Marketed surplus (3 – 6) (ton)	13,469	- 31,430	- 32,869	27,151	24,892

Note: 1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 8: Rice Balance, 2002 – 2005, in Kabupaten Aceh Barat Daya, NAD Province

Items	2002	2003	2004	2005[3)]	2005[4)]
1. Production					
a. Paddy (ton)	-	93,781	93,612	40,020	37,666
b. Rice equivalent (ton)[1)]	-	60,958	60,848	26,013	24,483
2. Export – Import (ton)	-	-	-	-	-
3. Food availability (1 + 2) (ton)	-	60,958	60,848	26,013	24,483
4. Rice consumption (kg of rice/cap/year)[2)]	-	138.1	138.1	138.1	138.1
5. Number of population (person)	-	113,923	115,358	152,274	152,274
6. Total Need (4 x 5) (ton)	-	15,733	15,931	21,029	21,029
7. Marketed surplus (3 – 6) (ton)	-	45,225	44,917	4,984	3,454

Note: 1) Conversion factor of paddy to rice is 0.65 %
2) Based on Susenas Data 1999 (for rural areas)
- : data are not available
3) Productivity in 2005 = 0.85 * productivity in 2004
4) Productivity in 2005 = 0.8 * productivity in 2004

Appendix Table 9: Fish Balance, 2002-2005, in Banda Aceh, NAD Province

Item	2002	2003	2004	2005[a)]
1. Production (ton)	9,762.0	8,270.0	9,340.0	275.4
2. Export (ton)	11.8	10.0	11.2	0
3. Stock (1+2) (ton)	9,750.2	8,260.0	9,328.8	275.4
4. Fish consumption (kg/cap/yr)	29.7	29.7	29.7	29.7
5. Population (person)	267,500	274,900	282,300	162,262
6. Total Needs (4x5) (ton)	7,944.8	8,164.53	8,384.31	1,606.4
7. Marketable Surplus (ton)	1,805.5	95.5	944.4	-1,331.0

a) up to April 2005

Appendix Table 10: Fish Balance, 2002-2005, in Aceh Besar, NAD Province

Item	2002	2003	2004	2005[a)]
1. Production (ton)	12,785.0	12,355.0	12,541.0	0.0
2. Export (ton)	15.4	14.9	15.1	0.0
3. Stock (1+2) (ton)	12,769.6	12,340.1	12,525.9	0.0
4. Fish consumption (kg/cap/yr)	24.6	24.6	24.6	24.6
5. Population (person)	322,700.0	329,500.0	336,300.0	234,330.0
6. Total Needs (4 x 5) (ton)	7,938.4	8,105.7	8,273.0	1,921.5
7. Marketable Surplus (ton)	4,831.2	4,234.4	4,252.9	-1,921.5

a) up to April 2005

Appendix Table 11: Fish Balance, 2002-2005, in Pidie, NAD Province

Item	2002	2003	2004	2005[a)]
1. Production (ton)	14,524.0	13,443	13,121	2,184.1
2. Export (ton)	17.5	16.2	15.8	0.0
3. Stock (1+2) (ton)	14,506.5	13,426.8	13,105.2	2,184.1
4. Fisk consumption (kg/cap/yr)	24.6	24.6	24.6	24.6
5. Population (person)	478,300.0	481,200.0	484,000.0	511,123.0
6. Total Needs (4 x 5) (ton)	11,766.2	11,837.5	11,906.4	4,191.2
7. Marketable Surplus (ton)	2,740.3	1,589.3	1,198.8	-2,007.1

a) Up to April 2005

Appendix Table 12: Fish Balance, 2002-2005, in Birueun, NAD Province

Item	2002	2003	2004	2005[a)]
1. Production (ton)	18,644.0	21,250.0	20,250.0	5,429.4
2. Export (ton)	22.4	25.6	24.4	0.0
3. Stock (1+2) (ton)	18,621.6	21,224.4	20,225.6	5,429.4
4. Fish consumption (kg/cap/yr)	24.6	24.6	24.6	24.6
5. Population (person)	352,556.0	357,042.0	361,528.0	348,937.0
6. Total Needs (4 x 5) (ton)	8,672.9	8,783.2	8,893.6	2,861.3
7. Marketable Surplus (ton)	9,948.7	12,441.2	11,332.0	-2,568.1

[a)] up to April 2005

Appendix Table 13: Fish Balance, 2002-2005, in Aceh Barat (including Aceh Jaya), NAD Province

Item	2002	2003	2004	2005[a)]
1. Production (ton)	12,042.0	12,011.0	11,340.0	936.0
2. Export (ton)	14.5	14.5	13.6	0.0
3. Stock (1+2) (ton)	12,027.5	11,996.5	11,326.4	936.0
4. Fish consumption (kg/cap/yr)	24.6	24.6	24.6	24.6
5. Population (person)	644,668.0	656,396.0	652,986.0	166,293.0
6. Total Needs (4 x 5) (ton)	15,858.8	16,147.3	16,063.5	1,363.6
7. Marketable Surplus (ton)	-3,831.3	-4,150.8	-4,737.1	-427.6

a) Up to April 2005

Appendix Table 14: Fish Balance, 2002-2005 in Aceh Barat Daya, NAD Province

Item	2002	2003	2004	2005 [a]
1. Production (ton)	5,382.0	6,385.0	6,412.0	1,067.4
2. Export (ton)	6.5	7.7	7.7	0.0
3. Stock (1+2) (ton)	5,375.5	6,377.3	6,404.3	1,067.4
4. Fish consumption (kg/cap/yr)	24.6	24.6	24.6	24.6
5. Population (person)	112,364.0	113,923.0	115,358.0	152,274.0
6. Total Needs (4 x 5) (ton)	2,764.2	2,802.5	2,837.8	1,560.8
7. Marketable Surplus (ton)	2,611.4	3,574.8	3,566.5	-493.4

[a] Up to April 2005

Appendix Table 15: Fish Balance, 2002-2005, in Aceh Utara, NAD Province

Item	2002	2003	2004	2005 [a]
1. Production (ton)	28,757.0	15,854.0	17,850.0	9,328.8
2. Export (ton)	34.6	19.1	21.5	0
3. Stock (1+2) (ton)	28,722.4	15,834.9	17,828.5	9,328.8
4. Fish consumption (kg/cap/yr)	24.6	24.6	24.6	24.6
5. Population (person)	1,091.400	1,109.000	1,127,200	398.780
6. Total Needs (4 x 5) (ton)	26.848.4	27,281.4	27,729.1	3,220.8
7. Marketable Surplus (ton)	1,873.9	-11.446.5	-9,900.6	6,108.0

[a] Up to April 2005

Appendix Table 16: Estimated Monthly Rice Surplus/Deficit 2004 by *Kabupaten* in NAD Province (January – December 2004)

No	*Kabupaten/Kota*	Estimate of Rice Surplus / Minus Monthly (Tonnes)												
		Jan	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**August**	**Sept**	**Oct**	**Nov**	**Dec**	**Total**
1.	Banda Aceh	-2,410	-2,838	-2,838	-2,838	-2,838	-2,838	-2,838	-2,838	-2,838	-2,838	-2,838	-2,838	-33,628
2.	Aceh Besar	3,909	34,127	-967	-4,525	-4,525	-5,525	-1,024	8,642	-2,053	-4,525	-4,525	-4,525	15,485
3.	Pidie	-6,179	4,278	50,716	21,028	5,435	-892	-5,795	-1,536	-703	-519	-4,268	-4,169	57,397
4.	Bireuen	-4,393	13,462	20,792	7,198	-5,683	-5,683	-5,683	3,880	10,932	5,642	-2,342	-5,683	32,441
5.	Aceh Utara	891	2,478	14,772	8,222	2,219	2,302	-289	-5,294	6,685	9,054	7,500	-2,797	45,602
6.	Aceh Jaya	4,414	-1,688	-1,688	27,049	-1,688	-1,688	-1,688	2,571	113	-1,688	-1,688	-1,688	20,645
7.	Aceh Barat	-2,766	-2,232	-795	-2,369	6,283	-2,766	1,560	-2,063	-2,116	-1,408	1,157	-2,766	-10,280
8.	Aceh Barat Daya	-2,051	-193	9,742	5,839	6,750	6,443	2,907	-345	-348	-400	96	760	29,199
9.	Others	-12,910	66,390	38,318	-1,535	-9,855	-5,196	-9,816	5,454	4,294	3,339	9,261	-2,846	61,754
Total NAD		**-21,495**	**113,784**	**128,052**	**58,069**	**-3,902**	**-15,570**	**-22,666**	**8,471**	**13,966**	**21**	**2,353**	**-26,552**	**218,615**

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura Provinsi NAD, 2005

Appendix Table 17: Rice Marketing Margin, From Farmer in Blang Bintang and Indrapuri to Retailer, Market Destination Banda Aceh, 2005

Costs/ Profit	BeforeTsunami			After Tsunami		
	Cost/ Profit (Rp./Kg)	Price (Rp/kg)	% to retailer's selling price	Cost/ Profit (Rp./Kg)	Price (Rp/kg)	% to retailer's selling price
1. Farmer		1,450			1,650	
- Price rice eq.		2,230	74.33		2,540	78.63
2. Paddy Colecting Trader PCT)						
-Collecting cost	25			25		
-PCT seliing price		1,500			1,700	
-Profit margin	25			25		
-Rice eq.		2,310	77.00		2,600	80.05
3. RMU						
- Milling	250			250		
- Sack	25			25		
- Packing	5			5		
- Handling	5			5		
- Transport	20			25		
Marketing Cost	305			310		
-Selling price		2,675	89.17		2,950	91.33
-Profit margin	55			40		
4. Wholesaler in prod. center in Kabupaten						
-Handling	5			5		
- Transport	50			55		
-Weighting labor	5			5		
-Warehouse rent	5			5		
-Retribution	2,5			2,5		
Marketing cost	66,5			72,5		
Wholesaler selling price		2,800	93.33		3,070	95.05
Profit margin	58,5			47,5		
5.Wholesaler in Banda Aceh						
-handling	5			5		
- Transpor	20			25		
- Handling	5			5		
- Warehouse rent	5			5		
- Retribution	2,5			2,5		
Marketing cost	37,5			42,5		
Selling price		2,900	96.67		3,150	97.52
Profit margin	62,5			37,5		
6. Retailer						
- Plastic bag	10			10		
- handling	5			5		
-Labor and weighting	5			5		
- warehouse rent	2,5			2,5		
-Retribution	2,5			2,5		
Marketing cost	25			25		
Selling price		3,000	100.00		3,230	100.00
Profit margin	75			65		

Notes :
1) Paddy-rice conversion factor: 65%
2) Rice quality to sell in Banda Aceh is medium quality

Appendix Table 18: Rice (*Arias type*) Marketing Margin, Market Destination Medan and Traded Back to Banda Aceh, 2005

Cost/profit	Before Tsunami			After Tsunami		
	Cost/ Profit (Rp./Kg)	Price (Rp/kg)	% to retailer's selling price	Cost/ Profit (Rp./Kg)	Price (Rp/kg)	% to retailer's selling price
1. Farmer		1,500			1,700	
-Price rice eq.		2,310	71.08		2,615	74.71
2. Paddy collecting trader						
-Collecting cost	50			50		
-Paddy selling price		1,600			1,800	
-Profit margin	50			50		
-Eq. rice		2,460	75.69		2,770	79.14
3. RMU						
- Milling	250			260		
- Sack	25			25		
- Packing	5			5		
- Handling	5			5		
- Transport	75			75		
Marketing cost	360			370		
- Selling price		2,900	89.3		3,200	91.43
- Profit margin	80			60		
4. Wholesaler in productin center						
- Handling	5			5		
- Transport	100			110		
- Labor and weight	5			5		
- warehouse rent	5			5		
- Retribution	2,5			2,5		
Marketing cost	112,5			122,5		
- Selling price		3,125	96.15		3,375	96.43
- Profit margin	62,5			52,5		
5. Wholesaler in Medan						
- Handling	5			5		
- Transport	50			60		
- Labor and weight	5			5		
- warehouse rent	5			5		
- Retribution	2,5			2,5		
Marketing cost	67,5			77,5		
- Selling price		3,250	100.00		3,500	100.00
- Profit margin	82,5			72,5		
6. Wholesaler in Banda Aceh						
- Handling	5			5		
- Transport	150			175		
- Labor and weight	5			5		
- warehouse rent	5			5		
- Retribution	2,5			2,5		
Marketing cost	167,5			192,5		
- Selling price		3,500	100.0		3,750	100.00
- Profit margin	82,5			57,5		

Appendix Table 18 (continued)

Cost/Profit	Before Tsunami			After Tsunami		
	Cost/ Profit (Rp./Kg)	**Price (Rp/kg)**	**% to retailer's selling price**	**Cost/ Profit (Rp./Kg)**	**Price (Rp/kg)**	**% to retailer's selling price**
7. Retailer per sack						
- Sack trade mark	50			60		
- Handling	5			5		
- Transport	5			5		
- Labor and weight	2,5			2,5		
- warehouse rent	2,5			2,5		
- Retribution	65			75		
Marketing cost		3,650	100.00		3,900	100.00
- Selling price	85			75		
8. Retailer plastic bag						
- Plastic bag	10			10		
- Handling	5			5		
-Labor and weighting	5			5		
-Warehouse rent	2,5			2,5		
-Retribution	2,5			2,5		
Marketing cost	25			25		
Selling price		3,750	100.0		4,000	100.00
Profit margin	75			75		

Notes:
1) Paddy – rice conversion factor is 65%
2) Rice quality traded to banda Aceh is high quality rice.

APPENDIX 19

QUESTIONNAIRE
PRICES AND WAGES MONITORING, NAD PROVINCE

Village	: ____________________	Week	: ____________________
Kecamatan	: ____________________	Month/Year	: ____________________
Kabupaten	: ____________________	Enumarator	: ____________________

A. PRICES OF AGRICULTURAL COMMODITIES

No	Sector/activity	Form of product	Price (Rp/kg)	
			Producer	Consumer
1	Rice:			
	a. Variety:	Wet paddy [1)]		
		Dried paddy [1)]		
		Rice [2)]		
2	Cooking oil	Non branded		
3	Fresh fish (litle tuna)			
4	Sugar			

Notes:
1) the dominat variety at monitoring site
2) medium quality

B. WAGES

	Sector/activity	Daily wage (Rp/day)	Monthly wage (Rp/month)
1	Agriculture:		
	a. Unskilled labor [1)]		
	b. Skilled labor [2)]		
2	Non Agriculture:		
	a. Unskilled labor [3)]		
	b. Skilled labor [4)]		

Notes:
1) Howing labor; 2) Tractor operator; 3) Carpenter/craftman assistant; 4) Carpenter/craftman

Date of recording : _______________ Date of verification: ____________
Date of delivery
to WFP office : _______________ Enumerator signature: ____________