

LIVELIHOOD AND ENVIRONMENT IN ACEH AND NIAS: THE ROLE OF TREE CROPS IN POST-TSUNAMI DEVELOPMENT

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Abstract

Despite its rich natural resources, Aceh remains one of the poorest provinces in Indonesia. The 3-decade long political conflict, economic isolation, lack of technology and weak institutional setups are part of the reasons. The long political dispute between the government and the Free Aceh Movement (or GAM) killed nearly 15,000 people, displaced more than 35,000 households and caused serious damage and deterioration of infrastructure. The 2004 earthquake and tsunami thus occurred in a province that was already experiencing large-scale disaster, damage and poverty. While the direct impact of tsunami was along the coast, there was indirect yet significant impact of post-tsunami reconstruction and emergency relief activities in the inland of Aceh.

The existing disparity in poverty between people living in the coastal areas and those living further upland is significant. About 54% of the people live inland and nearly 94% of them rely on agriculture compared to 55% in the coastal areas. On average 76% of total household income is based on agricultural activities and tree crops are the most important providing 60 to 78% of total household income. Even before the tsunami, tree crops provided large proportion of household income to most farming households. Rubber, cocoa, areca nuts, coffee, coconut and oil palm are important income generating tree crops. These tree crops are fundamental to the economic prosperity in Aceh and Nias. A focus on “trees people want” and tree-based systems and how such forest and agroforest systems can be managed in a sustainable manner is a key to livelihood and economic development and environmental recovery in Aceh and Nias. The paper emphasizes the role of major as well as minor tree crops in the post-tsunami context in Aceh and Nias.

Introduction

The earthquake and the following tsunami waves caused unprecedented damage to human lives and property along the coastal areas in Aceh and North Sumatra in Indonesia, Malaysia, Sri Lanka, Thailand, India and Maldives. Over 300,000 people died and many more were displaced. Run-up heights of the tsunami up to 30 m were reported. Among the affected countries, Indonesia was the hardest hit; about 170,000 people died (including missing) along the coastal areas (1000 km coastline, of about 12,000 square km) in Aceh and islands; and around 600,000 people were displaced. The damage of infrastructure, trade and commerce led to a job loss of 600,000 – 800,000 people, about 25% of the total Aceh workforce.

Aceh remains one of the poorest provinces in Indonesia despite its rich natural resources. In fact, resource wealth is closely linked to the conflict that has affected Aceh for over three decades that killed nearly 15,000 people and displaced more than 35,000 households. In most rural areas, infrastructure sustained serious damage and further deteriorated due to lack of security and access for development. This has resulted in a struggling economy, often with negative economic growth, low levels of public services delivery and some of

the highest poverty levels in Indonesia. High GDP per capita in Aceh, primarily the result of the large gas and oil reserves on Aceh's east coast, has not yielded lower poverty levels. The 2004 earthquake and tsunami thus occurred in a province that was already experiencing large-scale disaster and damage.

Soon after the earthquake and Tsunami of December 2004, unprecedented amounts of aid money from international development agencies and governments were spent in big projects for reconstruction, rehabilitation and economic development. The narrow strips of coastal areas that were directly affected by the Tsunami waves remained the focus for most, if not all, projects. The post-tsunami emergency and recovery activities and construction 'boom', however, are causing major problems to forest and other natural resources both in coastal and inland areas.

Looking from the perspective of tsunami and poverty in Aceh, there are two distinct but overlapping groups of people (World Bank 2008). The 'shocked' group includes the people living along the coast and was directly or indirectly affected by the tsunami waves. Their assets, family members, livelihood options were damaged or destroyed. The second group of 'structurally poor' consists of inland inhabitants and victims of the long political dispute. Many of the 'shocked' retained certain productive capacities, such as their own education, that are in shorter supply among the 'structurally poor'. Given the better existing infrastructure, diverse income sources, external support and aid concentration, the 'shocked' group are able to recover relatively quickly. The 'structurally poor' largely remained neglected in 'tsunami aid' programs.

Even prior to the Tsunami, the rural economy in both Aceh and Nias was largely dependent on tree crops such as rubber, cocoa, coconut. While the post-tsunami development support focused mainly on emergency relief and short term recovery, the development of tree crop sector, through promotion of appropriate technology, marketing and other institutional support can accelerate economic growth and help in livelihoods and environmental recovery in Aceh and Nias.

Poverty and tree crops

Poverty is predominantly a rural phenomenon (Table 1). A closer look at the poverty incidence in Aceh indicates a disparity between people living along the urban areas and those living in rural areas. Most cities and urban areas are located along the coast while rural areas are further inland and upland. Again, poverty incidence is much higher in Aceh compared to the average for the whole country.

Table 1: Poverty incidence in Aceh and Indonesia, 2004 to 2006.

Year	2004	2005	2006
Aceh Province	28.4	32.6	26.5
Urban	17.6	20.4	14.7
Rural	32.6	36.2	30.1
Indonesia	16.7	16.0	17.8

Source (World Bank 2008)

Prior to the tsunami the major sources of household income for coastal sub-districts of Aceh Barat District included fishery, paddy cultivation, tree crops, home gardens (multiple products), off-farm labour and trading (Table 2a). Tree crops such as rubber, coconut and cocoa provided up to 45 percent of income in the sub-districts. In Johan Pahlawan, where

the district capital Meulaboh is located, off-farm labour more predominant. The tsunami caused some disruption in these, while construction and aid programmes brought other opportunities. Six months after the tsunami, off-farm labour and trading had become more important (Table 2b) than before, but the importance of paddy cultivation and tree crops had reduced. This was mainly due to shift of labour from agriculture activities to construction work (mainly buildings and roads), damage on paddy fields and tree crops.

Table 2a: Activities contributing to local economy in the 4 coastal sub-districts of Aceh Barat (pre-Tsunami).

Sub-district	Fishery	Paddy	Tree crops	Annual crops	Home garden	Labor	Trading
Arongan	5	30	45	5	3	10	2
Lambalek							
Samatiga	7	35	40	8	2	3	5
Johan	8	12	15	5	2	40	18
Pahlawan							
Meureubo	10	30	40	5	2	8	5

Table 2b: Change in livelihood activities in Aceh Barat six months after Tsunami (negative value means decrease, positive means increase).

Sub-district	Fishery	Paddy	Tree crops	Annual crops	Home garden	Labor	Trading
Arongan	5	-28	-35	-2	2	35	23
Lambalek							
Samatiga	3	-33	5	-5	3	17	10
Johan	6	-11	-10	-2	0	20	-3
Pahlawan							
Meureubo	-5	-28	3	5	3	17	5
Average	2.3	-25	-9.3	-1	2	22.3	8.8

A study was conducted in June-August 2007 along coastal and upland areas in three locations - accessible East Aceh with strong conflict history, less accessible Aceh Barat with some conflict history, and the remote island of Nias with no conflict history. Primary data and secondary information were collected through household interviews, group appraisals and expert consultations from sample villages, both in coastal as well as inland areas. Data on deforestation were analyzed and comparisons were made between coastal and upland regions regarding livelihood strategies, land use household income, environmental damage after December 2004.

About 54% of the district populations live inland and nearly 94% of these inland people rely on agriculture compared to 55% in the coastal areas. In rural communities in the uplands of Aceh and Nias, agriculture is the basis of daily lives. In the inland average of 76% total income comes from agricultural activities and 21% from off-farm activities. Within agriculture tree crops form the predominant source providing up to 78% of household income. Compared to coastal communities the upland people depend more on tree crops and other forest resources as there are fewer off-farm economic opportunities (Table 3). People living in the inland areas are far poorer than those living along the coastal regions.

Table 3: Contribution of different sources to household income (%) in coastal and inland areas in Aceh and Nias.

Source	Coastal area			Inland area		
	Aceh Barat	Pidie	Nias	Aceh Barat	Pidie	Nias
Agriculture	87.0	56.3	75.9	79.6	64.3	79.0
Food crop	4.1	0.3	20.8	8.7	25.4	
Tree crops	59.5	0.7	32.7	62.1	36.0	77.8
Aquaculture	1.0	54.6	8.3			
Livestock	22.4	0.8	14.2	8.9	2.8	-1.2
Off-farm	12.2	41.7	13.4	18.4	35.6	14.5
Other	0.8	2.0	10.8	2.0	0.1	6.5
Remittance	0.8	2.0	1.3	2.0	0.1	
Aid programme	0.1		9.5			6.5
<i>Poverty incidence</i>	<i>0.4</i>	<i>0.4</i>	<i>0.7</i>	<i>0.5</i>	<i>0.7</i>	<i>0.7</i>

Source: Budidarsono *et. al.* 2007.

Among the tree crops rubber, cocoa and coconut are the most commonly grown tree crops in Aceh and Nias (Table 4). Rubber alone provides a large proportion of the total income of sample households in coastal and inland areas of both Aceh Barat and Nias. Cocoa is more important in Pidie. While coconut is common in all areas, its contribution to household income is significant only in the coastal area of Pidie. Areca nut is also important in the inland of Pidie, but less significant in other areas. Coffee and oil palm are also cultivated by farmers on a smaller scale.

Table 4: Relative importance of tree crops based on total income of sample households

	Coastal area			Inland area		
	Aceh Barat N=31	Pidie N=29	Nias N=35	Aceh Barat N=32	Pidie N=31	Nias N=34
Rubber	97.8	-	85.5	43.2	-	93.3
Cocoa	0.9	54.5	-	44.2	44.8	6.7
Coconut	1.3	45.5	14.5	0.3	2.3	
Areca nut	-	-	-	8.9	41.1	-
Coffee	-	-	-	2.4	11.7	-
Oil palm	-	-	-	1.1	-	-

Source: Budidarsono *et. al.* 2007.

The survey conducted in 2007 in the three locations in Aceh and Nias also produced a list of 'tree species local people want' (Table 5). Tree crops, particularly rubber and cocoa, were the most preferred except in Pidie. Pandanus species used for handicrafts is more wanted by local people in the coastal area in Pidie. Annual crops seem important only in the coastal area of Aceh Barat. The findings are not surprising and are consistent with the contribution of these to overall income sources (Table 2).

Table 5: Tree species people want (% respondents).

	Coastal area			Inland area		
	Aceh			Aceh		
	Barat	Pidie	Nias	Barat	Pidie	Nias
Tree crops	61.3	52	66.7	93.8	90	65.7
Clonal rubber	45.2		57.6	59.4		51.4
Cocoa	6.5		9.1	31.3	77.4	14.3
Coconut	6.5	13.8				
Oil palm	3.2			3.1	3.2	
Areca nut					9.7	
Pandanus		37.9				
Timber trees	3.2	3.4	24.2			34.3
Fruit trees		6.9			3.2	
Annual crops	22.6	3.4		3.1	6.5	
No interest	12.9	34.5	9.1	3.1		

Source: Budidarsono *et. al.* 2007.

Although tree crops form a major part of household and local economy, the sector is poorly developed on multiple fronts. There is a clear lack of quality germplasm of major crops such as rubber, cocoa, coconut, other fruit trees in Aceh and Nias. The necessary support - supply of planting materials, established tree nurseries, technical know-how, market infrastructure, and road access remain very poor in many parts of Aceh and Nias. Given the existing and increasing area under rubber (and the interest of farmers), the prospect of timber from rubber trees has not received any attention so far. It is worth noting that the rubber timber, mainly used for furniture, has already become a major source of timber in Thailand and Malaysia, but not so much in Indonesia.

Post-tsunami activities and natural resources

During the 'construction boom' phase (for about 3 years following the Tsunami), the high demand for construction materials (sand, stone, timber and brick) has led to intensified logging and sand/rock mining activities throughout Aceh and Nias. Reconstruction works, mainly in the coastal areas, in Aceh have already used an estimated 850,000 cubic meters of illegal logs (nearly 50% of the total timber used). It is estimated that illegal logging is destroying around 20,769 ha of rain forest each year in Aceh. Most of this is in the inland areas that had remained relatively intact during the conflict years. The deforestation sharply intensified after the earthquake and Tsunami. The price of rice doubled within a year after the Tsunami, leading to clearance of more land for growing rice. The clearance of peat area for human settlements and oil palm plantations is also an environmental problem.

Conclusions

Aceh and Nias are going through rapid transformation. While the past was marred by political isolation, conflict and negligence, the tsunami and earthquake of December 2004 has opened a new chapter in the economic development of Aceh and Nias. The recovery is not merely going back to pre-tsunami condition. The political context, the economic opportunities and the needs of the local people are opening new opportunities for accelerating development in Aceh and Nias. However, it is important that the development plans should move beyond the 'post-tsunami' focus and incorporate wider economic prosperity and emerging opportunities. It is important to note that in Aceh the long

political conflict caused more impact on poverty than from the Tsunami of December 2004.

In many rural areas forests and other natural resources that provide environmental protection are also used by local communities to meet their economic requirements. The study in Aceh and Nias clearly demonstrates that many of the environmental problems in such post-disaster context cannot be solved through short-term measures and only through conservation oriented programs. An integrated but balanced approach, and with a focus on trees people want (with economic value) and tree-based systems is needed in Aceh and Nias a key to the success of economic development and environmental recovery.

Technologies for improving the productivity of tree crops such as rubber and cocoa are already available and should be promoted through appropriate skill development and capacity building. Using good quality planting materials, proper tree and field management, appropriate harvest and post-harvest processes coupled with good market linkages, infrastructure development will lead transformation of tree crop cultivation and economic development in Aceh and Nias. The opportunities for tree crops for livelihood and environment development should be an integral part of land use and economic development plans.

References

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