

Policy Note: Environmental Management for a Sustainable Economic Development Strategy for Nanggroe Aceh Darussalam



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Executive Summary

This policy note sets out a framework for environmental management to support the sustainable economic development of the Nanggroe Aceh Darussalam province. The policy note has been prepared by the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) in collaboration with its Indonesian associates. The policy note is one of a series being prepared for the World Bank Indonesia Office to provide information to the provincial government to support the preparation of an economic development strategy for the province. The focus of the economic strategy is to develop existing, and new, sustainable industries and employment opportunities in the province, and to provide a framework that will ensure a more integrated and coordinated approach to the management of the province's natural, environmental and other endowed resources. Aceh's greatest potential is in the transformation and value adding it can make to its natural resources. It must, however, do this patiently and sustainably.

Scope of the Policy Note

The policy note investigates six environmental management topics, which will affect the capacity of the province to develop the economy and need to be underpinned by strong environmental and natural resource management. The six discussion papers cover: agriculture, forestry, fisheries, land and water, environmental law and regulations, and spatial planning. These papers are included as annexes in the policy note. The development of other sectors of the economy is addressed in other policy notes. Each discussion paper provides the context for and some background on the sector, key issues facing the management of the sector, potential sustainable development opportunities and initiatives and recommendations on actions to improve the development and management of the sector. The policy note includes a framework to develop nine elements of an enabling environment that would support the development of the province's natural resources, as well as a set of specific recommendations and initiatives.

Key Environmental Management Issues Affecting Sustainable Development

There are a many environmental management issues confronting the recovery and future development of the Aceh economy. The tsunami caused more than US\$5 billion damage to infrastructure and the environment. The effect of the armed conflict over thirty years has probably been much greater in terms of lost development opportunities. Both events have had long lasting social impact causing trauma, destruction of social capital, and the loss of skills and knowledge in the region. These matters cannot be addressed easily in the short term.

The tsunami caused a near total collapse of the economy. Coastal regimes were destroyed or severely modified along with the livelihood of thousands of people and the aquatic food chain. More than 200,000 hectares of forest have been felled since 2005 to support the reconstruction process, new non-food cash cropping farming and timber exports (some of it illegal) occurred. The effect of forest removal and poor land management practices has increased the levels of soil erosion, and flooding and damage to property and infrastructure during the rainy season.

Land administration and management is an intransient problem in the province. Large numbers of Acehnese have lost their land. Many have inadequate security of tenure or are engaged in disputes

over land. Environmental laws and regulations are overly complex, outdated and lack clarity and responsibility between the different levels of government. Customary laws, which often provide a sound basis for land management, are not given adequate recognition and status. Strategic land use planning has been widely applied in the province, but lacks the infrastructure, technical skills, finance and often political will to enforce the provision. These and many other environmental management issues discussed in the paper pose major impediments to the long-term development of a sustainable economy.

Policies, Plans, Programs and Projects Supporting Sustainable Development

There are a significant number of policies, plans, programs and projects which have been developed and implemented by the Governments of Indonesia and Aceh, local governments, international development agencies, business and non-government organizations which have the capacity to support the sustainable development of the province. In December 2007, the governor issued a green paper on *Green Economic Development and Investment Strategy for Aceh Province*. The paper is an important document which sets the government's policy and investment support sought in order to achieve environmentally sustainable development in the province.

The Green Paper has seven components centred on three key sustainable development categories which focus on: land use, land use change and forest (LULUCF) management, sustainable economic development, and renewable green energy. The land use, land use change and forest category focuses on primary forest protection and management, reforestation and forest restoration, community forestry, and agro-forestry development. The component on sustainable economic development focuses on two components: smallholder estate crop development in partnership with private sector and parastatal estate crops and associated infrastructure and biofuels, and public infrastructure development. The focus on renewable green energy is directed towards the development of geothermal energy and micro hydro power.

The strategy outlines a four-tiered approach to sustainable land-use management: (i) The Core Zone / Protected Forests: estimated to total approximately 3.1 million hectares of eternal forests (ii) Restoration Zone / Replanting Protected Forests: estimated at 250,000 hectares logged-over or secondary forest in higher elevations and steep slopes suitable for forest restoration through reforestation and assisted natural regeneration, again the eternal forest (iii) Community-based Production Zone / Community Forests: estimated at 350,000 hectares of mid-elevation, more gently sloping logged-over or secondary forests suitable for community forestry / agro-forestry schemes and (iv) Land Reform / Smallholder Plantation Zone: estimated at 250,000 hectares of largely level land that fulfils agro-ecological and climatic conditions for smallholder estate crops like oil palm, rubber, coffee, and coconut with well-established local and global market demand.

One of the most important public policies announced by the Government of Aceh was the indefinite moratorium on logging in Indonesia's north-western-most province in 2007. The purpose of the moratorium was to prevent further loss of forest and to give the government time to complete a forest management plan supported with ADB funds which will help to support improved management of Aceh's forest resources. Another important project which supports the implementation of the policy is the Aceh Forest and Environment Project funded by the World Bank which aims to protect the Leuser and Ulu Masen forest ecosystems from illegal logging, support

biodiversity and ensures water conservation and supply. This forests system ensures the continuous provision of water supply to 60% of the Acehese population.

Restoration of agriculture and fishing is of vital importance to the long-term sustainable development of the province. The Agency of the Rehabilitation and Reconstruction for the Region and Community of Aceh and Nias (BRR) mangrove rehabilitation program supports the restoration of nursery and protected fish habitats important to the long-term recovery of the fishing industry. The continued implementation of the Coral Reef Rehabilitation and Management plan funded by AusAID is helping to restore the coastal reef systems damaged severely by the tsunami. The Aceh aquaculture rehabilitation project seeks to rehabilitate aquaculture, especially brackish water aquaculture ponds, along with capacity-building activities. Important rural development programs supporting sustainability are the restoration of annual cropping in tsunami-affected areas of Nanggroe Aceh Darussalam Province, the World Bank Reconstruction of Aceh Land Administration System Project (RALAS) to identify land ownership and land titles issues through a community land inventory, recovery of land records for 600,000 titles, and establishment of a land database, and the USAID initiative for coastal resource rehabilitation and sustainable coastal communities which is paving the way for more environmentally sustainable development in the province.

In the urban context, the UNDP Tsunami Recovery Waste Management Programme builds government capacity in waste management, creates immediate employment and longer-term livelihoods in waste management and provides benefits to the environment through collection, recovery and recycling of waste materials. The Muslim Aid-supported project for flooding in Banda Aceh is a program of activities that could have wider application to other urban centres in the province.

Focus of Environmental Management in Support of Sustainable Development

The long-term development of Nanggroe Aceh Darussalam (NAD) will be dependent upon the sustainable use of the province's endowed resources. The primary industries that will underpin the development of the economy involve the natural resources sectors. However, the development of the economy based on sustainable use of resources will be difficult as the province lacks much of the basic infrastructure and human capital and management capacity needed to support its development. Careful planning is required over the next 20 years to develop:

- Hard infrastructure (such as roads, ports, water supply and other engineering services);
- Soft infrastructure (education, health, governance, technology) as needed to facilitate the development of new and sustainable industries; and
- Networks to support trade, investment and technology transfer between Aceh and other regions of Indonesia and South-East Asia.

There will be temptation to quickly exploit many of the province's natural resources in order to maintain the development momentum in the economy that has occurred since the tsunami. The major challenge for the provincial government will be how to ensure current development practices are improved while strategic infrastructure is built to develop a more sustainable economy for the future. Much of the hard and soft infrastructure currently developed or being replaced in Aceh is supporting the reconstruction, aid and security efforts to rebuild the economy. However, for the province to develop new industries and investment based on the sustainable use of the region's

natural resources, the strategic infrastructure in the form of governance, human capital, international business, investments and trade networks, technology, and research and development needed to achieve this, does not exist, and will take many years to build.

To build a sustainable economy based on the use of natural resources will require very careful thought to be given to the management of non-renewable resources and the development of renewable resources, which add value to production in the economy wherever possible. Fundamental changes are needed in the way the province goes about its business in the future. To create a new and competitive economy, the current enabling environment must be changed or adapted to support the growth of new sustainable industries. Identifying the key elements of the future enabling environment necessary to ensure the sustainable use and management of the province’s endowed resources is an important issue addressed in the policy note.

There are many good international and national examples of best practice that the province can adapt to enable it to achieve sustainable economic development. Some of these are described in the policy note and discussion papers. It is imperative, however, that cultural, social and other customs and practices are considered very carefully in order to develop an enabling environment that will support the future development of the economy. This will require engaging government and communities in the process of change management and the adoption of better management practices if the economic development strategy for NAD is to be successful and sustainable.

Opportunities for the Development of Sustainable industries

In formulating a strategy for the sustainable economic development of Aceh, a number of significant opportunities to capitalise on the province’s endowed resources to ensure greater self-sufficiency and growth of the domestic and export economies have been identified. These opportunities, if realised, have the potential to create new niche and specialized markets for the province. However, Aceh will continue to struggle in the development of its traditional agricultural and fisheries industries until better strategic infrastructure is developed and new cultivation and farming technologies are introduced. Aceh has been a producer of agro-forestry products (nutmeg, cloves and rubber) and the question will be how to add value to these products, improve cultivation methods, and ensure market chains enable farmers to maximise benefit from cultivation by preventing the majority of the benefit being captured by other actors.

TABLE 1: INDUSTRIES CONSIDERED TO HAVE THE GREATEST SUSTAINABLE DEVELOPMENT POTENTIAL FOR ACEH INCLUDE:

Sector	
Energy	Biofuels energy, geothermal and hydroelectric power, carbon trading
Food Production	Irrigated rice, horticulture and tropical fruit production, tropical cattle grazing, poultry production, herb and spice production, coffee and cacao
Non-Food Production	Cut flowers, biofuels production, palm oil, rubber, non-timber medicinal/pharmaceuticals/cosmetics
Conservation/Forestry	Mangrove forestation, farm forestry, plant nurseries, carbon sink forestry
Fisheries	Deep water mariculture, aquaculture
Tourism	Ecotourism, business and education tourism

Realising many of these opportunities will require long-term international assistance, investors and research for development partnerships, along with the creation of a new learning and business environment and culture for the province. One of the key thrusts of the Economic Development Strategy for Aceh will be to identify a framework to build the enabling environment to realise these specific sector and niche market development opportunities.

Strategic Framework for Sustainable Development

The policy note includes strategic initiatives designed to support the sustainable development of the province. This refers to ecological sustainability and to the strengthening of sustainable livelihoods. The economic strategy to be prepared for the province should focus on strengthening the capacity of the enabling environment to support the development of current and new sustainable industries, to enable investment and to provide employment opportunities. The framework for developing the economy is shown in the matrix below (Figure 1). Priority must be given to restoring and developing the capacity and productivity of the energy, food, and non-food sectors as these are important to servicing the local and export economies. Forestry and Conservation are also high priorities, as they have significant export potential - especially the development of non-timber products, carbon credits and ecotourism. Forestry and Conservation also has a very important role in land and water management. The fisheries sector has significant potential, especially aquaculture (fresh water) and mariculture (sea water).

The main question for sustainable development will be to find a balance between capital intensive investments creating profits for small groups and strategic investment to support the development of community livelihoods. An important issue will be to identify conditions under which these two strategies can create synergies.

It is recognised that opportunities will arise in the future to support some industrial activities in Aceh; however, the province does not have the transport infrastructure, skills or support services necessary to develop a competitive manufacturing industry sector. The priority for the development of the province must be on developing and value adding in the resource sector.

Multi-criteria analysis, which involved a qualitative assessment, was used by the research team to evaluate the priority to be given to capacity building for nine factors that will support the enabling environment for the province and for the industry sectors considered to have the strongest sustainable development potential in the province. The ranking of the industry sectors and capacity building requirements to develop the economy of Aceh are shown in Figure 1 below and are based on sustainability principles. The energy sector ranks highest, which is expected, because of the region's previous competitive position in this sector and the potential to develop new off-shore reserves. There is also potential to develop the renewable energy sector. There are still extensive off-shore energy reserves, but these will prove increasingly expensive to develop, hence priority must be given to raising capital and developing new infrastructure. Food production, agro-forestry and conservation rank next, followed by fisheries, tourism and construction.

FIGURE 1: FRAMEWORK FOR CAPACITY BUILDING REQUIREMENTS OF THE ECONOMIC SECTORS IN ACEH

	Infrastructure	Capital and investment	Land management	Environmental management	Water management	Markets	Technology and Innovation	Governance and regulation	Human resource development
Agriculture	Mod	High	Highest	Highest	High	Mod	Mod	Mod	High
Fisheries	low	High	Mod	High	Mod	Mod	High	Mod	High
Forestry	Mod	High	High	High	Highest	low	High	Mod	High
Energy	Highest	High	Highest	Highest	Highest	low	High	Mod	High
Tourism	High	High	Highest	High	Mod	High	High	High	High
Overall	Mod	High	Highest	High	High	low	High	High	High

The highest priority for capacity building need for all sectors is in land management, due to the many issues associated with security of tenure and land use management. Environmental and water management are issues of growing importance, especially water quality and flood management. The need for enhancing the capacity to increase capital investment is high for all sectors, as is investment in human capital and development. Infrastructure is important to the development of the province, but the priority is less on the need for new infrastructure than on the maintenance, repair and upgrading of existing infrastructure throughout the province. Priority must be given to repair and upgrading of the local and distributor road network. New infrastructure is urgently needed in the energy sector to service the rising demand for business and domestic energy. Priority given to the development of markets is low; which reflects the need for investment in the primary industry sectors before new and existing markets can be developed. More detailed assessment and feasibility work is required to define specific elements of capacity building and subsector industry activities which should be targeted for more detailed analysis during the preparation of the economic strategy for the province. Specific attention will need to be given to studying supply chain linkages to the service sectors and how to develop capacity in those sectors.

Recommendations

Recommendations for sustainable development based on agriculture, fisheries and forestry

Agriculture

Recommendations for the development of agriculture in the Aceh province include activities at the farm level, the regional level and the provincial level. Coordinated spatial planning, land tenure reform and transparent and enforceable land ownership will be a prerequisite to agricultural modernisation in the province to enable investment, participation in capacity building and environmental stewardship. Stable ownership structures for agriculturalists combined with rural credit facilities will help improving land management skills, improved soil and animal waste management and will allow for increased land and labour productivity in Aceh's agriculture.

Payments for environmental services and stewardship will further contribute to increased rural income. Agricultural modernisation strategies will, however, require local capacity building to ensure environmentally sound agricultural development.

Agriculture in the Aceh province has to combine an intelligent product mix and innovative cropping and livestock raising practices (such as low-input, organic farming and agro-forestry) to ensure the competitive advantage for Aceh's products on national and international markets. Agriculture in the province has to reach a critical mass for certain product groups, such as coffee, cocoa, rubber and palm oil to attract global buyers. Increased market access will depend on the development of local roads and transport facilities, cooling capacities, the development of regional service centres as well as the development of new food processing industries.

- Highest priority in developing the agricultural sector should be given to land management and environmental management. This ensures that spatial planning, land ownership and natural resource management in agriculture work together to allow for investment to support environmental sound growth.
- High priority should be given to water management to secure stable access to water under climate change. Access to credits and micro finance will be essential for local investment and has to be aligned with human resource development to allow the skill base to grow and to support ingenuity and entrepreneurial attitude.
- Other factors influencing successful agricultural development include the provision of suitable infrastructure such as irrigation schemes or access to roads. Technology and innovation will drive agricultural modernization and will allow for higher yields as well as increasing labour productivity.
- Good governance will be essential to create rural institutions for enhanced sharing of machinery and tools, shared marketing and human capacity building networks among farmers. A combination of private land ownership and cooperative farming and marketing seems to be the most promising strategy for Aceh.
- Small and medium scale food processing industries should be developed to increase the provincial value chain of agricultural products.
- Food security at the local, sub-provincial and whole of the province level should be a first priority and based on paddy rice production and horticultural and livestock production.
- Export markets should focus on products that have competitive advantage such as coffee, cocoa, palm oil and rubber. These products should, however, be developed under strict environmental performance and natural resource management objectives to avoid overuse of natural ecosystems and production areas.

Fisheries

The development of the fisheries sector in Aceh will require a combination of marine and aquaculture activities and should rely on sustainable management of deep water and coastal fish stocks as well as sustainable management of fish stocks in aquaculture. Especially environmental management and marine habitat management will be important to generate stable long-term livelihoods for fishing communities.

- High priority should be given to capital and credit facilities to support investment, to technology and innovation in production and product handling as well as human resource development. Investment will be needed to purchase boats, and to establish hatcheries and ponds. Direct foreign investment should be allowed in coastal zones where local fishermen lack the capacity to establish fish production infrastructure and investors should be obliged to technology transfer, capacity building and market access.
- Improved fish resource management and the establishment of a marine habitat protection zone would help increasing the sustainability of the industry.
- Infrastructure development will include port and landing facilities, support for developing infrastructure for aquaculture, development of local cold storage facilities and of local and regional fish markets. This will help to improve the handling of the fishery products and will increase the local capacity to deal with seasonal price fluctuations for fish.
- The fishing industry will require improved public administration and regulation based on local registration and management of fishing activities.
- Small-scale local manufacturing for fish based products could increase the provincial value chain but will require substantial initial funding to get such activities and businesses started.

Forestry

Recommendations for developing the forestry sector in Aceh are aimed at increasing the effectiveness and efficiency of timber utilization as well as increasing the potential of non-timber forest products. To manage forest resources in a sustainable way and not to compromise alternative income options such as local incomes from carbon trading, eco-tourism and non-timber forest products requires a combination of incentives and binding legislative arrangements.

- Highest priority should be given to water management and to ensuring that forests could provide their important ecological functions.
- Land management, forest zoning and environmental management of forests should be given high priority to secure long-term revenues from forests.
- Avoiding deforestation and allowing for reforestation will require a mix of availability of investment, technological development and human capacity building. It will be necessary to allow for direct foreign investment to support businesses opportunities, market access and technology transfer as well as human capacity building.
- Infrastructure development and improving governance and regulations for forest utilization has a medium priority.
- Markets for timber and timber products, non-timber forest products, ecotourism and educational tourism and carbon trading are readily available or in creation.
- Small-scale local manufacturing for timber based products could increase the provincial value chain but will require substantial initial funding to get such activities and businesses started.
- Export products should include raw timber, and forest resources for use in pharmaceutical and cosmetic industries. Local timber and other forest products should be increasingly used to provide infrastructure for tourism based on local skills and employment.

Local communities should be encouraged and supported by programmes, strategies and project funding to create a portfolio of agricultural, agro forestry and fishing activities to enhance the adaptive capacity of communities to influences and shocks from global markets, policy framework changes, and environmental risks and disasters.

Recommendations on Land and Water Management

The following recommendations are made to improve land and water management to support the more environmentally sustainable development in Aceh:

Water Catchment Management Plans

As part of the spatial planning process, the government of Aceh should prepare water catchment management plans for the main river systems in the province. This will involve an audit of existing surface and ground water resources, water quality and hydrology attributes and land use activities for each catchment. The water catchment management plans should identify programs for the future use, storage, management, treatment (including standards) and recycling of water. Water catchment management plans should also include measures designed to reduce soil erosion, enhance water quality, reduce water wastage and loss and flood mitigation. Issues such as the management of future water rights should be covered in the management plans. Local governments should be given a management role in the implementation of Water Catchment Management Plans

Coastal Zone Management Plans

To protect the coastline of Aceh from undesirable and speculative development and to improve the management of coastal resources, the Government of NAD should prepare and implement coastal zone management plans in line with those currently being prepared in other parts of Indonesia. The plans would identify areas of conservation and scientific value, areas for tourism development, and suitable fish farming area. Coastal management plans would describe institutional and other governance arrangements for to be adopted for the management of the coastline. Coastal Zone Management plans should be integrated with spatial plans prepared at a regional and local scale for the province.

Documentation of Traditional Sustainable Land Management Practices

The Government of NAD should seek international development assistance for a project to research and document sustainable development land management practices which can be disseminated to communities (in local languages) as part of an education program to increase public awareness and application of traditional sustainable development land use and management practices.

Land Management Community Education Programs

The Government of NAD should develop education programs to increase local knowledge of land management and conservation practices to protect and restore the productivity and bio-diversity of arable and forest lands throughout the province. Such programs could be delivered using mobile training teams involving trainers familiar with local conditions and customary practices. Simple easily to read and well illustrated materials should be distributed to schools, libraries and local government offices as a means of disseminating wider knowledge and application of traditional and improved land and water management practices.

Integrated and Multi-functional Water Development Projects

Where possible, projects involving the construction of dams for irrigation areas should be designed using good practice principles which support multiple function/uses activities such as: mini-hydro, tourism development, fisheries and urban water supplies. Encouraging the development of integrated and multifunctional water development projects increases the sustainability of development.

Recommendations on Environmental Laws and Regulations

The legal system is one mechanism the NAD provincial government can use to improve natural resource and environmental management in the province. The following recommendations, in order of priority, are considered necessary to strengthen the legislative infrastructure necessary to improve natural resource and environmental management in the province and support the development of a sustainable economy.

Audit of Existing Laws and Regulations

The Government of NAD conducts a full audit of all existing natural resource and environmental management legislation, laws, regulations and standards in the province. This review will require documentation and an examination of all written state laws, written and unwritten customary laws, as well as Islamic law (syari'ah law). Copies of all laws should be stored for ease of access and later web access in an electronic library. The audit should identify all laws where there is lack of harmony between national and provincial laws, followed by provincial and local regulations and legal practices. Priority should be given to repealing laws and regulations which are not current, or not conforming.

Developing Local Environmental and NRM Laws and Regulations to Implement Law 11/2006

The Aceh government and parliament (DPRA) should proceed immediately to prepare and revise existing environment and natural resources local regulations (qanun) as mandated in Law 11/2006. There is a need to organize a meeting involving multiple related agencies to establish a similar level of understanding and vision on the importance of natural resources. The new laws should ensure greater multi-agency collaboration, and community engagement in decision making concerning environmental and nature resource management matters. The local regulations (qanun) should provide the foundation to realize sustainable development in Aceh with a focus on making it a green province. The roles, responsibilities and authority of decision bodies, agencies and LGUs should be clearly defined so that each can conduct their responsibilities with authority and without ambiguity.

Agency for Sustainability and the Environment

In order to eliminate centralistic, exploitative, sectoral and fragmented natural resources management in the province, a change in management arrangements is necessary. The province should consider establishing an agency for Sustainability and the Environment, responsible for all environmental legislation, permits, EIA, environmental sustainability and environmental management, monitoring and assessment. The agency would oversee the review of the audit and be responsible for preparing new legislation and advise on repealing and reforming other legislation as required. The agency would be responsible for overseeing and supporting the application, recognition and (where applicable) the recognition of traditional, syari'ah and other customary land and resource management practices into legislation where these support the principles of sustainable development outlined in the GBHN and Law 23/1997.

Documentation of Traditional Natural Resources Management Practices

The adoption of methods and systems of natural resources management practiced by traditional institutions should be documented and referenced and used in developing future management policy and practices for natural resource and environmental management in the province. Part of the process to improve natural resources management practices in the provinces will be a broad range of community education and awareness programs, which explain the importance of protecting the environment, managing resources sustainably and maintaining a collective responsibility for environmental management and reporting breaches of regulations to the appropriate authorities.

Establish a Land and Environment Court and Local Land Tribunals

The NAD government should give consideration to the establishment of a separate court to hear all matters related to land and environment matters in the province. Provision should be made for the court to have representation by traditional and syari'ah experts to assist in the deliberation of cases that involve traditional and Islamic issues. To avoid long delays in hearing cases, the law establishing the court should also provide for local mobile tribunals and dispute resolution methods (based on traditional and modern practices) to resolve matters that need not go through the court system. The tribunals would be headed by experts knowledgeable in the fields of land, natural resource and environmental management. As is the practice in some countries, the courts and tribunals could also deal with land use planning and development matters.

Recommendations on Spatial Planning for Improved Environmental Management

While there is a need for consistent law enforcement and compliance around spatial planning, there are many other factors that must be addressed for planning to realise stated development outcomes. The internal and external factors discussed in earlier sections on lessons learned need to also be addressed. These include:

- improvement of data validity, accuracy and comprehensiveness
- continuously emphasizing specifics, including the actions needed and who the responsible parties are
- continuously promoting participation and inclusiveness, including those internal as well as external stakeholders that are influential
- realistically considering the limitation of resources available to support the realization of plans without confining any potential for aiming as high as possible
- strengthening the links to development planning and budgeting processes
- continuously encouraging those involved in the spatial plan formulation process to identify strategic areas and priorities to be regulated and the need for possible intervention by the government, and then "leave" other matters to market mechanisms.

Dissemination of publicly agreed and legally binding spatial plans needs to be conducted more thoroughly so that people will become aware of such regulations. This effort should precede any attempt to enforce the law, yet it has to be conducted continuously. Once people become aware of the existence of spatial plans (and the rationale behind them - including environmental protection) law enforcement can be put into effect more rigorously. Land and environment courts as recommended in Discussion Paper 4 of this series are worth considering.

Capacity building in the area of spatial planning (with an additional emphasis on linking it with development planning and budgeting) also needs to be pursued beyond the rehabilitation/reconstruction phase. It has to include institutional capacity building, individual human resource development, strengthening support systems and developing the enabling environment for spatial plans to be effective as both the means for inter-sectoral or inter-governmental coordination, as well as the means to achieve sustainable local economic development and improved environmental management.

General Recommendations

- That the World Bank, in association with the Governors Economic development advisory group initiate further discussion and debate on the proposed framework for fostering the preparation of a sustainable development strategy for the province.
- That the World Bank gives consideration to the preparation of policy documents on environmental management of minerals and energy exploration in the province.
- That the broad sustainable development principles outlined in this policy note underpin a sustainable economic strategy for the province to be developed by the working group.
- The policy note and discussion papers, once finalised, be posted on the World Bank web site as well as sending hard copies to all relevant government agencies and donors working in Aceh to enable wider distribution and discussions on the materials and recommendations presented in the policy note.

1. Introduction

1.1. Background and Context to the Policy Note

Nanggroe Aceh Darussalam (NAD) is one of the natural resource richest provinces in Indonesia and as a result the province's economy has been based mainly on agriculture, fishing and the petroleum industry. NAD still has large areas of undisturbed tropical rainforest, suitable land for crop production and livestock raising and there may still be new reserves of oil and natural gas, although this is not proven. However, 30 years of armed civil conflict and the 2004 tsunami have had a significant negative impact on the development of the province. The economy of Aceh has not utilized its full potential because of the civil conflict and has declined significantly as a result of the tsunami. Since 2005, Aceh's economy has mainly been driven by the recovery efforts but has not grown in real terms. Additionally, over the next decade the petroleum industry is expected to decline due to the depletion of known reserves and the international donations will fade out because most of the recovery and reconstruction goals will have been achieved. This will have a big impact on the economy and will present significant challenges around the creation and development of new industries to reduce the dependence on petroleum as the province's primary export product.

In the scientific and political literature, sustainability has been discussed as an integrative concept where social, economic, environmental and technical issues are considered as equally important. We have to acknowledge though, that while the goal of ecological sound development can be analytically assessed, social and economic goals depend on normative decisions. Scientific analysis is able to assess how much pollution or toxic waste an ecosystem, a waterway or the human body might tolerate. How high unemployment can be or how much economic growth is needed is not an analytical question but depends on value judgement. Many established international principles have been formulated within the broader understanding of sustainable development. These include:

- Precautionary principle
- Uncertainty principle
- Intra- and intergenerational equity
- Recognition and preservation of diversity
- Internalisation of costs
- The polluter pays principle
- The prevention principle
- The protection and promotion of health and safety
- The principle of multisectoral integration
- The principle of subsidiarity

In our approach, we follow an integrative understanding of sustainability of social development and we acknowledge then importance of all above mentioned principles. For this reason, we are taking a broad approach to the questions asked for our inquiry, in order not to oversee important cross-linkages and dependencies between social, economic and environmental dynamics. In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investment, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations (Torgerson 1995: 46).

The development of the domestic economy since the tsunami has been driven mainly by the reconstruction effort, security and aid. This has boosted the construction, hotel accommodation and government sectors and generated employment – especially in Banda Aceh. Once reconstruction is completed these sectors of the economy can be expected to decline. The demand upon natural resources to service the construction effort has resulted in the loss of forests, often accompanied by poor management of building materials extraction sites. Without sound environmental management, there is a high risk the province will deplete its forests and other natural resources rapidly to maintain short-term support for the economy. This path to development is not sustainable.

The long term development of NAD will be dependent upon the sustainable use of the province's rich endowed resources especially in the agriculture, forestry and fisheries sectors. Aceh's greatest economic potential and potential competitive advantage lies in the transformation and value adding it can make to its natural resources. Aceh is well placed to pursue such a path of economic development based on the human capital and labour skills available to the region. However, developing an economy based on sustainable resource management will be difficult as the province lacks much of the basic infrastructure and social capital needed to support its development. Careful planning is required over the next 20 years to develop:

1. Hard infrastructure (such as roads, ports, water and energy supply systems and other engineering services);
2. Soft infrastructure (education, health, governance, technology) as needed to facilitate the development of new and sustainable industries; and
3. Networks to support trade, investment and technology transfer between Aceh and other regions of Indonesia and South-East Asia.

While the economy will develop, it is important to ensure that environmental sustainability, the integrity of ecosystems, ecosystems services and resource endowment are not degraded which would jeopardize future growth. This is particularly important for natural resource sectors dealing with renewable resources based on well-functioning agro-forestry ecosystems. The industrialization of agriculture has in many places introduced environmental pressures, including soil erosion and degradations, reduced soil fertility, ground water pollution, a negative energy balance of agricultural production.

This policy note is one of a series funded by the World Bank to provide background information, analyses and policy directions to help the Government of Aceh and BRR formulate a long-term strategy and development program for the province after the reconstruction period ends in 2009. The policy note prepared by CSIRO and associated Indonesian experts addresses a range of issues concerning environmental and natural resource management in the province and provides a framework to develop specific opportunities to create new sustainable resource-based industries and the enabling environment and strategic infrastructure needed to support these.

This policy note is primarily intended to provide information on environmental issues and resource management to inform public debate within the province and the wider international development

community on how to proceed to the next phase of development in the province. The framework outline is intended to provide the basis for discussion in setting priorities for investment and effort for sustainable development and capacity building in the province.

1.2. Scope of Policy Note and Research Approach

The topic of the environment and natural resources covers a wide field ranging from land and water to environmental regulations and land use development control. There is a very large volume of literature including studies, journal publications and reports, which have been published on the environment of Aceh. Many of these were prepared following the 2004 tsunami. The province is fortunate to have such a large volume of material on the state of the environment compared to other provinces, which is relatively up-to-date. Despite this, there are many information gaps in the research on the state of the environment for Aceh, especially in inland areas of the province that were not directly impacted upon by the tsunami.

This policy note does not attempt to cover every aspect of environmental management of Aceh's natural and primary resource sectors. Nor is it concerned with the gathering of data on the environment for scientific analysis. The mineral and energy resources sectors are not covered in any detail by the policy note. Policy note studies of these sectors are recommended to the World Bank. The development potential of the sectors is significant, as is the potential impact upon the environment associated with exploration and development. The policy note is limited to environmental management of land and water use related to conservation and support for the economic development of the province. The scope of the investigations covered in this policy note, as defined in the terms of reference, is thus restricted to an assessment of:

- the impact of the tsunami, peace process and reconstruction effort on the environment on a sector by sector basis including cross-sector linkages, an analysis of Aceh's environment, assets, vulnerabilities and risks.
- the appropriateness of the environmental regulatory and legal framework (including customary and Syari'ah regulations) in Aceh to support sustainable development including law enforcement capacity, implications of the implementation of increased provincial autonomy, and an analysis of the existing spatial planning framework in terms of its support to environmental sustainability.
- Good practice examples for environmental governance and resource management from other regions with a focus on Indonesia and Asia to understand some contexts in which economic development has not translated into environmental degradation.
- Specific opportunities and potential to create new resource-based industries that will enhance employment, investment and value-adding prospects for the province.
- Specific elements of the enabling environment and types of strategic infrastructure that will need to be developed for the province to realise these opportunities.

The policy note outlines a framework for developing an enabling environment and strategic infrastructure to support the future economic development of the province based on the sustainable use of its natural resources.

The approach to the research to prepare the policy note involved the preparation of six discussion papers on topics concerning natural resource and environmental management in the province. The discussion papers aim to provide background information for the policy note and cover the topics of:

- Agriculture;
- Fisheries;
- Forestry;
- Land and water management;
- Environmental law and regulations and
- Spatial planning.

Each discussion paper includes some brief contextual information about the topic; a discussion of key issues; the identification of risks and potential opportunities and a series of recommendations to improve the management and development of the sector related to the topic area. The policy note is a synthesis of the discussion papers but includes a framework for developing an enabling environment to support the development of the economy as discussed above.

There are many cross-sector issues and subject matters covered in the discussion papers. Many issues span other policy note subject material. Where possible, the discussion papers cross-reference other policy notes. All discussion papers draw significantly from publicly accessible reference materials.

2. Impacts of the tsunami and reconstruction effort on Aceh's environmental assets and livelihoods

The 2004 tsunami had a devastating impact on the province of Aceh, its people, communities and businesses. Many of the province's assets and the livelihoods of people depending upon these assets have been severely affected. A livelihood is comprised of assets (capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000). In this sense, a livelihood platform consists of assets in the form of the five capitals: natural capital, physical capital, financial capital, social capital and human capital.

- Natural capital includes the natural resources and ecosystem services a community can rely on. It refers to good agricultural land and soils, availability and security of good quality water, non-renewable resources, climate, rural landscapes and biodiversity.
- Physical capital refers to all elements of hard and soft infrastructure including roads, rail, air services, water supply and sewerage, recreational, educational and health services (schools, hospitals, police stations).
- Financial capital refers to the financial resources households, businesses and communities have access to, primarily savings and access to credit as well as stocks and bonds.

- Social capital refers to reciprocal relationships between people within communities and between communities that support cooperative action to accrue social benefits. Social capital is based on trust and three main components of bonding, bridging and linking. This refers to the ability to cooperate with other members of a community (bonding), to extend reciprocity to members of other social groups (bridging) and to be able to facilitate access to the resources necessary to implement proactive strategies (linking). All three components of social capital have to be present to reliably trigger effective adaptation to change. Social capital would be negative, if it were to lead to the exclusion of others, excessive claims on group members, restrictions on individual group members, or downward levelling norms.
- Human capital includes people's education, knowledge base, skills and health. It enables people to maximise their gains when opportunities or challenges occur.

The access to these assets is modified and regulated by social relations (gender, class, age, and ethnicity), institutions (rules and customs, land and sea tenure, markets) and organisations (associations, NGOs, local administration, state agencies). This happens within a context of trends (including population, migration, technological change, relative prices, macro policy, and national and international economic trends) and shocks (such as storms, recruitment failures, diseases and civil war) and results in livelihood strategies.

Livelihood strategies may be composed of natural resource based activities (fishing, cultivation, livestock, non-farm NR) and non-natural resource based activities (rural trade, other services, rural manufacture, remittances and other transfers). There are effects for livelihood security in terms of income level, income stability, seasonality and degrees of risk as well as effects on environmental sustainability in terms of soil and land quality, water, fish stocks, forests and biodiversity.

The civil conflict, the natural disaster and the reconstruction efforts also impact upon the sustainability of Aceh. If we employ a concept of weak sustainability allowing for a substitution of different types of capital and aiming at an increase in total capital we see, that total capital has decreased considerably. In the sense of strong sustainability, insisting on the non-substitutability of different forms of capital due the incommensurability of values, we see a reduction in natural capital hence reduced sustainability. The main objective of reconstruction and economic development in Aceh is to rebuild all five capitals under a sustainability imperative.

2.1. Financial capital and impacts upon the economy of Aceh

Economic Impact of the Tsunami upon the Economy

The economic impact of the tsunami and the GAM civil conflict has been significant. The relative contribution of the Aceh provincial economy to the national economy has been declining for more than a decade as the result of low levels of investment in the energy and agriculture sectors caused in part by the civil conflict. Since 2000 the GDP of the Aceh economy has declined in real (inflation adjusted) terms from 36,038 billion to 35,501 billion Rupiah (BPS 2008) despite considerable investment for reconstruction and an influx of foreign money in the hotel and service sector.

The tsunami caused a significant structural change to the economy. Table 1.1 shows the change in the share of value added to the Aceh economy by sectors. The tsunami has created a more service

sector based economy, with significant growth in transport, construction, hotel, and trade services (see table 1.2).

TABLE 2.1: CHANGE IN THE STRUCTURE OF GDP, ACEH ECONOMY 2003 -2007

	2003	2004	2005	2006	2007*
Agriculture	17%	20%	21%	21%	23%
Mining and quarrying	36%	30%	26%	25%	20%
Manufacturing Industry	20%	18%	16%	14%	12%
Construction	3%	4%	3%	5%	6%
Trade, Hotel and Restaurant	11%	12%	14%	15%	16%
Transport & Communication	4%	5%	6%	6%	7%
Services	8%	10%	13%	13%	15%
	100%	100%	100%	99%	100%

Source: BPS 2008 * preliminary estimates

TABLE 2.2: SECTORAL GROWTH RATES, 2002-2006 (PERCENTAGES)

	2002	2003	2004	2005*	2006**
Agriculture	2.13	3.27	6.04	-3.9	1.5
Oil Gas & Mining and Quarrying	66.79	9.86	-24.06	-22.6	-2.6
Manufacturing	5.45	1.68	-17.8	-22.3	-7.9
Electricity and Water	-3.16	16.98	19.53	-2.0	12.0
Building/ Construction	13.28	0.95	0.92	-16.1	48.4
Trade, hotel and restaurants	2.18	2.46	-2.68	6.6	7.4
Transportation and communication	4.17	3.87	3.67	14.4	11.0
Banking & Other Financial	23.95	30.99	19.45	-9.5	11.8
Services	5.95	6.31	20.14	9.7	4.4
Total	20.07	5.52	-9.63	-10.1	2.4

Source: BPS 2007

* Revised Figures ** estimates

Since 2005, the construction sector has boomed and has been the primary driver of growth in the service sectors of the economy. There are indicators that the provincial economy is contracting as the reconstruction phase nears completion. Wages growth and inflation have stabilized; however, investment in the primary industry sector is falling and exports have increased only marginally. If the primary industry sectors cannot be rejuvenated by 2010, the economy and employment growth will decline. For these reasons, it is imperative that priority be given to kick starting the recovery and development of the primary industry sectors. The key question will be how to adjust to such development by investing in innovative projects that assist the majority of the Acehnese population dependent on agriculture in making agriculture more productive and profitable.

2.2. Human capital development impacts on the environmental management sector

The tsunami led to the loss of over 138,000 lives or 3% of the population, with many of them providing the leadership and more skilled human capital in the province. However, prior to the tsunami, the province was losing significant professional and technical skills through migration to other parts of Indonesia and Malaysia in search of better employment opportunities and higher wages. Developing the skills base and attracting senior officials to the province has always been difficult due to isolation, cultural and other factors. The civil conflict led to the erosion of social capital and trust in the region, making it extremely difficult to build social capital and open communications to support business development and trade.

The extent of human capital loss, and what development needs this will cause in rebuilding the economy, is unknown. Capacity in the construction and service sectors has been enhanced greatly by large numbers of semi-skilled and trained migrants from other parts of Indonesia, coming to the province for work. However, there can be expected to be a flight of skills in this sector once the reconstruction phase is completed. In the primary industry resource sector many skills in fishing and boat building were lost. A generation of leadership skills and knowledge of local environmental factors has been lost, and will not easily be replaced. The cost of the losses in human capital, especially knowledge of primary industry land management and environmental practices, cannot be estimated, but the consequences will be felt for many years to come. It is, and will continue to be for some time to come, the most significant constraint factor on the capacity of the province to develop its economy.

2.3. Physical (man-made capital)

Physical capital comprises roads, infrastructure, buildings and other public and private facilities used to support production and movement of goods and services. The tsunami destroyed or badly damaged much of this, especially along the coastline. The earthquake which triggered the tsunami caused major damage to engineering services, irrigation canals and dykes, buildings, roads and bridges, many of which are still awaiting repair. The effect of the civil strife in the interior parts of the province led to the neglect of roads and other vital municipal services, which is greatly hindering the development of local economies.

The state of physical capital in the province is still very weak despite the construction effort, especially outside the main urban centers. Substantial investment is needed to upgrade the arterial road and feeder road network; the development of storage and food processing facilities, regional water supply and irrigation infrastructure and telecommunications services in the province. An increasing proportion of the province's budget will need to be allocated to the re-establishment and provision of new infrastructure. There is a high risk that environmental and social service budget allocations will need to be cut to ensure there are sufficient funds allocated to the provision of physical assets needed to support the development of the province. Balancing the social and environmental capital needs with the economic needs will require a very well managed development strategy for the province.

2.4. Sector Impacts

Agriculture

Agriculture was a significant driver of the local economy before the tsunami, contributing one third of provincial added value and nearly half of all employment. Food crop production – mainly paddy rice – was the dominant activity with minor contributions from horticulture, plantations and animal husbandry. The wetland area of about 360 thousand hectares of productive land was dominated by rice production while the 1,200 thousand hectares of dry land production area were allocated to coconut, coffee, cloves, palm oil and rubber production. There has been a large proportion of smallholder production for many crops; only palm oil and rubber were mainly estate-produced.

The 2004 earthquake and tsunami damage was mainly concentrated in western and north-eastern coastal areas where in some places the tsunami inundated up to 5 kilometres inland. While in general agricultural premises on the west coast have been badly affected up to 2 kilometres inland from the coastline, on the eastward coast about 1 kilometre has been seriously damaged. Job losses occurred because of losses in agricultural land, standing crops, and crops (such as rice and other crops), livestock, farm machinery and irrigation schemes. Erosion and salinity occurred alongside land loss resulting in reduced agricultural production cumulating in negative growth in the year 2005 and very small growth of 1.5% in 2006. According to estimates, about 50-60 thousand farms have been severely affected (BAPPENAS, 2005).

Total damages and losses in agriculture have been preliminarily assessed at a total value of US \$250-300 million, 40% of which related to direct damage of assets (such as permanent loss of land, infrastructure, machinery and livestock) and 60% related to indirect on flow damage (BAPPENAS, 2005).

Fisheries

Fisheries in Aceh, prior to the tsunami, were a vibrant economic activity contributing 6.5% to provincial added value and providing employment to about 100,000 people. Most of the fish caught was consumed locally or exported unprocessed to other parts of Indonesia or internationally. Most fishing businesses were small scale and operated in inshore waters. The province had only one medium sized fish-canning facility. The infrastructure for fishing included one large fishing port in Banda Aceh, 49 small fishing ports and numerous individual landing facilities. Aquaculture was an important part of the fisheries sector with about 36.5 thousand hectares of shrimp and fish ponds.

The fisheries sector and fishing communities were hit hardest by the tsunami, losing lives, boats, ponds and gear. Most damage occurred in the northern part of Aceh. The damage to water ponds which occurred was more widespread. It has been estimated that 60% of fisheries capacity has been lost and that the recovery period for the sector would be 5 years. In marine fisheries, however, the recovery will take much longer (BAPPENAS, 2005).

Total damages and losses in fisheries have been preliminarily estimated at a total value of US \$630 million of which US \$210 million was attributed to the loss of assets and US \$410 to indirect on flow losses (BAPPENAS, 2005).

Forestry

Estimating the extent of damage caused by the unsustainable use of land and removal of forest areas is difficult. A study of the Leuser Ecosystem attempted to map its resource value (van Beukering, Cesar, & Janssen, 2003). The Leuser ecosystem and the lowland forests areas are being rapidly logged and non-timber forest products (NTFP) such as bamboo and rattan were being overexploited. If NTFP harvesting were organised in a sustainable way it can contribute to reduced pressure on forests. The Leuser National Park has already been degraded from deforestation and semi-legal conversion of former logging concessions into plantation estate crops, mainly producing oil palm and rubber.

The researchers estimated the economic value of the Leuser ecosystem at US \$7.0 billion under a deforestation scenario; US \$9.5 billion under the conservation scenario, and US \$9.1 billion under the selective utilisation scenario. This suggests the conservation value of forests in northern Sumatra was around US \$3500 per hectare in 2003. Given an estimated loss of more than 100,000 hectares of lowland forest per year, the environmental damage cost to the province of deforestation since the peace accord may exceed US \$100 million. More reliable estimates of environmental damage incorporating deforested areas are necessary to provide a reliable estimate of costs.

Aceh's forests provide a range of environmental services including flood protection, supply of water for irrigation, sequestering of carbon etc. They play a key role in underpinning the sustainability of the agricultural sector upon which most people depend.

Environmental Resources

The full impact of the tsunami and subsequent demand for resources to support reconstruction on the natural environment of the province will never be known. Many impacts, such as increased soil and ground water salinity, changes in vegetation regimes etc, will not manifest themselves from some time and it will take decades, if ever, to restore the land and ecosystems to the state they were before the disaster. In the interior of Aceh, a lack of economic opportunities, a negative investment climate and the lack of an effective resource management framework and governance have contributed to illegal logging and deforestation. In some instances the conflict might have made the access to forest resources more difficult and might have prevented deforestation. A clear picture is missing because of incomplete and unavailable information and data. The social and dislocation problems which resulted from the conflict continue despite three years of peace. The activities associated with land clearance and the construction of the Ladia Galaska Road prior to the tsunami were beginning to have significant and, in some cases, irreversible, impact on the natural environment. The following provides a general assessment of the impact that the tsunami and peace process has had on the Land and Water sectors.

Various estimates have been made of the environmental damage caused by the tsunami. BAPPENAS (UNEP, 2005) estimated 30 per cent damage to 97,250 hectares of coral reefs at a net loss of \$332.4 million (\$1,599/ha). Initial estimates indicate that approximately 48,925 hectares of coastal forests (other than mangroves) were impacted by the tsunami. The economic value of this loss is calculated at a net present value of \$21.9 million. The BAPPENAS assessment estimates approximately 90 per cent damage to between 300 and 750 hectares of mangrove forests, yielding a net loss of \$2.5 million and a 20 per cent loss of sea grass beds, of approximately 600 hectares, for a net loss of \$2.3

million (\$2,684/ha estimated value). The true extent of environmental losses is probably much greater.

Environmental Governance

The period of the GAM conflict had a major influence on reducing development in Aceh, especially in the rural sector. As a result, large parts of the province were given over to subsistence farming and fishing practices or were abandoned for security reasons. Environmental governance was largely ignored because of the difficulty in enforcing laws and regulations under the condition of the civil emergency. Forestry, including illegal logging, activities slowed considerably in certain areas and many parts of the natural environment in remoter areas of the province, destroyed by earlier development activities, ironically, began regenerating during the period of instability.

The peace accord and the tsunami reconstruction effort changed the situation greatly and led to an unprecedented demand for timber from the region's forests and other natural resources. The lack of enforcement capability meant that environmental laws and regulations went largely unenforced, with public officials often giving priority to securing construction materials over the need for environmental management and protection. The result has been widespread environmental damage from largely uncontrolled development activities outside the tsunami reconstruction zone. Steps have been taken to prevent further loss of forest through a moratorium on logging to protect the environment. The lack of coordination and some times conflict between development and environmental management agencies has also not helped the situation.

3. Key issues affecting the sustainable development of the Acehese economy

The roundtable discussions with key sector stakeholders, discussion papers and other literature have identified a range of issues, which will continue to impact upon the sustainability of development in the province. Addressing these issues will take time and require very careful research and evaluation by public agencies, in consultation with business and communities. It is essential that the Government of Aceh in developing a future strategy for sustainable economic development in the province set out clearly priority sectors of the economy to be targeted for development and identify the key elements of capacity building needed to ensure opportunities for investment and improved environmental management are realised quickly.

For the provincial economy to develop and grow sustainably, there are issues in three functional areas which the national and provincial governments, businesses and communities must support. These are: creation of enabling environments for environmentally sound economic growth; policies and programs to support sector specific development, and managing the environmental risks and impacts of development, especially those involving the natural and primary resource sectors. The discussion papers identified many issues related to weaknesses in these three functional areas in Aceh. The following summarizes some of the key issues.

3.1. Creating enabling environments for environmentally sound economic growth

The national and provincial governments are responsible for defining laws, policies, regulations, financial arrangements, and directives which put in place what is called the enabling environment through which governance is established and operates in the province. They establish what must be done, what can be done, what can't be done, and by whom. Under Law on Government in Aceh (Law 11/2006) the provincial government has been given special autonomy status and responsibilities to develop the policy framework and implement programs of activities through the local government structure to support the growth and development of the province. The enabling environment encompasses the policy and legislative framework, infrastructure, services and other support elements which the national, provincial and local governments must provide to ensure efficient and effective governance systems are in place to facilitate development and the proper functioning of governance throughout the province.

Strong enabling environments are needed to attract investment, ensure sound public sector development, financial and environmental management and good governance. There are many elements to the enabling environment including: infrastructure, capital markets, land management and administration, environmental and water management, markets, technology and innovation, governance practice and regulation, and human resource development. The specific nature and demand for services provided by these elements of the enabling environment will be different for sectors of any regional economy.

Weaknesses in one element of the enabling environment in one sector of an economy, e.g. lack of microcredit, can significantly impact on the performance and development potential of other sectors of an economy, e.g. investment in small scale enterprises or farming. There is thus a complex matrix of interdependent enabling environment elements needed to support the development of local economies and without them the prospects for economic development and growth can be weakened significantly.

In Aceh, many of the elements of the enabling environment are weak. Some elements, e.g. road infrastructure, have been damaged severely as the result of the tsunami and the civil conflict; however, unsustainable development activities and practices have been allowed to continue unchecked for many years in the province, which has also contributed to a weakness in capacity of the province to support sustainable development. The following describes briefly some of the critical issues affecting the capacity of the enabling environment to support sustainable development in the province.

3.1.1. Investment in infrastructure

The damage to roads, municipal services, public buildings and facilities caused by the tsunami was significant. It is worth bearing in mind, devastating though the tsunami was it only affected the coastal area on the NW of the island. Most of the areas not affected have however been neglected in development planning for a substantial time. Damage to infrastructure has been extensively documented in reports by the Indonesian government and international development agencies. It will take more than a decade to rebuild and repair much of this, especially in more remote parts of

the province. Issues of infrastructure investment needs for the province will be more extensively documented in the Investment Policy Note.

The tsunami and the many years of civil war destroyed or resulted in severe neglect of provincial and local infrastructure. The provincial road, electricity and telecommunications networks require massive investments to enable development opportunities in the region to be realised. A major challenge is the provincial and local government's capacity or resources to meet the demand for new or improve existing infrastructure. There are plans to develop the province's infrastructure but these plans are not well linked to a long-term economic strategy that will support strategic and sustainable development of the province.

3.1.2. Weakness of Capital Markets

Financial capital and a developed capital market would enable households, businesses and communities to gain access to financial resources. Financial capital such as savings and access to credit as well as stocks and bonds is low in Aceh as is the institutionalization of capital markets. It has to be ensured that capital markets work for the majority of Acehnese smallholders working with small areas of land.

Very often, funds are being directed to real estate rather than to investment in production. The lack of access to and development of local capital markets to support small and medium-scale enterprise development in the province has led to significant under-capitalization of investment in the farming sector. The financial services sector in the province has grown rapidly since 2005 to support the tsunami reconstruction effort. This has led to a large injection of capital, and in many cases the overcapitalisation of the housing and commercial property markets, but relatively little capital enabled new investment in the primary industry sector. The exception to this has been a small increase in investment by larger companies in medium-scale plantation farming activities for palm oil. Much of the small scale investment in farming has been funded from the flow of remittances from wages generated from construction, trading and hotel restaurant industry activities in Banda Aceh.

Aceh also suffers from a lack of microcredit facilities to support small and medium scale industry development. While there are a number of microcredit facilities operating in the province, the capital raised by these facilities is small and limited compared to the capital needed to support the development and management of the natural and primary resources sectors. Critical to the development of the province is to expand the development of opportunities for agriculture and fishing industry microcredit; however, increasing facilities for microcredit needs to be done in parallel with capacity building of other enabling environment elements such as land administration, water management, road and storage facilities and the development of markets to support the development of trade. The policy paper on investment contains a more extensive discussion on the issues related to the investment and the development of local capital markets.

The borrowing capacity of local governments is severely restricted by limits imposed by the national and provincial government. Most local governments are dependent on the DAU and DAK grants to carry out their public responsibilities under laws 32 and 33/2004. Public sector financial management is very weak in most local governments, so that funds which should be directed to the development of public private sector infrastructure to support the improvement of local roads,

water supply and other services to rural communities is often not spent, or is allocated to administration. The weakness in asset-based accounting and the inability of local governments to use their land and other assets as collateral to borrow or raise capital for investment in public infrastructure is a major constraint upon development. Improved public sector financial management is critical to the strength the capacity of local governments to engage with financial markets to raise capital for critical infrastructure and institutional capacity building programs to support sustainable local economic development.

3.1.3. Land tenure, management and administration

Aceh has a complex system of land tenure, administration and management. There exists a judicial and customary titling system along with localized land tenure practices. There are many disputes over ownership and property rights, which impose constraints upon development and pose risks to investment. The weakness of the tenure systems prevents the efficient use of land, especially the inability to capitalise on land as collateral to raise loans to support land improvements or to fund the investment in new technologies, machinery and crops that would increase productivity in agriculture and others sectors of the economy.

Significant efforts have been made to guide the planning for the reconstruction and development of towns and villages affected by the tsunami. However, very little spatial settlement and economic development planning has occurred in the province away from the coastline areas. There is need to expand significantly the activities for spatial and economic planning of settlements throughout the province to provide a long-term foundation of orderly spatial planning and development of the province and to take care of interactions and interdependencies between coastal and inland areas in Aceh.

3.1.4. Environmental and Water Management

The focus on the tsunami recovery effort and implementation of the peace program has meant that very few resources have been available for allocation to long-term economic development and management of the province's natural resources. Resource management governance is weak and will require significant institutional and human capacity building over many years.

An important issue for developing Aceh's economy is to avoid natural resource depletion and to ensure conservation management. The weakness in governance structures for natural resource management, the demand for materials to support the tsunami reconstruction, and illegal practices have combined to deplete forest and other natural resources in the province. If left unchecked, severe environmental damage and natural resource depletion will occur in the province over the next decade. There is neither capacity nor resources to enforce the regulation and management of the use of the region's natural resources under the current governance systems. Alternative, more localised land and resource management practices will be necessary, along with community education programs and community capacity building to capitalise upon the benefits that conservation and effective and efficient use of resources can generate in terms of social and economic benefits. As important as education and social learning is to development, government must ensure that incentives are in place for all stakeholders (private sector, communities, government) to manage natural resources in a sustainable way. Economic incentives can take the

form of direct payments, tax reductions or right of exploitation for a set period, and related tenure rights that ensure appropriation of benefits by businesses and communities.

Water management will become an increasingly important resource management issue for the province in the future. There is a window of opportunity to create a legal framework that ensures the fair and equitable allocation of water rights and use in the future when these resources become more limited.

Environmental risk management and assessment

There is a poor understanding of environmental risk and assessment management, by public agencies. Aceh has already experienced significant flooding and inundation problems since the tsunami with some settlements being damaged by storm activity. With climate change posing a threat to changes in traditional weather patterns, many parts of the province will be exposed to more intense natural disaster events in the future. There is a need for capacity building programs to improve environmental and natural risk assessment, disaster management planning and mitigation.

To reduce the potential impact of future natural disaster and hazard events on the province, there is need for an improved risk and disaster assessment and management response system. Improved environmental risk management is needed to reduce the potential risk to human life of natural disaster, but also to investment in development and conservation.

Impact and management of climate change

The potential impact of climate change on the province could be severe, especially in coastal areas. Very little consideration has been given to the planning and management of climate change in the rush to develop the province and recover from the tsunami. The projected rise in sea level resulting from climate change will likely see large parts of the eastern coastline subjected to increased inundation and storm damage. Relocation of coastal villages will be inevitable. The impact of deforestation will further modify local climates with some parts of the province experiencing significant increases in temperature and a reduced rainfall. While climate change is a global issue, the protection and enhancement of the province's forest reserves could create economic and environmental opportunities for the province to benefit from climate change measures.

3.1.5. Markets

Development of export markets and supply chains to support sustainable industries

With the exception of the gas and oil industry, the Aceh economy is not well integrated with global and regional markets and supply chains. A critical factor in developing new export opportunities which capitalise on the potential of the province natural resources will be the ability of the province to develop the business and physical infrastructure to integrate with global and regional markets and supply chains and develop new sustainable industries, such as ecotourism, organic food and other competitive horticultural products.

3.1.6. Research and development, technology and innovation

The region lacks capacity to support research and development and to foster the adoption of new and improved technologies for production and environmental management. The Syiah Kuala

University, Banda Aceh, has played an important role in providing academic leadership in the development of learning and knowledge in the region, but it lacks research capacity, especially in the critical area of technology adaptation and innovation in the primary industries sector. Strengthening the capacity for research and development will be important to support the development of the province.

3.1.7. Governance practice and regulation

Participatory governance

The democratic reforms which followed the fall of the Suharto government have given rise to more decentralised government and wider consultation with local communities on a wider range of development issues. The regional autonomy law for Aceh has also given the province greater independence in decision making over the use of its resources and its approach to development. The tsunami has led the way in Indonesia to greater localization of decision making processes on development matters. These changes are significant and welcomed, and there is significant capacity to mobilise the social capital developed from the tsunami consultation process and to direct this into efforts to support sustainable economic development opportunities in local communities throughout the province. This will, however, require some capacity building in local economic development for local governments, administration and businesses to realise the opportunities in the resource sectors described above.

Legislative and regulatory reforms

The major challenge for the province is to improve enforcement of environmental laws and regulations and to encourage improved land and coastal land and sea shore management practices. The need to reform and repeal old laws gives rise to opportunities to introduce laws and regulations which are relevant to the circumstances of Aceh, especially the human capacity and resources needed to enforce legislation related to environmental matters. There are significant opportunities to introduce new governance practices which delegate environmental management functions and enforcement of regulations to local governments and communities, to encourage greater use of customary practices and traditions to manage the environment, where these provide sustainability outcomes.

3.1.8. Complexity and difficulty to enforce environmental laws and regulations

The province has many laws and regulations related to management of land and other natural resources. There are four levels of legislation and regulation which operate in the province: national, provincial, local and traditional/customary. There is confusion and there are many inconsistencies and gaps between laws and regulations created and enforced by these different levels of government. The province faces a severe shortage of skilled people and institutional capacity and willingness to enforce environmental legislation. Many of the environmental laws are complex and contradictory, making them difficult to enforce. How to strengthen the capacity of the sector is a challenge that may take many years to improve.

Framework for managing the transition back to a resource-based economy

The most recent development of the provincial economy has been driven by construction and development assistance programs of activity. The traditional resource sectors of fishing, agriculture and forestry have declined markedly after the tsunami but have started to recover since then. The post reconstruction phase may result in a period of economic decline unless capacity and productivity can be restored to the primary industry sectors. The understanding of how to guide the transition from the tsunami reconstruction phase of development to a new resource-based economy has to be developed. The lack of a framework to guide the long-term sustainable development of the province will add to investment uncertainty, increase the outflow of skills and undermine the opportunity to achieve more integrated planning and budgeting for the development of the province.

3.1.9. Human resource development

Human capital development for the resource management sectors

Despite being one of the richest natural resource provinces in Indonesia, the level of human capital development in the province has been weakened due to the years of conflict and capacity lost in the tsunami. As a result, human capital development is weak across all sectors. Human capital development to support the development and management of the resource development sectors will be essential for the province to develop a sustainable economy.

3.1.10. Planning and coordination

There are considerable cross-influences and constraints for these potential strategic development options linked to the natural resource sector, which have to be tested and understood in order to avoid misallocation of investments and human resources. All of the strategies have to be accompanied by suitable and supporting institutional frameworks to create a climate for systems innovation and to support sustainability experiments. Land management, land titles, credit schemes and education, human resource development and community capacity building in particular will be essential to support opportunities that build on sustainable natural resource development and management.

3.1.11. Social learning

Social learning for sustainable development

Significant achievements and lessons have been gained from processes involving the socialisation of planning in the province to support the reconstruction effort. However, much of this has been limited to coastal settlements, so that planning for interior areas has yet to be achieved. The social learning process for sustainable resource management and economic development requires significant support, especially integration and coordination at the provincial level.

Management information systems

Management information and network systems in the province are weak. Systems, institutional and human capacity will need to be strengthened to support the development of environmental and

resource management in the province and to support the development, planning and law enforcement process.

3.2. Sector specific key issues

Agriculture

Agriculture will be the main activity in building an environmental sustainable economy in the Aceh province. This will require a combination of local knowledge and agricultural practices that have been successful in the past with attempts of agricultural modernization to increase labor productivity and production. Modernization and new technologies and inputs in agriculture have contributed to environmental damages in other parts of Asia resulting in soil degradation, habitat loss and loss of biodiversity. Careful natural resource management and environmental stewardship strategies are needed to avoid overuse and certain impacts of agriculture. This might be best achieved by low-input farming strategies, organic farming and agro-forestry farming systems. Trade-offs in agriculture between rapid modernization and livelihood provision and sustainable resource use will require innovative approaches to resolve conflicts of interest.

Sustainable Fisheries Development

Reduced fish catches resulting from overfishing and coastal habitat loss has been a problem which preceded the tsunami. The tsunami; however, lead to a severe reductions of the province's fishing fleet and fish farm infrastructure which was severely disrupted or destroyed by the earth quake and tsunami. The loss and change to the much of the coastal regime has destroyed important fish breeding habitats, and the lack of capital for investment in the industry, human capital and knowledge which was destroyed through loss of life and relocation has severely disrupted the capacity of the industry to recover and develop. Much of the infrastructure used for coastal mariculture fish farming was destroyed and needs replacement. Fisherman are amongst the poorest industry group in the province, and although reasonably well organised through cooperatives, there is very limited microcredit capacity within the province to support the recovery of the sector.

Forestry

Good governance of resource use in the forestry sector of NAD is compromised by conflicting laws and regulations. As a result, the divisions of authority and responsibility for forest resource management under the current legislative frameworks are not clear. Provincial autonomy has altered the relations between and responsibilities of central and regional government, leaving room for interpretation of regulations and their implementation. Forest conditions, therefore, tend to be largely ignored because of lack of agreement. The logging moratorium issued by Aceh's governor in June 2007 overwrites licenses which have been issued by the central government. However, despite considerable effort made to employ forest rangers, logging in production forests still lacks sufficient control by government officials. The governor's instructions concerning the moratorium have generated uncertainty for the future conservation of forest resources as there are many outstanding concessions which still remain valid in law.

Sustainable Energy from Renewable Sources

The energy sector in Aceh is highly dependent on local petroleum and gas resources for export. These resources, especially oil, will be largely depleted in about 10 years, necessitating increasing imports of these products. When energy use in the province eventually rises due to economic development and rises in the standard of living of households it might be difficult to ensure the availability and affordability of energy sources. It is essential that the province can plan for an effective and efficient use of a portfolio of energy sources including local renewable energy sources in order to meet its future energy requirements in a sustainable way.

4. Sustainable development opportunities, policies and programs for Aceh based on natural resource sectors

4.1. Introduction

Many reports and plans have been prepared by the international, national and provincial government agencies identifying opportunities and strategies for the development of the province's primary and natural resources. Many of the proposals and suggestions in these documents require further investigation, as the cost, benefits, impacts and feasibility of many proposed projects and programs are unknown.

The following describes sustainable resource development and management opportunities identified in the discussion papers, which are considered to have merit in supporting sustainable development in the province. This policy note is extensively concerned with the sustainable development of sectors of the economy dependent upon renewable natural resources. That includes agriculture (food and non-food), forestry and conservation, fisheries, energy and minerals, which are directly involved in natural resource extraction and eco-regulation, the construction sector that depends on minerals extraction to provide building materials as well as retail, tourism, hotels and restaurants also depending on a healthy and aesthetically intact environment. As noted earlier, the energy and minerals sectors are not discussed in any detail in this policy note.

The importance of developing the natural resource dependent sectors of the economy were ranked with regard to the effort that should go into the development of each sector in a policy workshop in Aceh in February 2008¹. The results of this analysis suggest that the highest priority for public investment should go to the development of the agriculture food production sector, followed by forest conservation management and fisheries. This makes sense, as two of these sectors provide the basis for most employment in the province and will improve livelihoods and local income for Aceh's rural households. Aceh seems to have a comparative advantage in fisheries and agriculture and most of the poor make a living from such activities today. Lower priority should therefore be given to public investment in the non-food, energy, minerals, construction and tourism sectors as the development of these sectors can be more easily supported by the private sector. Since revenues from private investment will not flow back to local communities, private investment will need to be linked to capacity building and revenue sharing strategies and requirements.

¹ 50 participants at a policy workshop in Aceh in February 2008 were asked to give priority to sectoral investment and effort to best support primary sector based sustainable growth in Aceh

Economic opportunities in the primary sectors of agriculture, fisheries and forestry have to be implemented with a strong focus on the sustainable use of natural resources and ecosystems to ensure the most effective and efficient use of those resources to support social and economic development in the province of Aceh. It will be crucial for Aceh's success to avoid shortfalls that have occurred in relation to intensification in agriculture, fisheries and forestry elsewhere. Table 3.1 lists the most common environmental impacts that have to be coped with in order to enable long-term growth based on these economic activities.

TABLE 4.1: ECONOMIC ACTIVITIES, ENVIRONMENTAL IMPACTS AND SECTORAL POLICY AREAS AND STRATEGIES

Economic sector	Environmental impact	National and provincial sectoral policy areas and international agreements
Agriculture	Soil erosion and soil degradation, ground and surface water pollution, acidification and eutrophication, loss of habitat and loss of biodiversity, methane emission from paddy fields and livestock production	Agricultural policy, International Biodiversity Strategy
Fisheries	Overfishing and natural stock depletion, water pollution, health risks	Fisheries Policy, International Marine Strategy
Forestry	Forest degradation and deforestation, erosion, natural disasters, climate change	Forestry Policy, Land Use and Land Cover Change, Climate Policy

The opportunities to develop the natural resource and primary production sectors of the economy, however, will not be realised without improved capacity and performance by the service sectors, especially government, business and transport services. Without improvements to public policies and the regulatory environment, education, finance, knowledge and other services, the operations of the production sector will remain inefficient and will not become internationally competitive. It is vital that the productivity and performance of the service sector in Aceh is improved.

4.2. Policies, Plans, Programs and Projects Supporting Sustainable Development

There are a significant number of policies, plans, programs and projects which have been developed and implemented by the Governments of Indonesia and Aceh, local governments, international development agencies, business and non-government organizations which have the capacity to support the sustainable development of the province. In December 2007, the governor issued a green paper on *Green Economic Development and Investment Strategy for Aceh Province*. The paper is an important document which tries to set the government's policy and investment support sought for the achievement of environmentally sustainable development in the province.

The Green Paper has seven components centred on three key sustainable development categories which focus on: land use, land use change and forest (LULUCF) management; sustainable economic development, and renewable green energy. The land use, land use change and forest category focuses on primary forest protection and management; reforestation and forest restoration, community forestry, and agro-forestry development. The component on sustainable economic development focuses on two components: smallholder estate crop development in partnership with private sector and parastatal estate crops and associated infrastructure and biofuels, and public infrastructure development. The focus on renewable green energy is directed towards the development of geothermal energy and micro hydro power.

The strategy outlines a four-tiered approach to sustainable land-use management: (i) The Core Zone / Protected Forests: estimated to total approximately 3.1 million hectares of eternal forests (ii) Restoration Zone / Replanting Protected Forests: estimated at 250,000 hectares logged-over or secondary forest in higher elevations and steep slopes suitable for forest restoration through reforestation and assisted natural regeneration, again the eternal forest (iii) Community-based Production Zone / Community Forests: estimated at 350,000 hectares of mid-elevation, more gently sloping logged-over or secondary forests suitable for community forestry / agro-forestry schemes and (iv) Land Reform / Smallholder Plantation Zone: estimated at 250,000 hectares of largely level land that fulfils agro-ecological and climatic conditions for smallholder estate crops like oil palm, rubber, coffee, and coconut with well-established local and global market demand.

One of the most important public policies announced by the Government of Aceh was the indefinite moratorium on logging in Indonesia's north-western-most province in 2007. The purpose of the moratorium was to prevent further loss of forest and to give the government time to complete a forest management plan supported with ADB funds which will help to support improved management of Aceh's forest resources. Another important project which supports the implementation of the policy is the Aceh Forest and Environment Project funded by the World Bank which aims to protect the Leuser and Ulu Masen forest ecosystems from illegal logging, support biodiversity and ensures water conservation and supply. This forests system ensures the continuous provision of water supply to 60% of the Acehnese population.

Restoration of agriculture and fishing is of vital importance to the long-term sustainable development of the province. The BRR mangrove rehabilitation program supports the restoration of nursery and protected fish habitats important to the long-term recovery of the fishing industry. The continued implementation of the Coral Reef Rehabilitation and Management plan funded by AusAID is helping to restore the coastal reef systems damaged severely by the tsunami. The Aceh aquaculture rehabilitation project seeks to rehabilitate aquaculture, especially brackish water aquaculture ponds, along with capacity-building activities. Important rural development programs supporting sustainability are the restoration of annual cropping in tsunami-affected areas of Nanggroe Aceh Darussalam Province, the World Bank Reconstruction of Aceh Land Administration System Project (RALAS) to identify land ownership and land titles issues through a community land inventory, recovery of land records for 600,000 titles, and establishment of a land database, and the USAID initiative for coastal resource rehabilitation and sustainable coastal communities which is paving the way for more environmentally sustainable development in the province.

In the urban context, the UNDP Tsunami Recovery Waste Management Programme builds government capacity in waste management, creates immediate employment and longer-term livelihoods in waste management and provides benefits to the environment through collection, recovery and recycling of waste materials. The Muslim Aid-supported project for flooding in Banda Aceh is a program of activities that could have wider application to other urban centres in the province.

4.3. Opportunities in the agriculture sector

The agricultural sector in Aceh appears to be most promising to drive further economic development in the province for several reasons: there is a skill base and history of agricultural production for the market, Aceh has been more than self-sufficient in rice production even during the years immediately after the tsunami, food prices are increasing globally due to increased international demand, and further processing of agricultural produce would allow for value adding without large capital investments. To achieve the full potential of agricultural based growth, however, many additional measures have to be taken including

- Human capacity building, development of entrepreneurial orientation and skills, capacity building for natural resource management to avoid overexploitation of ecosystem services and resource endowment
- Land tenure reform to enable investment and ensure proper environmental stewardship
- Technical and financial assistance to enhance agricultural productivity and the knowledge base for sustainable agriculture
- Identification of market opportunities
- Building of manufacturing capacities based on primary agricultural products, establishment of rural industrial clusters combining agribusiness and farming operations
- Enhancing social capital to allow for collaboration between farmers

Achieving economic development in agriculture while avoiding the negative consequences of industrial agriculture will rely on building responsible and viable farming communities. Larger businesses, the cooperation between farmers to achieve economies of scale, and the support of the diversity and viability of rural smallholders will be needed to achieve sustainable outcomes. The province of Aceh has a long tradition of regional smallholder communities that economize on locally specific products such as e.g. coffee, nutmeg and cloves. These activities have experienced periods where they provided viable livelihoods for local smallholders and their communities, mostly ignored by provincial or State support. The rebuilding of agriculture should put emphasis on attracting foreign investment, to create market access for smaller businesses through binding agreements with larger producers and also to ensure technology and knowledge transfer. It should also support cooperation between small farmers based on private tenure but using shared machinery, tools and marketing initiatives.

Agricultural strategies have to avoid negative effects of modern agricultural technology by introducing integrated land and crop management farming practices.

The opportunities occur in food production (crops and livestock) and in the non-food sector. Among the potential opportunities to be further investigated and trialed are:

- Irrigated rice cropping
- Horticulture and tropical fruit production
- Tropical cattle grazing
- Poultry production
- Herb and spice production
- Tropical cut flower production
- Manufacturing based on primary agricultural production
- Development of organic farming products

The development of low input farming, organic farming, and agro-forestry in combination with fair trade practices presents opportunities for the province to meet the growing demand for organic foods in developed economies. Aceh has favourable growing conditions and business advantages for the production of organic foods; however, it will be essential for a potential organic farming sector to focus on specialisation and local production, quality assurance and packaging of food, as well as labelling in order to meet the specific needs of international markets and consumers.

4.4. Opportunities in the fisheries sector

Because of Aceh's autonomy, the Aceh provincial government holds the authority to manage fish resources as far as 12 miles out to sea, and to carry out spatial planning within sustainability principles. In a situation of ambiguity about the size of natural fish stocks and limited financial and technical capacity it is important to provide a specific spatial plan for coastal and off-shore areas to regulate access, allow for investment and to manage resource exploitation within ecological limits. The focus of developing Aceh's fish resources and fishing capacities has to lie on aquaculture production, as capture fishing becomes more and more difficult because of overfishing and reduced fish stocks. In the year 2002, the Food and Agriculture Organisation (FAO) has identified 75% of all global fisheries as overexploited (FAO, 2002).

The requirements in Aceh's fisheries sector to realize opportunities are manifold and include capital and infrastructure development, improvement of handling, grading and storage as well as the creation of added value potential based on fish resources within the province. This will require a combination of foreign direct investment and investment from Indonesia and Aceh. To build livelihoods based on fishing, international investment has to be bound to provide capacity building to local fishing businesses and to guarantee market quotas for local fisherman to access international markets.

Development of sustainable mariculture and aquaculture

Fish stocks along the entire northern part of the island of Sumatra coastline were affected by the tsunami and are being over-fished. Opportunities exist to develop mariculture and aquaculture

activities, especially in east coast areas, to commercially farm fish and other seafood products for export to national and regional markets. To realise this potential opportunity, substantial public and private investment is required in infrastructure, management, marketing and distribution systems. There are also opportunities to develop joint venture projects, which will enable local producers to access supply chains and markets largely controlled by international businesses.

Developing cold storage capacity

The seasonality of fishing often results in an oversupply of fish, the surplus of which is traditionally dried. Fish losses from drying are often high. More effective means of storing fish in cold storage are required to ensure fish is more readily available year round and to bring about greater price stability in fish prices year round. Cold storage is also needed at sea and at ports/landings for larger and more expensive fish to enable local fisherman to benefit from potential exports. Currently, the export capacity of the sector is very weak, but the potential to obtain higher prices for fish is high, provided capacity for storage and access to markets is improved.

4.5. Opportunities in the forestry sector

Nanggroe Aceh Darussalam still has large areas of undisturbed tropical rainforest which are, however, under pressure because of population growth, settlement, cultivation activities and commercial logging. NAD has more than 3.3 million hectares of forest area and land use change is happening more slowly than in Sumatra as a whole. The total forest area is subdivided into conservation forests, protection forests and production forests each of which are guided by different rules for access and use. There has been considerable effort by the NAD authorities to define stable forest boundaries resulting in the enclosure of about 70% of NAD's forest areas to date. Boundaries between forest functions have been defined but are often not marked in the field or enforced.

The issue in the NAD province is to develop the economic return from forestry while avoiding forest degradation and deforestation as well as secondary environmental impacts occurring in deforested slope areas. Whether this can be achieved depends largely on good forest management and innovative use of the genuine resource. The development of non-timber resource utilization for medical, cosmetic and pharmaceutical use appears to be especially promising, as well as the creation of local income and community livelihoods based on carbon trading schemes. Industrial forest plantations, logging and wood based industries will also play a role in Aceh's redevelopment.

Plantation forestry and mono-culture tree cropping

The introduction of new industries, such as palm oil plantations for food and biofuels production, has the potential to have significant environmental impacts, as is now being experienced in Malaysia and in other parts of Indonesia. While the development of plantation and other cash crops will be important to the development of the region, the environmental consequences of mono-culture cropping on biodiversity and water quality are issues dealt with in the green paper of the Aceh government released in December 2007.

Forestation and carbon credit trading

Many developed countries are in the process of developing national carbon trading schemes for offsetting carbon emissions. These schemes will provide opportunities for industrialized countries

with a greenhouse gas reduction commitment under the Clean Development Mechanism (CDM) of the Kyoto protocol to invest in reforestation projects to enable Certified Emission Reduction (CER) credits to be issued for trading on global markets. There are still issues with respect to CDM as currently only land cleared prior to 1989 is eligible; however, there is support for land cleared since then to be considered for CDM projects. While the benefit from CDM related to reforesting areas that have been cleared in the past will be restricted in Aceh, the parallel mechanism of REDD (Reduced Emissions from Deforestation and Degradation) which creates CERs from avoided deforestation will be of much greater importance. The investment in forestation projects to gain the benefits of offsetting emissions to avoid carbon taxes will be negotiated in 2009 in the lead up to the review of the Kyoto accord. Indonesia and Aceh are already very well positioned to make use of the preparatory phase (2008-12) with Readiness and Pilot Project funding from the Forest Carbon Partnership Facility managed by the World Bank, launched in the Bali Climate Convention in 2007 (World Bank 2008). Further, REDD projects can be certified to produce CERs already now through a voluntary carbon market mechanism. The first voluntary market oriented REDD project in Aceh has been certified and is planned to receive financing agreement during early 2008.

While the mechanisms still are to be developed for this, forestation provides a unique opportunity for the province to enter into arrangements with governments and companies in developed economies to benefit from carbon credit trading schemes. Carbon credit trading schemes provide a means for the provincial government to generate funds that could be used to support the development of investment and employment in local communities.

Development of non-timber sustainable industries

The potential to develop non-timber sustainable industries in the province is significant. However, past experience with rattan (vine) harvesting indicates the need to proceed with non-timber harvesting with caution. There are good opportunities to develop eco- and educational tourism, scientific research and sustainable harvesting of forest products for the pharmaceutical and cosmetics industries, and the use of forests as a genetic resource pool appears to have some potential. These opportunities require further scientific research to assess their feasibility, and some activities may have very limited potential. The development of the eco-tourism industry will require very careful management and cultural sensitivity to avoid potential negative impacts on communities and natural systems.

Mangrove forestation

Attempts have been made to increase mangrove forestation to expand the habitat for fish breeding and the development of juvenile fish. The program was unfortunately cut back with less than half the expected mangrove replacement areas expected to be planted. Mangroves are a very important part of the natural food chain for fish and other marine life. Without a substantial increase in mangrove forestation, fisheries stocks and the livelihoods of a significant proportion of the population are at risk. There is need for government to recognise that mangrove forestation is a strategic investment that will enhance the recovery and development of the province's pelagic fishing industry as well as proving coastal protection from storm damage and possible future tsunamis.

4.6. Opportunities in the energy sector

Development of renewable energy to support local economic development

The provincial government recognizes the importance of developing the energy infrastructure of Aceh to support its development but it is not in a position to develop a regional electricity supply network. In order to develop a sustainable economy, the region must consider the use of renewable energy resources, given the limited lifetime of current petroleum and gas reserves in the region. Opportunities to enhance the development of geothermal, local biomass and solar energy will be important to ensuring reliable and local supplies of energy to support the development of the province. A decentralized energy infrastructure might also create additional income for households and communities.

4.7. Opportunities in the tourism sector

Currently, tourism opportunities in Aceh are restricted due to unstable political conditions, lack of infrastructure and amenities. However, Aceh has opportunities for developing quality tourism based on its unique forestry ecosystems and undisturbed coastal areas. Provided that transport infrastructure could be installed and security and reputation could be improved, Aceh could become a destination for quality and educational tourism where local resources and skills would be engaged to provide local infrastructure and amenities and to enhance and secure income for communities.

4.8. Opportunities in other sectors

Development of localized opportunities for application of Industrial Ecology

Industrial ecology is a process that aims to capitalise on the use of materials and energy by re-using products or wastes to produce new or reprocessed products or energy for sale to consumers and other producers. There are significant opportunities in the province to capitalise upon the use of natural resource by-products and to convert these into products that can support other local sustainable industry activities. Opportunities for industrial ecology include: cogeneration of electricity and steam to support a food processing industries cluster, production of fertilizer using organic, food and fish by-products, biogas production to meet local energy needs, and recycling of waste water for agriculture and industrial uses.

Identification of import substitution industries

Opportunities exist to develop import substitution industries, which will support the development of new jobs and investment in the province. Such industries will, in an initial phase, refine the products of agriculture, fishing and forestry. There could potentially emerge specific opportunities to develop machinery and equipment for the farming and fishing, transport, construction, and light manufacturing sectors if the primary sectors yield enough surpluses to support such development.

5. Good practice examples for natural resource based economic development from Indonesia and other parts of Asia

The discussion papers identify many examples of good practice for sustainable development, which could be applied in Aceh. An important element of the economic development strategy prepared

for the province will be to develop and disseminate examples of best practice. The best approach to this will be through community and sector learning programs, since many of the examples selected as good practice will require adaptation to local conditions and land management practices. The following summarizes some best practice examples of sustainable development in Indonesia and other Asian countries.

5.1. Good practice in agriculture

The demand for meat and dairy products in Asia is rising rapidly as the demand for protein increases. In Indonesia, the demand for milk and dairy products is rising more than 10% per annum. Animal husbandry practices have changed little in Aceh and the need for improvement will be great if demand for animal protein is to be met. There are a number of best practice projects in Indonesia and other Asian countries, which could significantly improve the production of protein in the province and offer opportunities for exports.

The **Bali Cattle project** provides an example of best practice in livestock management and improved cattle breeding. The high demand for beef in this part of Indonesia has led to a selection of the best quality bulls being slaughtered, resulting in a marked decline in genetic potential for faster growth and mature size of the remaining cattle. This AusAID project involved developing appropriate options for the genetic improvement of the Bali cattle herd in the eastern islands of Indonesia. The project involved developing a model project and disseminating knowledge through formal and informal learning (local village networks) and about best practice in breeding and stock management. The program is now being rolled out in Sulawesi.

The **Ecological Agriculture** concept in **China** explores how traditional and modern farming can best be connected to support a growing population from a limited agricultural area. The concepts developed have succeeded by combining best practices from traditional farming with innovative science and technology to achieve sustainability.

The **Integrated Farming Practice in Ciwide, West Java**, Indonesia has developed a strategy to overcome insufficient land availability and stagnating living standards of farmers by implementing integrative agriculture based on three business strategies: horticulture, dairy farming and freshwater fisheries. By using by-products and wastes from one activity to feed into the other activities the integrated approach reduces soil degradation, allows for business diversification and strengthens the economic condition of farmers.

Organic fair-trade Coffee in Aceh Tengah and Bener Meriah. In the sub districts of Aceh Tengah and Bener Meriah, organic Arabica coffee is produced for export with an organic coffee label, which is given by the State Certificate Institution of Beuna (*Badan Sertifikasi Negara Beuna*). Challenges for organic coffee development include the availability of the land to plant coffee becoming more and more limited, as well as price fluctuations at international markets. In order to overcome price instabilities, farming cooperatives have entered marketing agreements with international coffee chains. Also, farmers who wish to obtain organic certification are included into price agreements for organic coffee to enable their transition to organic production.

5.2. Good practice in forestry

Nepal was the first country in Asia to support community-based forest management. Forests were handed over to communities who were responsible for sowing seeds, protecting and maintaining forests and implementing a forestry management plan. When local communities were institutionalised as self-governing entities for managing forest resources, elites captured many of the benefits from community forests. In order for decision-making to be more effective and equitable, representation in local community forests user groups was changed. There are still challenges with regard to the representation of the poor, lower castes and women.

Gunung Halimun National Park, West Java, which was designated as a national park in 1992, exhibits conflicts between forest laws over protected areas, and local communities that have no alternative but to enter the parks and extract resources. Administration was based on a zoning management system - core zone, wilderness zone, intensive use zone. Buffer zones and enclaves were established around and inside the park to allow people to pursue livelihood-related activities. Because boundaries were not clearly identified, encroachment into the park took place. In response, government authorities have adopted the policy of strictly adhering to official policies, disregarding the livelihood needs of local people. Latent conflict between local people and park authorities has the potential to trigger further destruction of forests. When establishing protected areas, Harada (2005) found that consideration should be given to gaining a thorough knowledge of traditional land tenure systems and how forest resources are used, and boundaries must be carefully determined. Aceh has deeply rooted traditional management systems that are still adhered to in many areas. The mukim system is a framework under which there are specific "guilds" for different traditional livelihoods sectors. From the point of view of sustainable forest management, revitalizing these systems offers significant potential, as has been recognized by several conservation and livelihoods projects. In Cambodia and Lao PDR, forest policies allow indigenous people to gather non-timber forest products from buffer zones in order to improve the management of national parks.

In the **Jiuzhaigou Biosphere Reserve**, resident Tibetan communities host more than a million tourists per year. The park combines conservationist goals with local community needs. Local people stopped farming and ceased providing yak rides for tourists, the number of tourists was restricted, the area was serviced by green buses and no overnight stays in the park were allowed. In return, local people have received a variety of compensation measures for stopping business activities within the park. In addition to a cash payment, every local is entitled to employment. The well-being of local people has been enhanced through their association with the park. The success of the park has been achieved through partnerships between local communities, the tourism industry and the State.

In summary, good practice in forestry requires engagement with local communities, transparent and easy to understand as well as enforceable tenure rights, and usually knowledge transfer and capacity building is through private-public partnerships.

5.3. Good practice in fisheries

The **Bali Plan of Action (BPA)**, issued as a result of the ocean-related ministerial meeting at Bali in September 2005, provides a comprehensive near to medium-term blueprint for activities. The BPA

calls on the Fisheries Working Group to ensure the sustainable management of the marine environment and its resources by understanding oceans, seas and coasts - through undertaking research, communication and information exchange on fisheries and other marine activities, and building capacity to enable APEC economies to conform to international reporting regimes.

It also asks that the marine environment be managed sustainably - through such activities as sharing best practices on the roles and function of the business and private sectors, and understanding and managing the impacts of human activities, including fishing practices and aquaculture, on environmental health and productivity.

The action plan focuses on sustainable management of living resources through various measures addressing issues such as illegal, unregulated, and unreported fishing, by-catch, the use of conservation and fisheries management schemes, and encouraging APEC members to conform to international fisheries regimes, among others. In order to provide for sustained economic benefits from oceans, production, post-harvest practices, trade facilitation and market access have to be ensured.

Fisheries development plans as part of poverty reduction strategies in Cambodia, Oman and the Philippines

In a number of Asian countries, poverty reduction strategies address aquaculture, fisheries management and livelihood improvement, and community fisheries in separate sections, with frequent other references to fisheries issues throughout the documents. In contrast, the Omani and Philippine documents discuss fisheries issues in distinct chapters. The Omani Plan provides a detailed evaluation of the (disappointing) performance of the sector under the preceding five year plan, thus helping to pinpoint the contemporary challenges faced by the commercial and artisanal fishing sectors. In the case of the Philippines, two separate chapters discuss in detail: (i) the state, challenges and future of the agricultural and fishery sector and (ii) environmental issues (including fisheries resources) and responses (Best Practice).

5.4. Good practice for land and water management

Improved management of land and coastal areas will be important to maintaining soil, water and vegetation resources of the economy. There are several examples of best practice for land and water management which Aceh could learn from and adopt in the province to enhance the sustainability of development. These include:

Pak Mun Irrigation Regional Development Project - Thailand

Thailand has benefited from policies to integrate land and water resources management to provide multiple benefits from water related development. The Pak Mun dam project developed in 1982 on Mun River, Ubon Ratchathani, north-eastern Thailand involved a dam project that supplies 225 million m³ of water for irrigation, generates 290 gigawatts per hour hydro power electricity, and provides a major recreation and fishing resource for the district. The project provides one of the best examples of value adding to a water engineering project, especially the creation of a fishing, tourism and recreation industry. In developing irrigation projects in Aceh to support the development of irrigated farming, the opportunities to add value to local economies through

aquaculture, tourism and recreation should be sought wherever possible. In the Indonesian context, the Jatiluhur Multi-Purpose Dam Project in West Java demonstrates a similar example of value adding to a hydro irrigation project.

Can Gio Mangrove Forest Restoration Project – Viet Nam

The Can Gio Mangrove forest restoration project, about 50 km south east of Ho Chi Minh City, is an example of a world best practice coastal wetland management restoration of an area that was severely damaged as the result of defoliant sprays used to kill the mangroves during the Viet Nam War. The project has had significant ecological, social and economic benefits for the local communities and the Saigon River and coastal ecosystems. The project could be replicated easily in Aceh in communities to increase and enhance the conservation value of mangrove forests in the province.

Can Gio is a mangrove forest wetland covering an area of about 70,000 ha. Much of the area was heavily damaged. The project has involved the plantation 20,000 ha of mangroves, and fostering the regeneration of 7,000 ha of naturally regenerating mangroves. The restoration has restored the marine ecosystems and is one of the most important fish breeding habitats in Vietnam. The restoration of the fish breeding habitat has aided the recovery of the fishing industry. It has also created significant employment opportunities for the development of tourism and recreation, with improved road access to the area and the creation of a monkey wildlife sanctuary. Can Gio salt-marsh forest is perhaps the best recovered, protected and managed area in Southeast Asia. The area was the first mangrove forest in Viet Nam to be admitted to the World Network of Biosphere Reserves by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in January 2000.

Conservation of Pra Sae River - Thailand

The Pra Sae River in south eastern Thailand is a major resource of the Klaeng District for transportation, consumption (domestic, agricultural, and commercial), and food (through fisheries). With increased urbanization, waste discharged directly into the river and upstream pollutants from agriculture and other uses entering the system, the overall quality and viability of this important resource are being threatened. Rather than waiting for a national response to local requests for action, the mayor initiated an operation to begin managing and rehabilitating the resource.

With private sector support, the project activities included the mobilization of youth groups, which monitored water quality along the river enabling the municipality to scale-up pollution control and protection by focusing on steps to rehabilitate the river environment and ecosystem, including a mangrove replanting program. A key component was the promotion of people's participation in and increased awareness of river conservation. This involved a wider set of participants beyond the municipal boundaries to include other districts and players in the surrounding jurisdictions.

To build public awareness, the municipality published the *Rak Nam Pra Sae Newsletter* to disseminate news and information about activities concerning river conservation to the public. The activities have markedly improved the river water quality and the quantity of aquatic species, and enhanced the scenic views along the river, creating additional tourism activities and income-

generating opportunities for local fishers. At present, there are 25 monitoring stations along the river involving three additional districts, all in Rayong Province.

5.5. Good practice for environmental laws and regulations

National Policy and Prospective Plan for the Enhancement and Conservation of National Environmental Quality: 1997-2016 – Thailand

Environmental policy and legislation enforcement has always been difficult in Asia. In response to environmental challenges over the last two decades, Thailand has developed increasingly progressive policy mandates that have aimed to strengthen legal frameworks, institutional arrangements and environmental management capabilities. The *National Policy and Prospective Plan for the Enhancement and Conservation of National Environmental Quality: 1997-2016* is an example of a best practice document which sets forth specific policy areas, strategies and targets that mandate actions by public agencies, local communities and citizens. A major driver for improved policies and practices has been the 1997 Constitution, which guarantees citizens a number of fundamental rights related to managing and conserving natural resources and the environment ensuring participation in environmental decision-making, and receiving information about projects and activities that may affect the environment.

Community Improvement Program - Jembrana, Bali

Jembrana is the poorest regency (district) in the Bali Province. It remains rural in nature although it is located along the main road connecting Bali's capital city of Denpasar and the harbor city of Gilimanuk, which functions as the island's gateway to the adjacent island of Java. The regency has developed and implemented a strategy focused on improved agricultural production, but more fundamentally eradicating poverty and developing local human resources. Human resource development in Jembrana has been hindered by poor education and health facilities. The local government has applied a business management approach to solving the problems in the region, especially introducing new local health and education programs and improving efficiency and effectiveness of government and related works (Winasa, 2005). These actions have increased community well-being, employment and investment in SME's in the region. The success of the program was due to strong leadership and the focus on an integrated approach to local economic development which focused on health, education and community development partnerships.

6. Framework for assessing environmentally sustainable development in Aceh

If environmentally sustainable development is to be a meaningful and an inspirational goal for the development of Aceh, then it must have demonstrable benefits to government, business, and the community sectors. In developing a medium and long-term sustainable economic development strategy for Aceh, one of the most difficult challenges will be to arrive at a set of commonly agreed actions and priorities for the development of the economy and to explain how these translate into coordinated programs, new ideas and practices that must be applied at and across all levels of government and in local communities. Sustainable economic development is something that must be learned: it is not something that can be imposed, mandated or regulated to make it happen.

Developing a framework to support sustainable economic development in any region of the world is difficult. Regions that are successful in supporting sustainable economic development are those which have identified clearly their priorities on which sectors of the provincial and/or local economy to develop, and the key elements of the enabling environment that need capacity building to facilitate investment to encourage and minimize the costs of business development and sound environmental management. Such strategies need to be underpinned by a clear set of principles which guide decision making about sustainable development activities.

A significant challenge for the provincial government of Aceh is seeking to build a strong competitive economy quickly, but to avoid overexploiting the province's rich endowment of natural resources to achieve this. It will take at least five years to develop much of the strategic infrastructure to build a competitive economy which is less dependent on energy as its main export activity. The future development of the Aceh economy will be based on the careful use and management of its natural resources. Aceh will not become a highly industrialized and/or services economy – at least not in the short term – although there will be some development opportunities in these sectors. As noted in the first paragraph of the policy note, Aceh's greatest potential is in the transformation and value adding it can make to its natural resources. It must, however, do this patiently and sustainably.

This section of the policy note outlines an environmentally sustainable development framework for Aceh province based on sound environmental management practices and principles. It presents a set of principles which can usefully be applied in supporting decision making processes by government related to sustainable development. It then outlines the analytical framework and the analysis used to assess the priorities for the development of sectors and capacity building elements needed to support environmentally sustainable development in Aceh. This assessment was developed through qualitative research processes involving a workshop of key industry stakeholders.

6.1 Sustainability Principles to Underpin Economic Development in Aceh

There is a growing realization in Aceh, and elsewhere, that sustainable development will only be achievable if government, business and local communities adopt a more holistic, collaborative and integrated approach to decisions affecting development, its impacts, and risks and desired outcomes. Such an approach calls for a greater understanding and focus by the province on how to:

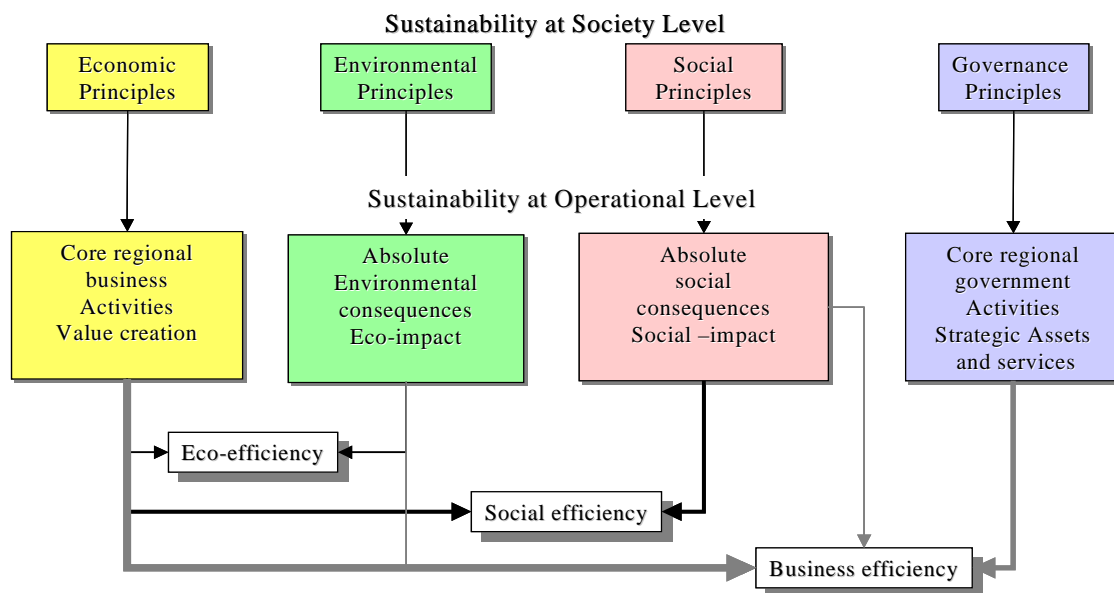
- Add value to conservation, production and services through increasing the economic, social and environmental benefits of development projects and programs;
- View the social and environmental consequences of economic activity as part of the solution, not as costs or problems;
- Encourage organizations to understand how to optimize the value of change;
- Ensure investments become more strategic in order to gain benefits from the effect of cumulative causation;
- Persuade organizational management to become more concerned with the management of externalities and to balance this with the internal local values and capacity to manage systems; and

- Promote multi-sector approaches to problem solving and decision making with a clear understanding that this will involve building new systems of governance.

These components of sustainability are important elements which need to be incorporated into sustainable development principles to underpin the environmentally sustainable development strategy for Aceh. All societies and cultures are governed by commonly held principles, rules and values etc, which guide government, business, community and personal decisions about many things, including the use of natural resources and development. These same principles are constantly being reshaped, reinforced and changed by custom, new knowledge, past experiences and events, as have occurred as the result of the tsunami.

There are many examples of principles which have been developed to support sustainable development. Most of these principles draw upon those outlined in international agreements or protocols, such as the Rio Earth Summit and Kyoto Protocol. In framing principles for sustainable development, it is useful to group these under four broad headings: governance, economic, environmental and social, as shown in Figure 6.1.

FIGURE 6.1: PRINCIPLES AND OUTCOMES OF SUSTAINABLE DEVELOPMENT



Some of the guiding Principles for Sustainable Development which could support the economic development strategy for the province are listed below under the four broad headings of Governance, Economic, Social and Environment. These will require elaboration and development.

- **Governance Principles** relate to such things as: Integrating social, environmental and economic factors in decision making; taking a whole-of-government perspective; empowering people; engaging the community; focusing on the wider region; focusing where risks are highest and where regional governments have a capacity to influence.

- **Economic Principles** relate to: Focusing on multipliers and value adding; materials and energy recovery and taking all costs (including life cycle costs) and benefits into account in assessing the feasibility and desirability of development.
- **Environmental Principles** relate to: Valuing and protecting ecological integrity and biodiversity; using resources prudently, and implementing the precautionary principle.
- **Social Principles** relate to: Ensuring equity within and between generations and believing in and fostering the ability to create a sustainable future.

The inter-relationship between these sets of principles leads to the identification of economic, social and business efficiencies. Governance is the primary mechanism which we use to establish rules, guidelines, learning and practices to achieve these efficiencies. Sustainability governance principles thus reflect the values and rules that guide the use of all forms of resources at a society and individual/firm/agency operational level.

6.2. Sustainable economic development assessment framework using Multi-Criteria Analysis

The Aceh economy has been in decline since 2000, due in part to declining revenues from the petroleum industry sector. While there was strong growth in the hotel trade, construction and finance sectors as a direct result of the tsunami and post-GAM conflict reconstruction efforts, and some increase in the agriculture sector in 2007, growth in the economy is expected to decline once the reconstruction phase ends in 2009. The province must begin to focus quickly on developing activities for renewable energy, minerals, food and non-food production, conservation and forestry, tourism, and construction sectors identified in section 5 above if it is to maintain a sustainable economy. Not all these sectors of the economy can be developed at once, and substantial investment is required for the development potential of the sectors identified to be realised. There are many impediments to overcome in developing all sectors of the economy.

Managing Aceh's natural resources sustainably is critical to the development of a competitive economy. But this means identifying and realizing the development of new niche industries in the primary industry sectors above and improving the enabling environment elements to support these and existing industries which have provided the economic base for the economy for many years. This will need significant investment in such things as: infrastructure; water management; land management; environmental management; capital markets; human resource development; governance and regulation; domestic and export markets; technology and innovation. Capacity building of these elements of the enabling environment is essential to support a level of development that will enable Aceh to realise some of its development potential.

Assessing priorities for investing in capacity building projects and programs, to strengthen elements of the enabling environment to support of environmentally sustainable development is a complex process. The key to successful environmentally sustainable development is the identification of public and private sector investments in capacity building projects and programs that will increase the economic, social and environmental multipliers in an economy. Especially important is investment in strategic infrastructure to help expand the growth and development of networks and

supply chains which enhance competition, open up markets and minimise economic, social and environmental transaction costs. There are no established analytical methods or tools which can guarantee regions' success in doing this.

One useful technique, however, which can be used to arrive at a set of priority actions to support environmentally sustainable development in the province, is multi-criteria analysis (MCA). Using qualitative assessments methods involving expert group inputs into the evaluation process, it is possible to assess which sectors of the economy have the highest development potential and what priority and support for developing capacity building projects and to develop enabling environments should be given by government, business and communities to realise the development opportunities. The basic framework for an MCA assessment of the priorities for the development of the sectors and enabling elements of the Aceh economy is shown in Figure 6.2 below.

6.3 Assessment of the Sector Capacity Building Requirements for a Sustainable Economy in Aceh

Determining which sectors of the Aceh economy government should give priority of development to is difficult. Section 4 above identified potential opportunities for the development of the economy; however, the realization of these will necessitate substantial further research and investment in capacity building over many years on an industry sector and cross-sector basis. The focus on developing strong industry clusters focusing on the development of more specialised industries will be important ensuring sustained economic development.

Most governments seeking to foster regional and local development tend to focus on investing in activities in an economy which have the greatest potential to generate high investment and employment multipliers that lead to some form of competitive advantage for the economy. However, this approach does not necessarily generate environmentally and socially sustainable development outcomes. In Aceh there is need to consider carefully the potential social and cultural impacts that the future development of the economy may have on the province.

In setting priorities for the development of the Aceh economy, the highest priority must be given to greater self-sufficiency in meeting the basic needs of food and shelter. However, the province must move from a semi-subsistence economy based on agriculture and fishing, to one based on increased production and export of processed products in these and other primary and natural resource sectors. To do this, the provincial and local governments must foster the development of capacity and capability in the services sectors such as: transport; business and government services; education and research; and must prepare the province for greater urbanization.

Increasing productivity and performance of the natural resource and primary industry sectors is essential if the province is to develop, and to enable it to generate the capital and investment needed to reduce poverty, create wealth and improve the general well-being of the population. This will necessitate policies that will lead to a fundamental shift in the structure of employment in the province, with a greater focus on decentralization and specialization of economic development and activities, and support for expanded regional towns or growth centres to accommodate greater urbanization which follows when economies become more service orientated.

The analysis of industry sector potential and capacity building needs conducted for the preparation of this policy note, suggests that the highest priority and efforts to support the development of the province’s economy should be given by government to agriculture (food production); forest conservation management (forestation and non-timber harvesting) and fishing (especially fish farming) sectors. These sectors are considered to have the greatest potential to generate employment and create new value-added industries in the province. High priority should also be given to the development of the energy sector (petroleum and non-renewable energy). Medium term prospects for the development of the minerals, non-food production and eco-tourism sectors are good, but they will require substantial long-term investment before these opportunities can be realised. Government should give lower short-term priority to supporting the development of these sectors. There are also significant environmental issues associated with the development of these sectors.

Substantial reforms are necessary to legislation, land and water management, governance and technology practices in supporting the development of the above sectors of the economy to realise their full potential. These reforms are discussed in more detail in the six discussion papers and in the initiatives below.

Significant capacity building is needed to establish a strong enabling environment to support the sustainable development of the sectors of the economy identified above. Figure 6.2 shows an assessment of eight critical enabling environment elements identified earlier in the policy note which need capacity building to support five primary and natural resource sectors of the economy. The information used for the assessment shown in the figure was obtained from a qualitative assessment by sector conducted by participants attending the second Policy Note workshop. The analysis indicates the relative effort that government and business must apply to future capacity building to strengthen the enabling environment to support the development of the five primary and natural industry sectors described above. The matrix includes weights derived from the participants’ assessment of the relative importance that should be given by government to developing sectors of the economy.

FIGURE 6.2: FRAMEWORK FOR CAPACITY BUILDING REQUIREMENT EFFORT IN ACEH

	Infrastructure	Capital and investment	Land management	Environmental management	Water management	Markets	Technology and Innovation	Governance and regulation	Human resource development	Sector Weighting
Agriculture	Mod	High	Highest	Highest	High	Mod	Mod	Mod	High	1.4
Fisheries	low	High	Mod	High	Mod	Mod	High	Mod	High	1.25
Forestry	Mod	High	High	High	Highest	low	High	Mod	High	1.25
Energy	Highest	High	Highest	Highest	Highest	low	High	Mod	High	1.00
Tourism	High	High	Highest	High	Mod	High	High	High	High	0.90
Overall	Mod	High	Highest	High	High	low	High	High	High	

The matrix above provides a useful indicator of the capacity building efforts needed to develop elements of the enabling environment to support the sustainable development of the resource sectors of the economy. Land management ranks as the highest priority for capacity building across all sectors. This reflects issues related to land tenure security and planning raised in several discussion papers and the Investment Policy note. Water and environmental management ranks highly, indicating the need for improved land management practices to protect soils, water and environmental quality. The need for enhancing the capacity to increase capital investment is high for all sectors, as is investment in human capital and development.

Infrastructure is important to the development of the province, but the priority is less on the need for new infrastructure, than on the maintenance, repair and upgrading of existing infrastructure throughout the province. Priority must be given to repairing and upgrading the local and distributor road network. New infrastructure is urgently needed in the energy sector to service the rising demand for business and domestic energy. Priority given to the development of markets is low; which reflects the need for investment in the primary industry sectors before new and existing markets can be developed. More detailed assessment and feasibility work is required to define specific elements of capacity building and subsector industry activities which should be targeted for more detailed analysis during the preparation of the economic strategy for the province. Specific attention will need to be given to studying supply chain linkages to the service sectors and how to develop capacity in those sectors.

It will be up to public agencies and local communities to work out how best to identify the specifics of the capacity building needed to strengthen the enabling environment elements of the economy shown in figure 6.2. Significant capital is required to develop infrastructure, human capital and technology; however, the dissemination of local knowledge and rewarding best practice for initiatives which foster sustainability will be critical to strengthening the capacity of the province to compete for investment and markets to develop the economy.

6.4. Analysis of risks and vulnerabilities

All forms of development carry risks. To achieve sustainable development in the province will require government, business and communities to manage not only environmental risks, but risks associated with the development of the primary and natural resources sectors.

Table 6.1 shows an analysis of specific environmental and associated economic, social and governance risks that have the potential to impact on the development of the primary and natural resources sectors of the province's economy. The risk analysis uses a standard technique based on a qualitative assessment by the research team to measure the likelihood (L) and impact (I) of risks to arrive at a weighted risk assessment for the risk factors which may impact on the development of the region. Likelihood scores are based on a scale of 1 to 5, 1 being insignificant with five being catastrophic. The I scale is based on A-E with A being almost no risk and E being near certainty. The weighted risk scale uses the letters E, H, M and L, with E: extreme risk, immediate action required; H: high risk, senior management attention needed; M: moderate risk, management responsibility must be specified and L: low risk, manage by routine procedures.

The overall risk analysis suggests that the development of the Aceh economy faces significant risks, especially those associated with the management of the environment. Most risks are ranked high. The economic risk to the development of the economy is also ranked high, reflecting a lack of investor confidence in the long-term prospects for the development of the economy. Transaction costs in the economy, coupled with high inflation and poor communications infrastructure and access to markets, are major concerns. Governance risks are considered high, reflecting the need for reform and streamlining of procedures and laws, as indicated in the environmental laws and regulations discussion paper. Social risks are considered moderate, with the return to greater security and autonomy following many years of civil conflict.

TABLE 6.1 RISK MATRIX

Identified Risk	Likelihood (L) 1-5	Impact (I) A-E	Rating	Comments
ENVIRONMENTAL				
Forests and Vegetation Loss	4	D	H	Enforceability of logging moratorium and follow-up actions
Habitat & Biodiversity Loss	4	C	H	Loss of forest and risks of monoculture
Forest Fire	3	C	M	Uncontrolled fires
Erosion/Soil degradation	4	C	H	Top soil loss and increased runoff
Air Pollution	3	D	H	Forest fires clearances and urban emissions
Water Pollution	3	C	M	Ground and surface water contamination
Damage to Coastline	3	D	H	Oil spill risk
Coastal Development	4	C	H	Tourism development on coastline
Environmental Waste	3	C	M	Illegal waste dumping
Climate Change Risk	5	C	H	Increased flooding
Urbanization	5	D	H	Urban encroachment
Natural Disaster	4	D	H	Major earthquake flooding
Agriculture Diseases	4	D	H	Pandemic fungal diseases
Disease Aquaculture	4	D	M	Diseases affecting fish farming
ECONOMIC				
Rising Inflation	3	D	H	High local inflation reducing competitiveness
Market Entry Barriers	4	D	H	Local capacity to develop markets for export
Rising costs of capital	4	D	H	Lower returns on investment
Rising Labor costs	3	C	M	Labor costs higher than other provinces
Rising Transport costs	4	D	H	Poor road access and rising global fuel prices
Rising Import Costs	4	D	H	Poor connectedness to international sea/air ports
Resistance to Technologies	4	D	H	Traditional values and cultural heritage that contribute to adversity towards change
SOCIAL				
Acceptance of Change	3	D	M	Reforms and new technology
Increasing Social Unrest	3	D	M	Potential for conflict to reoccur
GOVERNANCE				
Weak Governance	3	D	H	Reform processes too slow to enhance
Corruption	4	D	H	Indonesia ranked 4 in Asian corruption index
Failure in Decentralization	4	C	M	Growing concerns about law 12/2006

6.5 Building the Enabling Environment for Aceh

To create strong enabling environments to support sustainable development it is necessary for all levels of government to provide or facilitate the development of capacity to support the development of different sectors of the economy in the eight broad areas described above. Many elements of the enabling environment are the responsibility of provincial and local governments (such as legislation establishing local government, local government revenue-sharing arrangements, and employment regulations governing local authorities). Others elements are the responsibility of national government, but directly or indirectly affect local government activities (examples vary but often include, housing policies, poverty reduction programs, heritage protection, and resettlement guidelines). Still other elements of the enabling environment, for example, legislation and regulations for controlling industry are the operational responsibility of special-purpose authorities. The national government enabling environment for urban governance and its associated incentives structure is a key factor influencing the performance of local authorities and of urban areas.

The structure and operation of the enabling environment is central to the functioning of urban governance and to the provision of infrastructure and services. Importantly, its impact is more than laws and regulations; it also plays an important role in setting the culture of operation of local authorities. At one end of the spectrum, the enabling environment can encourage the development of performance-based cities with a focus on location competitiveness, results, performance benchmarks, incentives for achievement, and efficiency of service provision; at the other extreme, it can lead to a culture of stifling, unproductive, administrative process and inefficiency.

Decentralization can only yield improved performance in infrastructure and service delivery if it is associated with a culture of performance improvement, often supported by incentives. Generally the enabling environment is less important the stronger the leadership, capacity, and resources of the local government; governments with stronger leadership are better able to find and exploit policy, program, and administrative flexibility.

For sustainable development outcomes in the province to be meaningful and achievable, there is need for better governance and a common language and understanding between public agencies, business and the community in Aceh which provides the basis for engaging with key stakeholders that will drive the development and new investment in the province. To improve the dialogue between those key actors it will be important to allow for better dissemination of knowledge and information, public consultation, cross sector planning, cooperation and collaboration in the delivery of public services and infrastructure that will lead to the achievement of common development goals.

6.6. Key initiatives in natural resource based economic sectors

This policy notes identifies initiatives to strengthen the enabling environment for the Aceh economy which will help support the development of a sustainable economy. Many included enabling elements which are cross-industry or cross-sector. Many initiatives described in the discussion papers have been identified in various government studies, international development agencies and non-government organization plans and reports. A list of known proposals related to environmental resource management is included in an Annex to the discussion papers. Bappenas has recently prepared a development plan for the provinces but the listing of priority projects in this

plan is not identified. In the absence of a detailed set of key initiatives to support the management and development of natural resources and primary industry sectors, the following key initiatives (table 6.2) are suggested:

TABLE 6.2: KEY INITIATIVES

Enabling Element	Initiatives	Reference
Agriculture	<ul style="list-style-type: none"> • Enhance the management capacity for establishing and implementing agricultural development plans • Ensure agricultural modernization and technology uptake for increased productivity • Consideration of socio-cultural capital and constraints • Provision of microfinance to support smallholder businesses • Provide cooperative frameworks for shared capital and market access combined with individual tenure rights • Land management reform • Infrastructure - Rural roads, irrigation • Information systems (for prices) • Market structure 	Discussion Paper 1 Discussion paper 1
Fisheries	<ul style="list-style-type: none"> • Integrated coastal spatial plans • Provide clear policies and planning documents • Improved coordination of initiatives and activities • Investment in post-harvest facilities • Improve human capacity, access to information, technology and financial institutions • Cold storage • Larger boats to reach outer waters • If for export, the systems should be in place to ensure quality and certification 	Discussion paper 2
Forestry	<ul style="list-style-type: none"> • Increase the efficiency of timber utilization • Improvement of data and information availability • Provide and secure well defined tenure rights • Provide disincentive regulations and strengthen law enforcement 	Discussion paper 3
Land and Water	<ul style="list-style-type: none"> • Increase the potential of non-timber products • Improve local governance capacity • Integrated Water Resource Management Plans <ul style="list-style-type: none"> ○ Management of provincial water resources ○ Building and maintenance of strategic water infrastructure • Forest Conservation Management Plans 	Discussion Paper 4

Environmental Law and Regulations	<ul style="list-style-type: none"> • Coastal Zone Management (CZM) Plans • Audit of Existing Laws and Regulations • Developing local environmental and NRM laws and regulations to implement law • Agency for Sustainability and the Environment • Improved natural resources management practices • Establishment of a Land and Environment Court and local tribunals 	Discussion Paper 5
Spatial Planning	<ul style="list-style-type: none"> • improvement of data validity, accuracy and comprehensiveness • continuously promoting participation and inclusiveness, including those internal as well as external stakeholders that are influential • strengthening the links to budgeting processes 	Discussion Paper 6

6.7 Feasibility of Implementing Key Initiatives

Implementation of development policies, plans, projects and programs for capacity building to create strong enabling environments to support development has proved a challenge for governments in Indonesia. Some capacity and sector building initiatives proposed in the section above will prove more difficult to implement than others because of cost, technical and social complexity, human resource capacity and other difficulties.

To assist the government in identifying the types of projects which may be easiest to implement, a qualitative multi-criteria assessment was used to identify and assess the feasibility of implementing more than 50 capacity building initiatives in five industry sectors of the economy. The feasibility analysis used 10 criteria: priority; independence of project and program; complexity of activity; funding attractiveness; multiplier effects; sustainability; beneficiaries; environmental impacts; poverty alleviation impacts; and capacity and ease of implementation to evaluate the ease or difficulty of implementing projects and programs to support capacity building of eight enabling environment elements. The feasibility of sector implementation of capacity building projects is shown in the table 6.3 below.

The analysis suggests that capital investment, water management and governance legislation reforms are going to be the most difficult capacity building activities to implement for the five sectors of the economy shown in the matrix. The analysis reconfirms the observations made in the three sector industry discussion papers. The implementation of capacity building initiatives will be most difficult in the forest management, fishing and the mining and energy sectors. This is because more levels of government will need to be included in the consultation and implementation. There are also international issues involved in areas like governance, finance, performance monitoring and evaluation of resource uses which will prove complex, difficult and costly to manage. Further analysis is required on the feasibility and capacity to implement many projects and programs identified as priority by the workshops and the six working papers. It is beyond the capacity of this policy note to complete such an analysis. Nevertheless, the above analysis provides a useful guide for the Government of Aceh and the business and investment sectors of the activities it could proceed to implement relatively easily and activities that will prove more difficult.

TABLE 6.3: FEASIBILITY OF IMPLEMENTING CAPACITY PROJECTS AND PROGRAMS FOR ENVIRONMENTAL MANAGEMENT AND ECONOMIC DEVELOPMENT IN ACEH

	Fishing	Agriculture	Tourism	Mining and Energy	Forest Conservation Management
Infrastructure	Mod	Mod	Easy	Mod	Diff
Capital & Investment	Mod	Mod	Mod*	Mod	Diff*
Environmental Management	Mod	Easy	Mod*	Mod	Diff
Water Management	Mod*	Mod	Mod	Diff	Mod
Markets	Mod	Mod	Easy	Mod	Mod
R&D, Technology & Innovation	Mod	Easy	Mod*	Easy	Diff
Legislation and Governance	Diff	Mod	Mod	Mod	Easy
Human Resource Development	Mod	Easy	Mod*	Mod	Mod

D = Difficult M = Moderate E = Easy

* Not assessed in workshop

7. Recommendations

Recommendations for sustainable development based on agriculture, fisheries and forestry

Agriculture

Recommendations for the development of agriculture in the Aceh province include activities at the farm level, the regional level and the provincial level. Coordinated spatial planning, land tenure reform and transparent and enforceable land ownership will be a prerequisite to agricultural modernisation in the province to enable investment, participation in capacity building and environmental stewardship. Stable ownership structures for agriculturalists combined with rural credit facilities will help improving land management skills, improved soil and animal waste management and will allow for increased land and labour productivity in Aceh’s agriculture. Payments for environmental services and stewardship will further contribute to increased rural income. Agricultural modernisation strategies will, however, require local capacity building to ensure environmentally sound agricultural development.

Agriculture in the Aceh province has to combine an intelligent product mix and innovative cropping and livestock raising practices (such as low-input, organic farming and agro-forestry) to ensure the competitive advantage for Aceh’s products on national and international markets. Agriculture in the province has to reach a critical mass for certain product groups, such as coffee, cocoa, rubber and palm oil to attract global buyers. Increased market access will depend on the development of local roads and transport facilities, cooling capacities, the development of regional service centres as well as the development of new food processing industries.

- Highest priority in developing the agricultural sector should be given to land management and environmental management. This ensures that spatial planning, land ownership and natural resource management in agriculture work together to allow for investment to support environmental sound growth.
- High priority should be given to water management to secure stable access to water under climate change. Access to credits and micro finance will be essential for local investment and has to be aligned with human resource development to allow the skill base to grow and to support ingenuity and entrepreneurial attitude.
- Other factors influencing successful agricultural development include the provision of suitable infrastructure such as irrigation schemes or access to roads. Technology and innovation will drive agricultural modernization and will allow for higher yields as well as increasing labour productivity.
- Good governance will be essential to create rural institutions for enhanced sharing of machinery and tools, shared marketing and human capacity building networks among farmers. A combination of private land ownership and cooperative farming and marketing seems to be the most promising strategy for Aceh.
- Small and medium scale food processing industries should be developed to increase the provincial value chain of agricultural products.
- Food security at the local, sub-provincial and whole of the province level should be a first priority and based on paddy rice production and horticultural and livestock production.
- Export markets should focus on products that have competitive advantage such as coffee, cocoa, palm oil and rubber. These products should, however, be developed under strict environmental performance and natural resource management objectives to avoid overuse of natural ecosystems and production areas.

Fisheries

The development of the fisheries sector in Aceh will require a combination of marine and aquaculture activities and should rely on sustainable management of deep water and coastal fish stocks as well as sustainable management of fish stocks in aquaculture. Especially environmental management and marine habitat management will be important to generate stable long-term livelihoods for fishing communities.

- High priority should be given to capital and credit facilities to support investment, to technology and innovation in production and product handling as well as human resource development. Investment will be needed to purchase boats, and to establish hatcheries and ponds. Direct foreign investment should be allowed in coastal zones where local fishermen lack the capacity to establish fish production infrastructure and investors should be obliged to technology transfer, capacity building and market access.
- Improved fish resource management and the establishment of a marine habitat protection zone would help increasing the sustainability of the industry.
- Infrastructure development will include port and landing facilities, support for developing infrastructure for aquaculture, development of local cold storage facilities and of local and regional fish markets. This will help to improve the handling of the fishery products and will increase the local capacity to deal with seasonal price fluctuations for fish.

- The fishing industry will require improved public administration and regulation based on local registration and management of fishing activities.
- Small-scale local manufacturing for fish based products could increase the provincial value chain but will require substantial initial funding to get such activities and businesses started.

Forestry

Recommendations for developing the forestry sector in Aceh are aimed at increasing the effectiveness and efficiency of timber utilization as well as increasing the potential of non-timber forest products. To manage forest resources in a sustainable way and not to compromise alternative income options such as local incomes from carbon trading, eco-tourism and non-timber forest products requires a combination of incentives and binding legislative arrangements.

- Highest priority should be given to water management and to ensuring that forests could provide their important ecological functions.
- Land management, forest zoning and environmental management of forests should be given high priority to secure long-term revenues from forests.
- Avoiding deforestation and allowing for reforestation will require a mix of availability of investment, technological development and human capacity building. It will be necessary to allow for direct foreign investment to support businesses opportunities, market access and technology transfer as well as human capacity building.
- Infrastructure development and improving governance and regulations for forest utilization has a medium priority.
- Markets for timber and timber products, non-timber forest products, ecotourism and educational tourism and carbon trading are readily available or in creation.
- Small-scale local manufacturing for timber based products could increase the provincial value chain but will require substantial initial funding to get such activities and businesses started.
- Export products should include raw timber, and forest resources for use in pharmaceutical and cosmetic industries. Local timber and other forest products should be increasingly used to provide infrastructure for tourism based on local skills and employment.

Local communities should be encouraged and supported by programmes, strategies and project funding to create a portfolio of agricultural, agro forestry and fishing activities to enhance the adaptive capacity of communities to influences and shocks from global markets, policy framework changes, and environmental risks and disasters.

Recommendations on Land and Water Management

The following recommendations are made to improve land and water management to support the more environmentally sustainable development in Aceh:

Water Catchment Management Plans

As part of the spatial planning process, the government of Aceh should prepare water catchment management plans for the main river systems in the province. This will involve an audit of existing surface and ground water resources, water quality and hydrology attributes and land use activities

for each catchment. The water catchment management plans should identify programs for the future use, storage, management, treatment (including standards) and recycling of water. Water catchment management plans should also include measures designed to reduce soil erosion, enhance water quality, reduce water wastage and loss and flood mitigation. Issues such as the management of future water rights should be covered in the management plans. Local governments should be given a management role in the implementation of Water Catchment Management Plans

Coastal Zone Management Plans

To protect the coastline of Aceh from undesirable and speculative development and to improve the management of coastal resources, the Government of NAD should prepare and implement coastal zone management plans in line with those currently being prepared in other parts of Indonesia. The plans would identify areas of conservation and scientific value, areas for tourism development, and suitable fish farming area. Coastal management plans would describe institutional and other governance arrangements for to be adopted for the management of the coastline. Coastal Zone Management plans should be integrated with spatial plans prepared at a regional and local scale for the province.

Documentation of Traditional Sustainable Land Management Practices

The Government of NAD should seek international development assistance for a project to research and document sustainable development land management practices which can be disseminated to communities (in local languages) as part of an education program to increase public awareness and application of traditional sustainable development land use and management practices.

Land Management Community Education Programs

The Government of NAD should develop education programs to increase local knowledge of land management and conservation practices to protect and restore the productivity and bio-diversity of arable and forest lands throughout the province. Such programs could be delivered using mobile training teams involving trainers familiar with local conditions and customary practices. Simple easily to read and well illustrated materials should be distributed to schools, libraries and local government offices as a means of disseminating wider knowledge and application of traditional and improved land and water management practices.

Integrated and Multi-functional Water Development Projects

Where possible, projects involving the construction of dams for irrigation areas should be designed using good practice principles which support multiple function/uses activities such as: mini-hydro, tourism development, fisheries and urban water supplies. Encouraging the development of integrated and multifunctional water development projects increases the sustainability of development.

Recommendations on Environmental Laws and Regulations

The legal system is one mechanism the NAD provincial government can use to improve natural resource and environmental management in the province. The following recommendations, in order of priority, are considered necessary to strengthen the legislative infrastructure necessary to improve natural resource and environmental management in the province and support the development of a sustainable economy.

Audit of Existing Laws and Regulations

The Government of NAD conducts a full audit of all existing natural resource and environmental management legislation, laws, regulations and standards in the province. This review will require documentation and an examination of all written state laws, written and unwritten customary laws, as well as Islamic law (syari'ah law). Copies of all laws should be stored for ease of access and later web access in an electronic library. The audit should identify all laws where there is lack of harmony between national and provincial laws, followed by provincial and local regulations and legal practices. Priority should be given to repealing laws and regulations which are not current, or not conforming.

Developing Local Environmental and NRM Laws and Regulations to Implement Law 11/2006

The Aceh government and parliament (DPRA) should proceed immediately to prepare and revise existing environment and natural resources local regulations (qanun) as mandated in Law 11/2006. There is a need to organize a meeting involving multiple related agencies to establish a similar level of understanding and vision on the importance of natural resources. The new laws should ensure greater multi-agency collaboration, and community engagement in decision making concerning environmental and nature resource management matters. The local regulations (qanun) should provide the foundation to realize sustainable development in Aceh with a focus on making it a green province. The roles, responsibilities and authority of decision bodies, agencies and LGUs should be clearly defined so that each can conduct their responsibilities with authority and without ambiguity.

Agency for Sustainability and the Environment

In order to eliminate centralistic, exploitative, sectoral and fragmented natural resources management in the province, a change in management arrangements is necessary. The province should consider establishing an agency for Sustainability and the Environment, responsible for all environmental legislation, permits, EIA, environmental sustainability and environmental management, monitoring and assessment. The agency would oversee the review of the audit and be responsible for preparing new legislation and advise on repealing and reforming other legislation as required. The agency would be responsible for overseeing and supporting the application, recognition and (where applicable) the recognition of traditional, syari'ah and other customary land and resource management practices into legislation where these support the principles of sustainable development outlined in the GBHN and Law 23/1997.

Documentation of Traditional Natural Resources Management Practices

The adoption of methods and systems of natural resources management practiced by traditional institutions should be documented and referenced and used in developing future management policy and practices for natural resource and environmental management in the province. Part of the process to improve natural resources management practices in the provinces will be a broad range of community education and awareness programs, which explain the importance of protecting the environment, managing resources sustainably and maintaining a collective responsibility for environmental management and reporting breaches of regulations to the appropriate authorities.

Establish a Land and Environment Court and Local Land Tribunals

The NAD government should give consideration to the establishment of a separate court to hear all matters related to land and environment matters in the province. Provision should be made for the court to have representation by traditional and syari'ah experts to assist in the deliberation of cases

that involve traditional and Islamic issues. To avoid long delays in hearing cases, the law establishing the court should also provide for local mobile tribunals and dispute resolution methods (based on traditional and modern practices) to resolve matters that need not go through the court system. The tribunals would be headed by experts knowledgeable in the fields of land, natural resource and environmental management. As is the practice in some countries, the courts and tribunals could also deal with land use planning and development matters.

Recommendations on Spatial Planning for Improved Environmental Management

While there is a need for consistent law enforcement and compliance around spatial planning, there are many other factors that must be addressed for planning to realise stated development outcomes. The internal and external factors discussed in earlier sections on lessons learned need to also be addressed. These include:

- improvement of data validity, accuracy and comprehensiveness
- continuously emphasizing specifics, including the actions needed and who the responsible parties are
- continuously promoting participation and inclusiveness, including those internal as well as external stakeholders that are influential
- realistically considering the limitation of resources available to support the realization of plans without confining any potential for aiming as high as possible
- strengthening the links to development planning and budgeting processes
- continuously encouraging those involved in the spatial plan formulation process to identify strategic areas and priorities to be regulated and the need for possible intervention by the government, and then “leave” other matters to market mechanisms.

Dissemination of publicly agreed and legally binding spatial plans needs to be conducted more thoroughly so that people will become aware of such regulations. This effort should precede any attempt to enforce the law, yet it has to be conducted continuously. Once people become aware of the existence of spatial plans (and the rationale behind them - including environmental protection) law enforcement can be put into effect more rigorously. Land and environment courts as recommended in Discussion Paper 4 of this series are worth considering.

Capacity building in the area of spatial planning (with an additional emphasis on linking it with development planning and budgeting) also needs to be pursued beyond the rehabilitation/reconstruction phase. It has to include institutional capacity building, individual human resource development, strengthening support systems and developing the enabling environment for spatial plans to be effective as both the means for inter-sectoral or inter-governmental coordination, as well as the means to achieve sustainable local economic development and improved environmental management.

General Recommendations

- That the World Bank, in association with the Governors Economic development advisory group initiate further discussion and debate on the proposed framework for fostering the preparation of a sustainable development strategy for the province.
- That the World Bank gives consideration to the preparation of policy documents on environmental management of minerals and energy exploration in the province.
- That the broad sustainable development principles outlined in this policy note underpin a sustainable economic strategy for the province to be developed by the working group.
- The policy note and discussion papers, once finalised, be posted on the World Bank web site as well as sending hard copies to all relevant government agencies and donors working in Aceh to enable wider distribution and discussions on the materials and recommendations presented in the policy note.

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Annex 1: Qualitative measures of impact, likelihood, and risk

TABLE A.1: QUALITATIVE MEASURES OF IMPACT

<u>Level</u>	<u>Descriptor</u>	<u>Example detail description</u>
1	Insignificant	No injuries, low financial loss
2	Minor	First aid treatment, on-site release immediately contained, medium financial loss
3	Moderate	Medical treatment required, on-site release contained with outside assistance, high financial loss
4	Major	Extensive injuries, loss of production capability, off-site release with no detrimental effects, major financial loss
5	Catastrophic	Death, toxic release off-site with detrimental effect, huge financial loss

Note: Measures used should reflect the needs and nature of the organisation and activity under study.

TABLE A.2: QUALITATIVE MEASURES OF LIKELIHOOD

<u>Level</u>	<u>Descriptor</u>	<u>Description</u>
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time
D	Unlikely	Could occur at some time
E	Rare	May occur only in exceptional circumstances

Note: These tables need to be tailored to meet the needs of an individual organisation.

TABLE A.3: QUALITATIVE RISK ANALYSIS MATRIX-LEVEL OF RISK

<u>Likelihood</u>	<u>Impact</u>				
	Insignificant	Minor	Moderate	Major	Catastrophic
	1	2	3	4	5
A (almost certain)	H	H	E	E	E
B (likely)	M	H	H	E	E

C (moderate)	L	M	H	E	E
D (unlikely)	L	L	M	H	E
E (rare)	L	L	M	H	H

Note: The number of categories should reflect the needs of the study.

Legend:

E: extreme risk, immediate action required

H: high risk, senior management attention needed

M: moderate risk, management responsibility must be specified

L: low risk, manage by routine procedures

Annex 2: Discussion papers

Discussion paper 1: Sabti, A. 2008. Sustainable Economic Development in the Agricultural Sector in Aceh. Canberra: CSIRO.

Discussion paper 2: Safar, S. 2008. Challenges to the Revitalization of Fisheries, following Post-Tsunami Rehabilitation and Reconstruction Efforts in Aceh Province. Canberra: CSIRO.

Discussion paper 3: Soedarso, S. 2008. Forestry. Canberra: CSIRO.

Discussion paper 4: Jakfar, F. 2008. Land and Water Management. Canberra: CSIRO.

Discussion paper 5: Rinaldi, Y. 2008. Environmental Law and Regulation in Aceh. Canberra: CSIRO.

Discussion paper 6: Sarosa, W. 2008. Spatial Planning for Sustainable Development in Post-Tsunami Aceh. Canberra: CSIRO.