



Ecological Mangrove Rehabilitation, Sustainable Livelihoods Adaptive Collaborative Management and Carbon Finance in Critical Mangrove Systems in Indonesia



2002 - Time Zero



**2005 - Time Zero Plus 3 Years
Tiwoho, North Sulawesi**

**Ecological Mangrove Rehabilitation, Sustainable Livelihoods,
Adaptive Collaborative Management and Carbon Finance
in Critical Mangrove Systems in Indonesia**

**A Concept Paper for
Danone Group/CBD/LifeWeb Initiative
November, 2009**

**Written by Ben Brown
Director, Mangrove Action Project - Indonesia
Co-Founder - Ishwara Environmental Institute**

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Pilot Project Concept Note - Executive Summary

Program Name	Ecological Mangrove Rehabilitation, Sustainable Livelihoods Adaptive Collaborative Management and Carbon Finance in Critical Mangrove Systems in Indonesia	
Proposing Institution & Contact	Mangrove Action Project – Indonesia Ben Brown – Director Mailing Address: Ishwara Environmental Institute Banjar Nyiuh Kuning, Ubud, Gianyar, Bali Email: seagrassroots@gmail.com Phone: +62 85857191274	
Program Duration	5 years from final project approval (Approx. Feb 2010 – Jan 2015)	
Program Location	*MAP Locations: Bengkalis Island – Riau, Simeulue Island, Aceh. **Partner Locations: Tomini Bay, Sulawesi, West Bali, Bali.	
Statement of Project Goal	To build the social, economic and ecological resilience of mangrove biodiversity “hotspots,” by restoring substantial critical mangrove habitats, developing sustainable mangrove resource based cooperative businesses, and strengthening existing adaptive collaborative management policies and practices. Development of Carbon Financing Scheme – Based on minimal 500 hectares restored forest valued at Voluntary Carbon Standards and minimum 1000 hectares of mangrove conservation valued at Voluntary REDD standards.	
Names of project proponents and main project implementing organization:	Main Implementing Organization: Mangrove Action Project – Indonesia Project Proponents: <u>Bengkalis Island, Riau</u> : Yayasan Laksana Samudera (NGO), 10 Community Steward Groups, Village Governments, District Government. <u>Simeulue Island, Aceh</u> : 10 Community Steward Groups, Village Governments, Traditional Coastal Leader, District Governments <u>Tomini Bay, Sulawesi</u> : Tomini Bay Sustainable Coastal Livelihoods and Management (SUS-CLAM) Project Proponents (Wetlands International – Indonesia Programme, IUCN Ecosystems and Livelihoods Group, 2 local NGO’s), Village, Sub-district, District Governments, Provincial Forestry Department. <u>West Bali & Suwung, Bali</u> : Mangrove Information Center, Yayasan Bahtera Nusantara (local NGO), Department of Forestry Special Mangrove Unit, Traditional Village-level Wetland Management Boards (Subak Lahan Basah).	
Program Budget	Minimum Scenario Total project cost: € 1,798,782 Amount of funding being requested from DFN: € 1,298,232 Matching Funds: Approx: € 505,550 Secured Funding: USD 50,000 (UNDP – GEC) CAD 225,000 (IUCN – ELG) of CAD 4.7 million USD 25,000 (Department of Forestry) Under Application: CAD 225,000 (CIDA) of CAD 7 million	Maximum Scenario Total project cost: € 2,308,642 Amount of funding being requested from DFN: € 1,743,692 Matching Funds: Approx: € 564,950 Secured Funding: USD 50,000 (UNDP – GEC) CAD 325,000 (IUCN – ELG) of CAD 4.7 million USD 25,000 (Department of Forestry) Under Application: CAD 325,000 (CIDA) of CAD 7 million

*MAP-Locations: Land tenure issues in advanced locations are already resolved, enabling mangrove rehabilitation to start in 2010. Minimum of 500 hectares ready for immediate rehabilitation.

**Partner locations still need to undergo land tenure issue resolution before mangrove rehabilitation may begin.

1) Who - Details of the Proponents

1-A) Contact Details

Name	Contact details	Role / responsibility
Ben Brown	Director - Mangrove Action Project – Indonesia Ishwara Environmental Institute Banjar Nyiuh Kuning, Ubud, Bali Office: +62 361 974 071 Cell: +6285857191274 seagrassroots@gmail.com	Main Project Implementation
Romie Johnerie	Ex Director and Member – Yayasan Laksana Samudera, Professor GIS - University of Riau Jl. Kandis Ujung No. 92 Tangerang Utara Pekanbaru, Riau 28282 P.O. Box 26, Indonesia +62 8197668108 +62 76146723 gerainfo@yahoo.com	Local community organizing, co-facilitation of project implementation and monitoring. GIS Mapping assistance for entire project.
Fahmi Abdullah	Representative – Simeulue Community Mangrove Stewardship Groups Desa Amaiteng Mulya, Simeulue Timur Simeulue, Nanggroe Aceh Darussalam +62 85270079806 f_abdoellah@yahoo.co.id	Local community organizing, co-facilitation of project implementation and monitoring.
Rita Lestari	Project Manager – Tomini Bay Sustainable Coastal Livelihoods and Management (SUSCLAM) rita.lestari@gmail.com	Local community organizing, co-facilitation of implementation and monitoring, national strategy for dissemination.
Arsonetri	Director – Yayasan Bahtera Nusantara +62 818552440	Local community organizing, co-facilitation of implementation and monitoring, lead organization in cooperative development.
Wiwien	Coordinator – Mangrove Information Center Jl Bypass Ngurah Rai KM 21, Suwung Kauh, Denpasar Bali, P.O. Box 1115 Tuban, Bali, Indonesia +62 817461624 (cell) +62 361 728 966 (office) micjica@indosat.net.id	Technical assistance, coordination with provincial and national government.

1-B) Summary Information on the Organisation and Organisation Structure

Mangrove Action Project – Indonesia was established as an Indonesian, non-profit, non-governmental organization in 2001 under the local name of Yayasan Akar Rumput Laut. In 2007, the name of the organization changed to Perkumpulan Mangrove Action Project – Indonesia, maintaining its non-profit, NGO status. MAP-Indonesia's mission is: Rehabilitation and Adaptive Management of Indonesia's Mangrove Systems in order to Build Ecological, Social and Economic Resilience.

Activities of Project Partners

Key Sumateran Stakeholders, Yayasan Laksana Samudera and Simeulue Island Mangrove Stewardship Groups, will build on previous mangrove rehabilitation skills and knowledge, previous mangrove governance, and previous sustainable livelihood programs, by implementation and monitoring of Ecological Mangrove Rehabilitation of all previously identified sites, development of small cooperative businesses based on sustainable mangrove resource utilization, coordinate participation of stakeholders in adaptive collaborative management, and carry out monitoring of social, economic and ecological indicators.

Key Stakeholders from Wallacea (SUSCLAM, Mangrove Information Center, and Yayasan Bahtera Nusantara) will co-facilitate the training of appropriate stakeholders in the methods of Ecological Mangrove Rehabilitation, implementation of steps 1-2 of the 6 step EMR process, co-facilitate various baseline assessments (carbon, resilience, biodiversity, etc.) develop sustainable livelihood alternative demonstrations with local communities, and facilitate the initial set-up of adaptive collaborative management. These groups will also assist in the facilitation of EMR demonstrations (planning, implementation and monitoring), after appropriate sites are identified.

1-C) Overview of relevant expertise and experience

Over the years, MAP-Indonesia has maintained projects in 7 provinces in Indonesia, while contributing at-large to community based coastal resource management networks across Indonesia, as well as in SE and South Asia. Highlights include;

Tiwoho, North Sulawesi: Rehabilitation of 25 hectares of disused shrimp ponds and community based conservation of 600 hectares of mangrove forest in Bunaken National Marine Park, along with development of 6 livelihood alternatives continued to this day by over 400 community members. Benefits to 1100 villagers.

Bengkalis Island, Riau: Organizing of 10 community stewardship groups designated 300 hectares of degraded mangrove resources, successful rehabilitation of 80 out of 300 hectares, ban on mangrove charcoal production, development of 3 sustainable livelihood alternatives. Benefits to 4000 villagers.

NE Langkat Wildlife Sanctuary: Designation of 500 hectares of collaborative management area in the 9000 hectare sanctuary, rehabilitation of all degraded mangrove habitat within the collaborative management area, development of 3 sustainable livelihood alternatives, benefits to 3300 villagers.

SE and South Asia: Training of over 500 relevant stakeholders in the methods of ecological mangrove rehabilitation and sustainable livelihood development in Indonesia, Malaysia, Thailand, India, Sri Lanka, Cambodia and Timor Leste resulting in improved management of over 50,000 hectares of mangrove habitat.

1-D) Short Description of Other Project Partners

MAP-Indonesia always works through local partners; prioritizing coastal communities themselves, but also NGO's, local business, academic, and government institutions. The total list of partners in these regions is long, but important to understand various roles, responsibilities, and areas of expertise.

SUMATERA REGION

Bengkalis Island, Riau

Yayasan Laksana Samudera is based in the capital of Riau, Pekanbaru, with a long-standing program on Bengkalis Island involving organization of small scale fisherfolk and mangrove conservation. This NGO has strong links to the University of Riau, with several senior staff as professors. They have a strong GIS component, led by Rhomie Jhonnerie, ex-Director of YLS and professor of GIS in the Fisheries and Oceanic Studies Department of Univ. Riau. Local village governments are all in strong support of mangrove conservation, and this is re-inforced at the Regency level by the Head Regent, who provided policy for community management of mangrove resources to 10 local stewardship groups in 300 hectares of mangrove area.

Simeulue Island, Aceh

Mangrove awareness was low on this island before the Dec 2004 tsunami. After the tsunami, and the disappearance of most of the island's mangroves, the Australian Red Cross Livelihood Division facilitated initial mangrove restoration attempts in 6 sites but met with widespread failure. MAP-Indonesia was called in to lead an assessment and training.

Seven (7) communities have now been organized, dedicated to mangrove conservation, rehabilitation and sustainable livelihood development. Fahmi, the local field manager for ARC-Livelihoods is now the liaison between MAP-Indonesia and the community groups. Several government village leaders are in strong support of mangrove conservation initiatives. Women's cooperatives, known as PKK, have already participated in 2 months of sustainable livelihood training. One of the strongest assets in the region, is the Pawang Laut from Teluk Dalam, the traditional coastal leader of the islands largest remaining mangrove forest. A 62 year old man who purchased his own GPS and digital camera after the MAP EMR training to document his areas mangroves, he has asked for MAP-Indonesia to help approach the District government for policy development in favour of collaborative mangrove management for conservation.

WALLACEA REGION

Tomini Bay, Sulawesi

SUSCLAM is composed of IUCN Ecosystems and Livelihoods Group (based in Sri Lanka), Wetlands International Indonesia Programme, two local NGO's and a regional project coordination team. SUSCLAM support from the Indonesian Ministry of Environment (MoE) gained support from the three Governors of Tomini Bay (i.e., Central Sulawesi, Gorontalo, North Sulawesi) signing a collaborative agreement/MOU (Memorandum of Understanding) for Tomini Bay's sustainable management.

The MoU signing was held at the World Oceans Conference (WOC), The MoE coordinated invitations/ participation of the three Governors and 5 Ministries (i.e., Ministry of Environment, Ministry of Marine and Fisheries, Ministry of Home Affairs, Ministry of Development of Backward Regions, Ministry of Tourism), while SUSCLAM did so for stakeholders in 14 Tomini Bay districts within the 3 provinces (e.g., Heads of Districts, Bappeda, Fisheries and/ or Forestry Offices, Universities, NGOs).

Strategic Co-Management Plans were also prepared by each province as addendums to the MOU. The MOU and Strategic Plans (which also cover mangroves) have thus become the policy umbrella for SUSCLAM to support Tomini Bay's ecosystem governance.

SUSCLAM has welcomed MAP-Indonesia to build on existing programs, to assist with development of ecological mangrove rehabilitation skills, sustainable livelihood development, and adding potential carbon finance components to the program to augment long-term to augment long-term adaptive collaborative management.

West Bali & Suwung, Bali

JICA and the Provincial Forest Department embarked on the development of the Mangrove Information Center (MIC) in 1997. A highlight of this project, was the successful restoration of over 300 hectares of mangrove habitat. Nonetheless, this restoration was costly, over \$60,000 a hectare (MAP-Indonesia's average cost is \$1000/ha). Trainings over the years focused on the production of mangrove charcoal, to "sustainably" meet the needs of Japanese export markets for charcoal. Management of the MIC has been taken over by a mangrove task force set-up by the Forestry Department. The forestry department has asked for assistance from MAP-Indonesia and local NGO Yayasan Bahtera Nusantara, to develop mangrove management, rehabilitation and sustainable livelihood development in all Bali mangroves, focusing on West Bali as a start. Yayasan Bahtera Nusantara is a local Balinese community based coastal resource management NGO. YBN facilitated an award winning program in Tejakula, Bali, developing a sustainable ornamental reef fish business in a village once dominated by Cyanide. This led to the development of small businesses based on sustainable coastal resource use in Bali and Sulawesi, and the development of a side company involved in the export of eco-friendly ornamental fish.

2) WHERE – Location of the Wetland System

2-A) Type of Wetland

Two biogeographical regions of Indonesia have been chosen for this program, Sumatera and Wallacea. These two regions represent the two most biodiverse longitudinal segments (15°) in terms of mangrove distribution in the world. The Sumateran region (90°E-105°E) maintains 31 out of 40 species of true mangroves in the Eastern center of mangrove diversity (East Africa, India, SE Asia, Australia, Western Pacific), while Wallacea (120°E – 135°E) contains 32 of the entire 40 species.

This high level of biodiversity of true mangroves species is also reflected in the biodiversity of floral mangrove associates as well as mangrove fauna. Therefore, not only does Indonesia maintain the highest mangrove area in the world (and regrettably the highest total of mangrove loss in the world) but is also the world's center of mangrove biodiversity.

There are six major Geomorphological classifications in which mangroves are commonly found; 1) Alluvial Plains, 2) Tidal Plains, 3) Barriers and Lagoons, 4) Alluvial Plains & Barriers, 5) Drowned Bedrock Valleys and 6) Coral Islands/ Coasts. Mangrove types in the focus areas exhibit all of the above types except for number 5.

Simeulue Island (2, 3, 6)
Bengkalis Island (1, 2)

Tomini Bay (1, 2, 3, 4, 6)
Bali (2, 3, 6)

It may be added that on Bengkalis Island, an exceptional layer of peat exists under alluvial and tidal plain mangroves, and form a continuous inland connection with freshwater peat wetlands.

2-B) Location and Size: *See attached site maps (Pdf)*

2-C) Current Legal Status of Wetland

Sumatera Region:

Bengkalis Island – 10 Village certificates demarcating 300 hectares of community mangrove stewardship lands, available for restoration (approx 80 of 300 already complete). All certificates accredited under Regency level legislation.

Simeulue Island – 7 Village certificates allowing for 200 hectares of rehabilitation. District level legislation for all 1200 hectares of Teluk Dalam to be considered protected mangrove area.

Wallacea Region: Still under a myriad of land-use tenures, which will be clarified during steps 1 and 2 of Ecological Mangrove Rehabilitation. No restoration will begin without local legislation by minimal of village government.

2-D) Current Management and Use of Wetland

Mangrove System	De Jure Managers	De Facto Managers	Goods and Services
Bengkalis Island	10 Community Steward Groups, District and Provincial Forest Dept	10 Community Steward Groups/MANGAL Cooperatives, District and Provincial Forest Dept	Fish, shellfish, crabs, etc., medicines, direct food, storm protection, pilings, timber, charcoal (Bengkalis only), fuelwood, carbon storage, carbon sequestration, water filtration, sediment trap, etc. Estimated value of goods and services – \$20,000 / ha/yr
Simeulue Island	7 Community Steward Groups, District and Provincial Forest Dept	7 Community Steward Groups/MANGAL Cooperatives, District and Provincial Forest Dept	
Tomini Bay	Coastal communities, village government, district and provincial forestry departments	Community Steward Groups/MANGAL Cooperatives, District and Provincial Forest Dept	
Bali	Provincial Forestry Department – Mangrove Task Force	Community Steward Groups/MANGAL Cooperatives, Forestry Department – Mangrove Task Force	

2-E) Wetland stakeholders

Stakeholder Group	Nature of relationship with wetland (also list goods and services)	Estimated number of stakeholders in this group
Mangal Cooperatives	Small business based on utilization and processing of mangrove resources, (divided roughly by mangrove zone; sub-tidal, lower, mid, upper, hinterland)	30 members per co-operative. 2-4 Cooperatives per participant village Bengkalis: 300 Simeulue:300 Sulawesi:180 Bali:180

Communities at Large	Direct and indirect benefits from mangrove fisheries, sustainable timber, ecosystem services, and infrastructure developed with carbon finance	Bengkalis: 6000 Simeulue:7000 Sulawesi:5000 Bali:5000
Government	Support for adaptive collaborative management from carbon finance	Community Steward Groups/MANGAL Cooperatives, District and Provincial Forest Dept
Local Business	Added value products, more consistent supplies of goods from mangrove areas	10 local businesses per region.

3) WHY – Status of the Wetland System

3-A) Historical Status as a Functioning Wetland

Bengkalis Island – Charcoal production has been the major form of mangrove disturbance over the past 3 decades on Bengkalis Island. In 2003, MAP-Indonesia and YLS created a State of the Mangroves GIS Atlas, which revealed 158 mangrove charcoal kilns operating in the Bengkalis Regency, requiring 640 hectares of mangrove wood each year. Most charcoal concessions were operating illegally, cutting beyond their designated areas into conservation areas, and operating on expired permits. Since the late 1990’s, due to shortages of Rhizophora trunks preferred for charcoal, various species were harvested, roots, branches and all, causing greater disturbance to hydrology. Replanting, where practiced, was largely unsuccessful, consisting of jabbing Rhizophora propagules into the ground without regard to habitat requirements, and without maintenance and monitoring. Within one year of the dissemination of the Atlas, the Regency government granted community stewardship rights to 10 groups, totalling 300 hectares, all in degraded mangrove forests. Several groups attempted reforestation, but failed due to inappropriate methods. MAP-Indonesia has since worked with three groups, achieving successful restoration in 80 hectares.

Another trend of degradation is coastal abrasion, due to a combination of sea-level rise and changing current patterns and sediment distribution along the Eastern shore of the island. Attempts to remediate coastal abrasion have been unsuccessful.

Simeulue Island – Historically, mangroves were in excellent condition on the island, valued by communities and with no external threats. The only significant area of degradation took place in and adjacent to the major population center of Sinabang. Mangroves around Sinabang were cut since the 1980’s to fuel a coconut oil processing plant and for brick making. After the Dec 2004 tsunami, mangroves on the Eastern side of the island were submerged and died immediately, while others were uplifted (and began slowly drying out). After the May 2005 earthquake, the entire island was uplifted, and most mangroves were lifted entirely out of the tidal range on the island. Natural regeneration is slow, as propagules are limited in most of the island. The exception is Teluk Dalam in the North Central Coast, where seaward species are surviving as seismic uplift was within the tidal range (avg. 50 cm uplift, tidal range 78 cm). Community awareness of mangrove importance, including government is high, but skills and techniques for mangrove rehab, livelihoods, and conservation need development.

Tomini Bay – Tomini Bay falls in the jurisdiction of three provinces; North Sulawesi, Gorontalo and Central Sulawesi. Gorontalo is a new Province, which split off from North Sulawesi in 2001. Historical data on mangroves illuminates the trend of mangrove degradation in this region. North Sulawesi historically maintained 30,500 ha of mangroves, reduced to 4,833 hectares by 1990. Central Sulawesi historically maintained 43,000 ha of mangroves, reduced to 17,000 hectares by 1990. This was largely due to the spread of industrial aquaculture in the 1980’s and 90’s known as the blue revolution.

In the past twenty years, shrimp aquaculture development has levelled off in the region. Abandoned ponds abound (ready for mangrove rehabilitation as land tenure issues become resolved), and although some new areas are being developed for aquaculture, by and large pond development is focused the broad alluvial plains of Kalimantan. Another sizeable threat to mangroves in the region is timber, which is usually performed illegally by wealthy landowners, village heads, or select government officials. The SUSCLAM program has been effective at garnering public support (government and community) for mangrove rehabilitation and conservation, searching now for on-the-ground mechanisms to make mangrove restoration, conservation and sustainable utilization a reality.

Bali – Bali had a former mangrove area of 1000 hectares, which was reduced to under 500 hectares by 1990, due to conversion of Suwung and Negara areas. Suwung has been completely rehabilitated by JICA and the Forest Department, leaving Negara the main degraded area. Nonetheless mangroves in West Bali have spotty degradation, and are politically easier to rehabilitate. The larger challenge for Bali, is development of community appreciation of mangroves by demonstration of sustainable business based on utilization of mangrove resources. The Mangrove Information Centre at Suwung (10 minutes from Ngurah Rai International Airport) provides an excellent opportunity to showcase mangroves for Bali and the Lesser Sundas (small islands East of Bali) in general.

3-B) Current degraded or Threatened Status of the Wetland

Bengkalis – 220-250 hectares remaining for rehabilitation. Hydrological restoration a necessity. Need for hinterland rehabilitation, re-connection of terrestrial surface and ground water with mangrove area.

Simeulue – 200 hectares ready for rehabilitation. Severely propagule limited. Requires human assisted distribution of propagules, and maintenance and monitoring of naturally re-established areas.

Tomini Bay – Gazetting of mangrove conservation areas taking place. EMR sites need to be identified, land tenure issues resolved, projects appraised and then planned.

Bali – Mangrove resource survey and gazetting of mangrove conservation areas completed by MIC and Dept of Forestry Mangrove Task Force. EMR sites need to be identified, land tenure issues resolved, projects appraised and then planned. Sustainable livelihood development essential to garner community support for continued conservation.

3-C) Direct and Underlying Threats and Causes of Degradation

Bengkalis – Industrial logging for charcoal production was the major threat. This has largely been addressed due to strong community support, leading to government issuance of a ban on charcoal production in mangroves. Unsuccessful rehabilitation attempts in the past, decreased interest of communities, but recent successes has sparked community interest again. Back-sliding can be managed by continuing to develop pro-mangrove/pro-community policy, making the step from sustainable livelihoods to small cooperative business development, and capacity building on adaptive collaborative management, financed in part by carbon finance.

Simeulue – Community awareness of the importance of mangroves is already high, especially as near-shore fisheries collapsed after the tsunami and subsequent earthquake. Seismic events can not be controlled. Accelerated rehabilitation of mangroves, development of buffer zones for island subsidence/sea-level rise, and conservation can be enhanced by development of adaptive collaborative management, primarily between district forest department and local communities. There is a lack of trust between these two departments, and the regency head needs to be involved as well, as significant inland forests have been recently converted to oil-palm without community consultation, setting a bad precedent for forest conservation.

Tomini Bay and Bali – The trend of mangrove destruction has largely been abated as aquaculture expansion decreases. Governments are aware of, and in support of mangrove rehab and conservation initiatives. Small, powerful individuals in degraded regions will need to be convinced against economic activities that degrade mangroves. This can be largely answered by development of sustainable business, demonstrating clearly that mangrove conservation provides viable economic incentives for a broad array of community interests.

3-D) Overview Of Any Previous Or On-Going Restoration Initiatives, In Addition To The Planned Project

Bengkalis – Charcoal producers were the first to exemplify poor restoration practices, planting *Rhizophora* seedlings in areas regardless of hydrological or habitat needs. A single community figure gained recognition for planting hundreds of thousands of seedlings in the 1990's, in areas where hydrology was not damaged, and met with good to excellent success. This has been repeated by community groups, but in areas with hydrological disturbance as well as eroding coastlines, with little to no success. Government planting projects have had little success, again, planting *Rhizophora* species only regardless of habitat requirements. MAP-Indonesia introduced EMR in 2004-5, and was successful in 80 hectares. Community stewardship groups which have not yet undertaken EMR are eager to begin.

Simeulue – Most post tsunami replanting efforts failed, for a variety of reasons; poor propagule condition, failure to plant within the tidal range, grazing by water buffalo, lack of community involvement in Government plantings, etc. Of six Australian Red Cross planting sites in Northern Simeulue, 4 failed completely, while two experienced temporary success, but failed after 3 years. MAP-Indonesia led an EMR training, gaining interest from 8 communities. Funds for implementation of EMR as follow-up have not yet been garnered.

Tomini Bay – Rehab sites have not yet been selected by the SUSCLAM project. Traditional planting projects have been attempted by government forestry department and communities with little success. One instance in Gorontalo saw the community rearing of 60,000 propagules of *Rhizophora* and *Ceriops* seedlings. Communities were paid 60 rupiah (.6 cents) for each seedling, and promised an additional 60 rupiah for planting, but the planting funds were mis-appropriated. Seedlings were left in the nursery and never planted. Instances such as these are common-place to this day.

Bali – JICA and the Provincial Forestry Department embarked on mangrove rehabilitation of over 300 hectares of degraded mangrove forest in Bali and Lombok in the 1990's. This work was completed by early 2000. Over 13 species of mangroves were raised in nurseries and planted. Some hydrological rehabilitation was undertaken, and species were planted with reference to habitat requirements. The only negative aspect of this program was the high cost of rehabilitation, over \$60,000 per hectare.

4) WHAT - Expected Project Outcomes

4-A) Goals, Objectives and Projected Outcomes of the Project in the Following Areas.

Project Goal: Ensuring access and sustainable utilization of healthy, diverse, mangrove resources to coastal communities in Sumatera and Wallacea

Key Purposes:

- Building social, economic, and ecological and resilience in critical mangrove systems of Indonesia.
- Linking agro-ecosystems with mangrove ecosystems to increase buffer capacity versus shocks and disturbances (decreasing coastal habitat fragmentation).
- Rehabilitation of degraded mangrove habitats.
- Understanding carbon sequestration and carbon storage mechanics in chosen mangrove systems, and developing carbon finance strategies based on Voluntary Carbon Standards.

Objectives:

- Learning to value social, economic, and ecological resilience through development of sustainable resource utilization in a minimum of 17 cooperatives in Sumatera and development of livelihoods in 2 regions in Wallacea.
- Rehabilitate a minimum of 500 hectares of mangrove ecosystem and degraded hinterland, linking agro-ecosystems with mangrove systems and enhancing coastal buffer capacity.
- Development of adaptive management systems & good business processes to ensure long-term improved management of all focus mangrove ecosystems (approximately 5,000 hectares, minimum of 1000 hectares ascribed to Danone Group).

Outputs - Expected Benefit for Beneficiaries and Indonesia

Expected benefit for beneficiaries:

- Increased knowledge and skills of first-hand coastal resource users to manage coastal resources to strengthen their livelihoods.
- Increased capacity of civil society to self-organize and engage in processes which effect their lives.
- Women and men with capacity to engage in development planning and decision making processes at local, sub-national and national levels in order to build resilience.
- Resilient community based adaptive coastal resource management (CBACRM) systems established in three mangrove ecosystems which will strengthen livelihoods.
- Government policies and practices accommodate poor and vulnerable household's interests to reduce poverty.
- Measurable increases in income generation and decreases in expenditures of the poor and vulnerable households through community based coastal resource management activities
- Strengthen mechanism of coastal village communities to adapt to climatic variation through mangrove ecosystem rehabilitation and conservation.

Expected benefit at Indonesia-wide scale:

- Development of field school methodologies to enable "scaling-up" of future coastal outreach initiatives in Indonesia
- Contribute to and help implementation of conservation policy in Indonesia
- Strengthen local government capacities to implement coastal conservation policies by considering the need of the poor and vulnerable including women living in coastal areas.
- Contribute to the achievement of Millennium Development Goals by district and provincial government in project areas.

- Increased engagement between government, academic, private and civil society sectors increasing transparency, good governance and poverty reduction.
- Strengthened body of knowledge and networks to address and engage in the processes of ecological restoration and natural resource management.
- Strengthen government capacities with, focus on sub-district, to take in mitigating the impact of climate change in Indonesia.
- Contribute to climate change mitigation by creating effective carbon stores by restoring and conserving mangrove forests and adjacent terrestrial systems.

Wetland Aspects: e.g. how will the project address wetland threats and what are the expected impacts on the provision of wetland good and services;

Clear statement of how the project will address and overcome the direct and underlying, current and potential future threats and causes of degradation identified in the previous section.

The project will be implemented through activities at multiple levels: the village level, the mangrove ecosystem level and the sub-district to provincial level in terms of governance. Development of adaptive management systems to achieve system resilience will be accomplished in three mangrove ecosystems over a 3-5 year period. Grassroots activities will be focused at the village level, with a critical mass of villages for each mangrove ecosystem being engaged (>33% of villages adjacent to the focal ecosystem). Business stakeholders, government, academic institutions, and NGO's with jurisdiction/activities that include the target mangrove ecosystem will be engaged for political, financial and technical support, leading to adaptive collaborative management of the systems for long-term resilience. Ecological Mangrove Rehabilitation and development of sustainable livelihoods leading to small cooperative business development, development of equitable carbon finance are major activities that will be used to develop on-going adaptive management.

Explain what the project intends to accomplish in terms of wetland restoration or conservation with a description of the expected biological outcomes at the ecosystem and species level.

Ecological Mangrove Rehabilitation is a whole system process – which restores the underlying processes that dictate the health of the system. In mangrove systems, these are underscored by hydrological processes. EMR uses reference forests as models for the restoration of mangrove systems, imitating substrate levels, gradient, mangrove species composition, and tidal creek formations. By re-establishing a full range of natural mangrove species, from seaward to landward edge, the mangrove system becomes self-functioning and resilient, and also is of increased value in terms of environmental goods and services. Appreciation for the variety of goods and services provide by a whole mangrove ecosystem, including the hinterland component, is achieved by development of community based business cooperatives that utilize a wide range of mangrove resources. This appreciation drives long-term conservation, starting due first to economic utilitarianism, and eventually adopted by social norms.

Identify what other improvements in wetland ecosystem goods and services, in addition to carbon, the project aims to deliver. Describe how project activities are expected to result in at least the same quantity and quality of wetland goods and services, but ideally in enhanced delivery levels of ecosystem goods and services, and how these changes will be monitored.

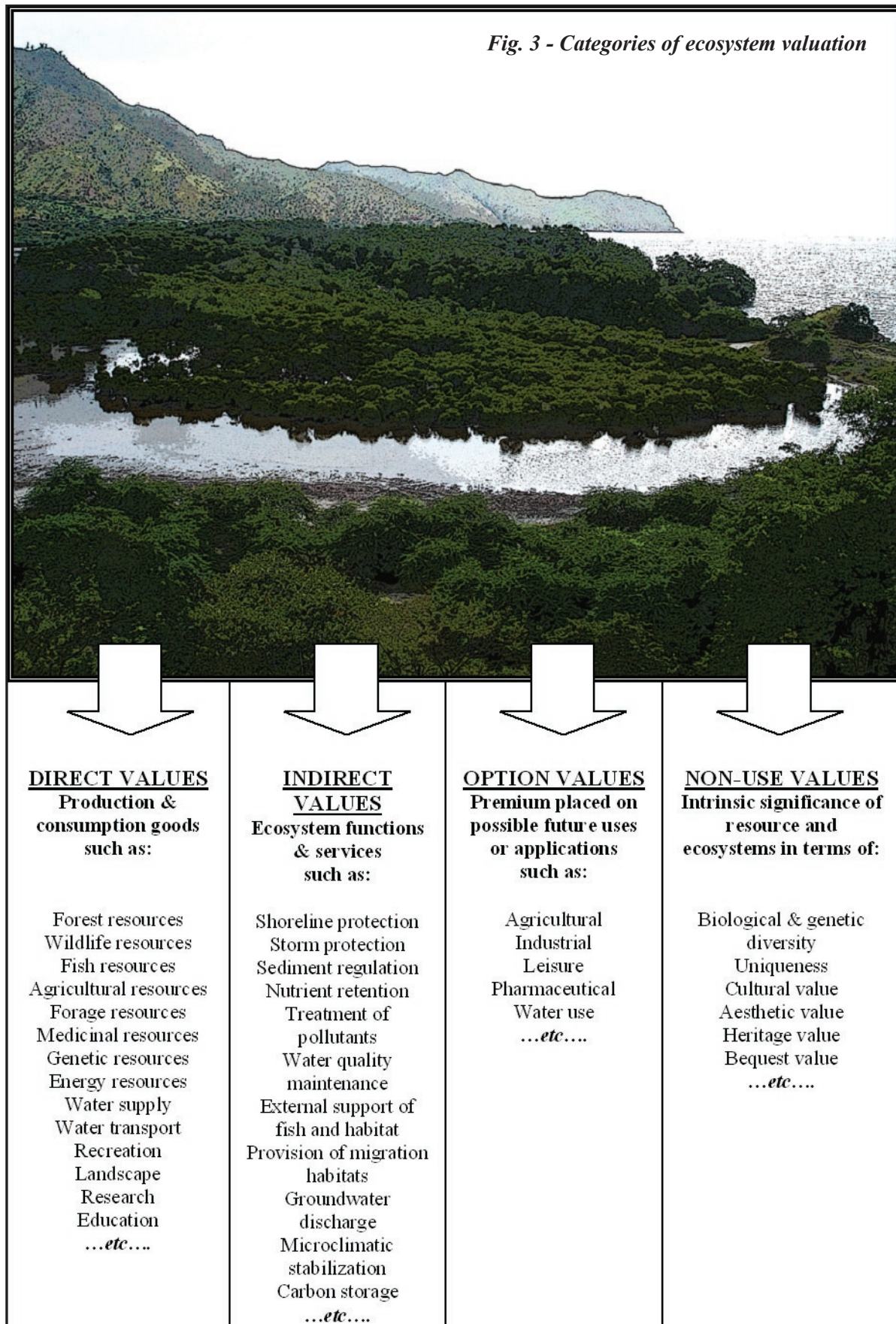
The most appropriate framework to assess the overall economic value of an ecosystem is the Total Economic Value (TEV) and represents the monetary measure of the change in an individual's well being due to a change in environmental quality. It is not environmental quality that is being measured per se, but people's preferences for changes in quality and quantity. Economic valuation of ecosystems tries to assess the preferences held by people, and the value determined by an exchange or transactions in the market. The TEV of the mangrove ecosystems is the sum of direct use value, indirect use value, option value and non-use value (bequest value and existence value).

Direct Use Values refer to values derived from actual use of the good either for direct consumption or production or other commodities. In the case of mangroves, direct use values would include the value of fuel-wood, timber, fruits, medicinal herbs, shellfish, fish, etc.

Indirect or Hidden Values refer to values derive from ecosystem functions and services, such as the benefits provided by mangroves as shoreline protection, breeding grounds and habitats for fish and shellfish species, storing carbon and biodiversity. Some of these values can only be measured when the asset is destroyed. One major indirect use value of mangrove forests is protection of coastlines from waves and wind. Virtually all coastlines in the tropical regions were originally protected by mangroves, coral reefs or seagrass beds. These systems are often interdependent. Mangroves protect nearby coral reefs from siltation and themselves are protected by the reefs from strong waves action. Seagrass beds trap silt and protect mangroves and beaches from erosion. IF they are removed the costs in terms of damage

and replacement are huge. These potential losses need to be considered when major construction, sewage out-falls, port developments, dredged channels and mangrove forest clear-cutting or coastal aquaculture and agricultural developments are planned.

Option Values are those that approximate an individuals willingness to pay in order to ensure that the goods and services can be utilized at a later date. Options values can be seen as an insurance premium for securing future use. Mangroves for example represent an option value in the form of protecting against future extreme weather events and natural disasters.



Non-Use Values refer to the benefits derived from the mere existence of mangrove ecosystems, above and beyond any direct or indirect use value that people may enjoy. Non-use values include both “existence” value and “bequest” value. Bequest values arise when people place a value on the conservation of particular resources for future generations or use and non-use values for offspring. Non-use values can be difficult to measure, like high biodiversity, or unique flora and fauna. These may not have direct money value now but in the long-term they are important as a source of medicine, valuable genes, and for the long-term stability of an ecosystem.

Mangrove forests also have value as part of the global life support system and act as storehouses of carbon dioxide (CO₂). It has been calculated that mangroves may be able to absorb 2-4% of the current human increase of the greenhouse gas CO₂. Mangrove systems, which include peat formed under their soils, are amazing storers of carbon, on the order of 700 kg per meter depth per hectare. In Bengkalis Island, peat layers have been measured at 2-4 meters depth (1400 – 2800 tonnes/carbon/ha), while in Wallacea it is estimated that peat layers range from 50cm – 2 meters. When the forest is destroyed, this stored carbon is released from the substrate, oxidizes and returns CO₂ to the atmosphere.

MAP-Indonesia uses participatory biodiversity surveys, participatory valuation tools (developed by IUCN-ELG), and additional Social-Economic and Ecological indicators for baseline and continued monitoring of mangrove resources, to not only ascribe value to the resource, but build awareness amongst local coastal inhabitants of the true richness of their environs.

Community Aspects:

Explain how the project will engage interested and affected stakeholders. Describe the socio-economic benefits to be generated by the project, with a particular emphasis on how they will accrue to or be shared with local communities. MAP-Indonesia initially engages coastal communities through a series of coastal field schools, set-up to explore sustainable livelihood options from sub-tidal regions, lower-mid and upper mangrove, and hinterlands. After coastal field schools, participants are encouraged to form cooperatives based on the outcomes of the coastal field schools. Continued business development (business planning, marketing, financial management, etc) are facilitated by MAP. This form of sweat-equity results in on-going business and conservation of mangrove resources.

Dispensation of finances generated from carbon offsets, will occur through continued support of coastal field schools and cooperative operations for direct program participants, and community-based infrastructure development related to social-economic and ecological resilience building principles for in-direct beneficiaries.



Carbon Related Aspects:

Explain how the project is expected to sequester carbon – e.g. through hydrological restoration and natural re-vegetation, planting of native species or preservation etc. – and how the project will measure and monitoring the carbon sequestered over time.

Explain how the project activities will deliver marketable carbon; which standards are being pursued. Estimate the volume of carbon credits. Describe the pertinent legal framework – international, national and local – for the project with respect to carbon credits, and how these credits will be generated. Also provide the names of the relevant designated national authorities for wetlands and carbon, if any.

Carbon Finance Strategies

Carbon Finance will be used as a major vehicle to coordinate continued adaptive management in the focal systems. Below, an introduction to mangroves and carbon, carbon finance strategies, and disbursement strategies are delineated.

Background on Mangroves and Carbon

Wetlands play a crucial role in climate change adaptation as well as mitigation. They protect terrestrial areas against the surge of storms, floods and tidal damage, as well as hosting a vast diversity of flora and fauna. Because of their high productivity they also play an important role in the global carbon cycle. Overall, wetlands store an estimated 20-25% of the world's soil carbon. Wetlands are also amongst the most threatened ecosystems worldwide and continue to be degraded at high rates, particular in the tropics.

The most common threats to wetlands include drainage for agriculture, encroachment by settlers or urbanization, and pollution from agricultural and industrial sources. Yet climate change puts additional stress on these ecosystems. Conversion of mangroves to fishponds – which invariably involves excavation of about two meters of sediment – could eventually result in a release of about 1400 tons of carbon from the sediment alone (Ong, 2002). According to calculations by Ong (2002), the conversion of just two percent of mangroves to aquaculture means that the advantages of mangroves as a sink of atmospheric carbon are lost. Other forms of mangrove destruction, such as destructive clear-felling practices of whole trees for charcoal production, will also release sediment carbon, at a rate of 700 kg per meter depth of disturbance. Clearly, alternatives to fishpond construction in mangrove areas must be sought, addressed in this program by development of sustainable livelihood alternatives.

Research findings indicate that mangroves carbon sequestration potential in Indonesia are 2.4 ton-C ha⁻¹ year⁻¹, (Tateda et al 2005) and the upper layers of mangrove sediments have high carbon content, with conservative estimates indicating levels of 10 percent (Ong 2003).

Carbon Storage and Monitoring:

This project will actively sequester carbon through Ecological Mangrove Rehabilitation (EMR). The process of Ecological Mangrove Rehabilitation is discussed further in the proposal. MAP-Indonesia will provide a table of Emissions Reductions over time related to EMR projects. MAP-Indonesia will make detailed estimate of the sequestration per hectares times total hectareage, then assume about a 20% loss. For REDD we take the area of the project, less the rate of loss (% per year) and quantify the carbon resulting from the loss under our project scenario and the baseline.

At this stage it is not possible to detail the exact model for accessing and utilizing carbon finance as there are considerations, outlined below, for tapping carbon finance for mangrove projects. There are a number of different options to consider, such as whether to focus purely on sequestration through improvement of biomass stock (reforestation) or if other options such as reducing emissions from degradation and deforestation (REDD) should also form part of the carbon finance aspect of the project. There are considerations, such as if the rehabilitation of degraded lands often outperforms CO₂ sequestration rates of mature mangroves, as “quick” growing pioneer species have been measured to grow between 1 – 6 meters in height per year, while mature mangroves grow relatively slower. REDD projects also have to assess the current rate of loss and the carbon contained within specific systems that would potentially be lost.

Our preferred goal at this preliminary stage would be to aim for a REDD project, achieved through EMR and community based conservation, verified under the Voluntary Carbon Standard (VCS) with additional Climate Community and Biodiversity Alliance verification.

It is expected that this project will sequester an average of 2 tonnes of CO₂/ha/yr, while Voluntary REDD components of this program will be responsible for conserving ex-ante and ex-poste carbon stocks of 700-2100 tonnes/ha.

Minimum rehab area = 500 hectares, resulting in 1000 tons/CO₂/yr for the life of the certificate (25 years average)

Maximum rehab area = 1000 hectares, resulting in 2000 tons/CO₂/yr for the life of the certificate (25 years average)

Minimum area ascribed to Danone Group through Voluntary REDD = 1000 ha with a minimum total carbon stock of 700,000 tons and a maximum total carbon stock of 1,400,000 tonnes.

Maximum area ascribed to Danone Group through Voluntary REDD = 3000 ha with a minimum total carbon stock of 2,100,000 tons and a maximum total carbon stock of 4,200,000 tonnes.

Specific Activities

1) Options assessment

This phase will address the following issues in relation to the suitability of carbon finance project activities.

- Assessment of project eligibility,
- Definition of project boundaries and activities,
- Identification of appropriate methodologies and combinations of approaches,
- Initial quantification of expected emission reductions (ER's) and feasibility threshold. This would entail an assessment of the most suitable configuration of the project design as either a Program of Activities (PoA) or singular activities, voluntary or compliance market standards small scale or bundle there of.
- Assessment of transaction costs of project, including registration and verification.
- Identification of the highest possible carbon standard and project design consideration.
- Development of necessary research themes for assessment and standard compliance
- Identification of risks to issuance of credits singular activities, voluntary or compliance market standards small-scale or bundle there of.
- Assessment of transaction costs of project, including registration and verification.
- Identification of the highest possible carbon standard and project design consideration.
- Development of necessary research themes for assessment and standard compliance
- Identification of risks to issuance of credits

2) Setting project parameters, baselines and carbon documentation:

This phase will develop all necessary project documentation and start the process of registration and verification of the projects. It will also input to the overall project design to ensure compatibility with carbon finance monitoring requirements. Essentially this stage ensures that all the relevant data and information is collected to complete validation and that the project design meets the appropriate standards. Specifically, we will conduct the following:

- Analysis of the project design
- Development of Project Idea Note (PIN).
- Baseline development, achieved through the development and implementation of research studies to determine impacts of action emissions baselines and other project parameters, including:
 - Measuring and monitoring plans for baseline
 - Baseline greenhouse gas emissions for project locations,
 - Project emission scenario and estimation of carbon benefits
 - Scenario estimation of carbon benefits and quantification of the potential emission reduction and carbon sequestration of the project under a range of scenarios
- Performing a gap analysis for completion of Project Design Documents (PDD) This will provide information on the data and studies required to complete the project documentation, for example baselines studies and PDD.
- Analysis of options to enhance project design to optimize number of ER's
- Developing monitoring plan.
- Completion of Project Documentation
- Identifying risks to issuance
- Validation
- Identifying monitoring requirements and ways to address them
- Verification

3) Monitoring and improvement plan for the projects, capacity building and consultation on the equitable management and use of the anticipated carbon revenues.

Define carbon finance sharing models

- Select, with stakeholders, the most appropriate sharing model
- Set up all bodies, regulations and processes to ensure sustainability of the model (at community level)
- Perform capacity building activities to stakeholders of the project, to ensure proper monitoring and subsequent funding of the activities after project completion.
- Identify ways of maintaining the project once donor funding has expired

After these phases we will identify buyers and asset management platforms, provide market intelligence and assist with securing equitable ERPAs and possibly participation to a key event of carbon finance. We will seek contacts and commitment of carbon key buyers (term-sheets).

Considerations:

ER Project Identification

Would it be preferable to aim for VERs or CERs?

Provide a comparative analysis of both voluntary and compliance markets with regard to: time, resource input, revenue expectation. Outputs will take the form of a short report with tabulated data and quantitative scenario analysis to compare credit varieties.

Is it better to apply for a Program of Activities (PoA) or to bundle projects?

Provide information on POA and bundling approaches in relation to the project. This requires a deep understanding of the operations and plans and detailed inputs from partners. MAP-Indonesia inputs will take the form of comparative analysis of POA and bundling with regard to: costs and revenue expectation and include a quantitative scenario analysis.

What is the appropriate size for a project to qualify for VERs or CERs?

Provide information on the methodological minimum and maximum thresholds for compliance (CER) and voluntary credits (VCS) for small scale and large scale projects.

Provide key information and analysis of similar ER projects at various stages of development.

Is it possible to combine different methodologies? If not, which methodology should be used?

Provide all information and analysis. The output will take the form of a set of project options to combine or differentiate projects and methodologies.

Feasibility Study

What are the actual total costs (e.g. infrastructure, registration, verification, monitoring, and operations) and revenues (e.g. user service fee and selling carbon credits) of this type of project? Is this model actually financially sustainable?

Provide indicative information on the costs of registration, verification of the project and a quantitative scenario analysis of expected carbon finance revenues.

How much income is needed for replication and how much would be available?

Provide indicative revenue scenarios for carbon finance income for the project.

Who will pay for the operational and monitoring costs after the end of the research project?

Who could buy the CERs or VERs generated by the project and what are the criteria that buyers are looking for?

What would be a fair contribution from each stakeholder in the implementation of the project?

Capacity Building

How can we build the capacity of NGO practitioners, local government and the private sector to engage in the registration process for ER projects?

Provide some capacity building to stakeholder on the project cycle and ER calculations.

How can communities be involved in ER projects?

Capacity building and awareness raising activities to local communities or leaders involved in the project. It could be, but not only, through advice on best practice and revenue raising potential from the projects.

Management of the ER Income

How will the ER income be managed? Should it be done through an institution? If yes, what would be the characteristics of this institution? How should these funds be used? What is a fair distribution? How will this be negotiated? How will the financial responsibilities of the project be shared amongst the stakeholders?

4-B) Major Assumptions, Risks and Threats to Achieving Outcomes

Identify the key risks to achieving the expected outcomes, and any assumptions made in relation to the design of the project and its expected outcomes.

- Resistance from current land owners to Ecological Mangrove Rehabilitation in Wallacea
- Chosen sustainable livelihood alternatives will succeed and market demand for the target products will remain viable
- IF local stakeholders can generate sufficient income from sustainable use of resources, immediate benefits from mangrove resources will outweigh temptations to convert mangroves for other uses.
- Established government policies, coupled with aware, involved local communities can withstand the pressures of external, short-term investors in mangrove conversion.
- Women's role and status is too entrenched to promote substantive change in participation in decision making and access to/control over productive resources.
- Dissemination of carbon finance will not degrade into a system based on hand-outs for conservation, but maintain principles of "sweat-equity."
- Active involvement of the DNA for Indonesia (formerly under the Ministry of Environment) now the National Commission on CDM (KOMNAS MPB)

Special Topic: Mangrove Associated Fisheries

By far the most important economic gain derived from mangrove products in many areas is that of coastal fisheries, which depend on particulate organic matter 'exported' from mangroves for food (Boto & Bunt, 1982; Johnstone, 1981, Woodroffe, 1985) and the mangrove environment for shelter (Sasekumar et al., 1992). As stated above, the productivity of these fisheries is directly correlated to the area of mangroves: for every hectare of mangrove cleared, near-coastal fisheries lose approximately 480 kilograms of fish per year (MacKinnon & MacKinnon, 1986). This compares with an average productivity of 287 kilograms per hectare per year for semi-intensively managed brackish water fish/shrimp ponds (tambak) in Sumatra. (ibid)



A school of mangrove snapper at the roots of Rhizophora trees

Certain commercially important species, such as barramundi (*Lates calcarifer*), mangrove crab (*Scylla serrata*), and threadfin salmon (*Polynemus sheridiani*) are directly dependent on mangroves and are caught in this habitat (Griffin, 1985). Indonesia's marine fisheries are largely near-coastal, being carried out by local fishing communities with rudimentary, little-mechanized gear, or by commercial fishing fleets operating from larger harbor towns. In 1990, the total production of Indonesia's marine fishery was 2.5 million tons, involving 400,000 families or 2 million persons (National Statistics Bureau – BPS, 1993). The total value is not indicated in national statistics, but is estimated to be in the range of US\$500-1245 million; much of this is for subsistence, local markets and the national market. By 2000, production had increased to 3.7 million tons of fish products landed and 320,000 tons of crustaceans and mollusks, totaling about 4 million tons of product. Estimating that roughly 2.4 million hectares of mangroves existed in Indonesia in this time period, and using the figure of 480kg of fish produced per hectare of mangrove as an estimate of fisheries supported by mangroves, total fisheries supported by mangroves in Indonesia (2.4 million x 0.48 tons = approx 1.2 million tons) was equal to between 33-50 percent of total recorded fish landings in the country. Not that mangroves are responsible for half of the nation's fisheries productivity, but they play a substantial role.

Mangrove Guidebook for SE Asia – FAO, Wetlands International

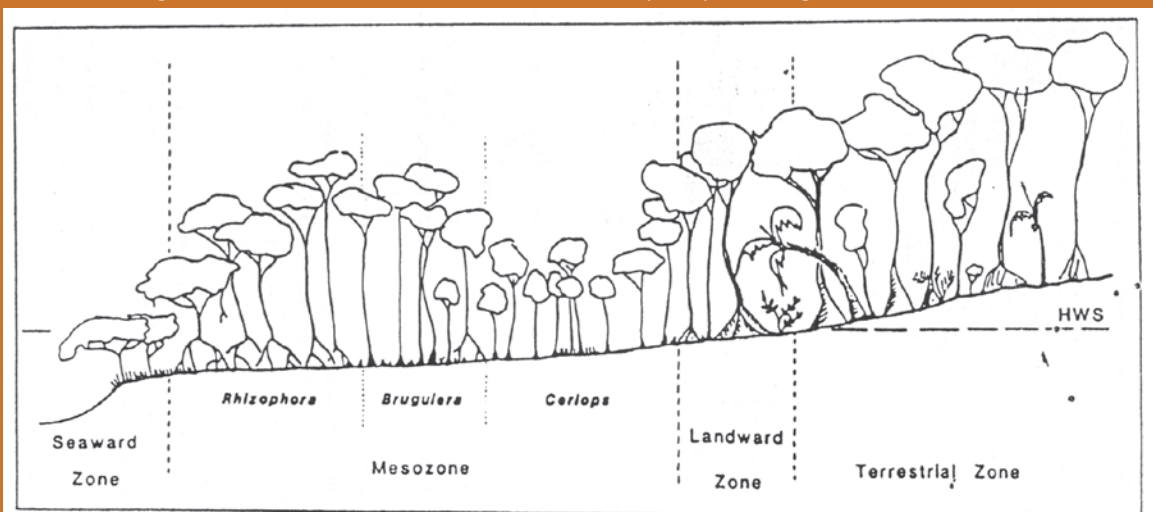
5) HOW - Project description

5-A) Project Summary Matrix

Project goal: Ensuring access and sustainable utilization of healthy, diverse, mangrove resources to coastal communities in Sumatera and Wallacea			
Objectives	Outcomes	Activities	Deliverable Outputs
	What outcomes are associated with this objective	Which activities are required to deliver on these outcomes	What physical outputs and deliverables the activities will generate
Project Preparatory Stage	<p>Project team and partners identified and trained.</p> <p>Project materials secured. Baseline social, economic and ecological data as well as specialized baselines for, biodiversity and carbon.</p>	<p>Organization and recruitment of project staff</p> <p>Final agreements with partners</p> <p>Development of annual work plans</p> <p>Procurement of project materials</p> <p>Assessments (Resilience, Participatory Biodiversity, Carbon Financing Options)</p> <p>Project beneficiary targeting and identifications.</p> <p>Trainings for partners in outcome mapping.</p>	<p>Organizational structure of project</p> <p>Project partnership agreements</p> <p>Baseline social, economic and ecological data, highlighting carbon and biodiversity.</p> <p>Outcome Mapping plan</p>
Learning to value social, economic, and ecological resilience through development of sustainable resource utilization in a minimum of 17 cooperatives in Sumatera and development of livelihoods in 2 regions in Wallacea.	<p>Approximately 600 graduates of Coastal Field School</p> <p>17 MANGAL cooperatives formed</p> <p>Policy to support cooperative development</p>	<p>Curriculum development for field schools</p> <p>Mangrove and hinterland sites and participants identified</p> <p>Training of Trainers</p> <p>Season-long Coastal Field Schools</p> <p>Cooperative formation</p>	<p>Increased knowledge and skills of first-hand coastal resource users to manage coastal resources to strengthen their livelihoods.</p> <p>Increased capacity of civil society to self-organize and engage in processes which effect their lives.</p> <p>Women and men with capacity to engage in development planning and decision making processes at local, sub-national and national levels in order to build resilience.</p> <p>Development of field school methodologies to enable “scaling-up” of future coastal outreach initiatives in Indonesia</p>
Rehabilitate a minimum of 500 hectares of mangrove ecosystem and degraded hinterland, linking agro-ecosystems with mangrove systems and enhancing coastal buffer capacity.	<p>Ecological Rehabilitation of 500 hectares of mangrove and associated systems, with minimum of 1250 plants/ hectare growing healthy (compared to benchmarks) after 3 years.]</p> <p>Data on CO2 sequestration of rehabilitated areas</p>	<p>Regional EMR Seminars</p> <p>EMR Trainings on the six-step process.</p> <p>Implementation of the six steps of EMR</p> <ol style="list-style-type: none"> 1. Ecological Assessment 2. Hydrological Assessment 3. Assessment of Disturbances 4. Site Selection and Land Tenure Issues Resolution 5. EMR Planning (for implementation and monitoring) 6. EMR implementation and monitoring 	<p>Minimum of 500 hectares of rehabilitated mangrove systems, growing at minimum 1250 seedlings/ hectare, with minimum carbon sequestration of 1000 tons/year</p> <p>Contribute to climate change mitigation by creating effective carbon stores by restoring and conserving mangrove forests and adjacent terrestrial systems.</p> <p>Strengthened body of knowledge and networks to address and engage in the processes of ecological restoration and natural resource management.</p>

<p>Development of adaptive management systems, good business processes and carbon financing to ensure long-term improved management of all focus mangrove ecosystems (approximately 15,000 hectares).</p>	<p>Business plans for each cooperative</p> <p>Significant increase in financial security of cooperative members</p> <p>Collaborative adaptive management boards in each of the four project regions.</p> <p>Voluntary Carbon Credit's generated for DANONE, with clear benefit sharing mechanism for local stakeholders</p>	<p>Improving small-scale fisheries, forestry and farming business processes in mangrove areas through creation of a guided business planning process (12 steps)</p> <p>Development of Grassroots Policy for mangrove use and conservation (6 steps – already completed in Bengkalis, and Tomini Bay)</p> <p>Developing Stakeholder Capacities in Adaptive Management (11 steps)</p> <p>Media and Communication (Publication of quarterly project newsletters, Participatory Media, Development and use of educational media/knowledge products.</p> <p>Outcome Mapping as a tool for adaptive management Project Evaluation (SANE Analysis, Financial Audit, Mid-term and Final Review, Carbon Audit)</p> <p>On-going MANGAL cooperative business planning. Carbon Finance Strategy Development for Project Sustainability, including sequestration calculations for rehab areas and carbon storage calculations for Voluntary REDD areas.</p>	<p>Resilient community based adaptive coastal resource management (CBACRM) systems established in three mangrove ecosystems which will strengthen livelihoods.</p> <p>Carbon storage in minimum of 500 hectares of Voluntary REDD protected systems totaling minimum of 350,000 tons over the life of the certificate.</p> <p>Government policies and practices accommodate poor and vulnerable household's interests to reduce poverty.</p> <p>Measurable increases in income generation and decreases in expenditures of the poor and vulnerable households through community based coastal resource management activities</p> <p>Strengthen mechanism of coastal village communities to adapt to climatic variation through mangrove ecosystem rehabilitation and conservation.</p> <p>Contribute to and help implementation of conservation policy in Indonesia</p> <p>Strengthen local government capacities to implement coastal conservation policies by considering the need of the poor and vulnerable including women living in coastal areas.</p> <p>Contribute to the achievement of Millennium Development Goals by district and provincial government in project areas.</p> <p>Increased engagement between government, academic, private and civil society sectors increasing transparency, good governance and poverty reduction.</p> <p>Strengthen government capacities with, focus on sub-district, to take in mitigating the impact of climate change in Indonesia.</p>
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MAP-Indonesia livelihood programs focus on building local capacities in sustainable use of resources in all mangrove zones, from seaward edge to the terrestrial zone (hinterlands). By emphasizing the economic value of the entire mangrove system, socio-economic pressures are exerted on the community at-large to take an ecosystem approach to mangrove conservation.



Profile of Whole Mangrove Ecosystem

5-B) Technical Description of Project Activities and Outputs

Activity I: Project Preparatory Stage

The first six months of the project will be spent on laying the groundwork for the remaining project period. MAP-Indonesia will mobilize the necessary human resources to manage and implement the project, establish the organizational and administrative set-up, and develop support from the various project stakeholders. The activities in this preparatory stage will include:

Specific Activities under Activity I:

a) The recruitment of project staff. To oversee the project MAP-Indonesia will recruit staff and coordinate with Ishwara Environmental Institute (MAP-Indonesia's umbrella organization).

b) Site assessment for EMR (completed in Bengkalis and Simeulue). Prior to Ecological Mangrove Restoration, site selection assessment for potential mangrove restoration sites will be undertaken by the MAP-Indonesia team. Site assessment criteria prioritize community interest, ecological feasibility of successful restoration and adequate clarification of land tenure. Assessments will also ensure that restoration activities will not have negative environmental impacts or undermine the livelihood of coastal communities.

c) Identification, assessment and selection of partners (completed). For each of the districts to be included in the project, MAP-Indonesia will identify, assess and select capable partners who will be responsible for the community development and community organizing part of this project. The priority will be local NGO's who are already working in the broad field of coastal/ environmental conservation and development and are willing to work in the district. This process will end into the signing of partnership agreements with those NGO's. Government partners will be focused at the sub-district level (Kecamatan) as well as the multi-stakeholder Coastal Partners Consortiums (Konsorsium Mitra Bahari) set up in each province.

d) Project management workshop for partners (completed in Bengkalis and Simeulue). Once the partnership agreements are in place, MAP-Indonesia and all its partners need to agree on each party's role and responsibilities as well as on managerial and administrative procedures and requirements one of the bases for cooperation in the project. These issues will be discussed with the partners in a workshop before the project activities commence.

e) Development of annual work plans. Detailed planning for the implementation of activities will be undertaken annually. MAP-Indonesia project staff and the partners will work out these annual work plans in brief workshops.

f) Procurement of project materials. Procurement of the necessary equipment and materials will be done overtime as necessary following the standard procedures of MAP-Indonesia.

Activity II: Field Assessment, Site and Participant Selection

In-depth understanding of current and past social, economic and ecological situations in project areas is required, as a base-line for more concise target identification and more detailed planning. For this purpose, a series of field assessments will be undertaken, some of which will be re-current throughout the duration of the project.

Specific Activities under Activity II:

a) Resilience Assessments. Using resilience assessment workbooks for practitioners and scientists developed by the Resilience Alliance (already translated into Bahasa Indonesia by MAP-Indonesia), MAP-Indonesia, institutional partners and local stakeholders will undertake resilience assessments for each work region. Resilience assessments will be undertaken both by multi-disciplinary study teams, as well as in workshop formats with local stakeholders, to provide clear baseline data of current resilience status as well as to provide localized input on intervention strategies for each project region.

b) Participatory Biodiversity Surveys. The participatory biodiversity survey used by MAP-Indonesia was first trialed for use in the Watu Ata Strict Nature Reserve of Flores. Creating a realization among local people that they hold significant stores of relevant knowledge and expertise and are able to carry out surveys which are relevant to resource management is only one of the early stages in the process of establishing participatory management. It is, however, a key step in creating self esteem among community members and in building bridges between the community and scientists and resource managers. The methodology includes surveys for both flora and fauna as well as soil ecology.

Goals of the participatory biodiversity survey:

- i) motivating local people to revive and build on their traditional conservation practices;
- ii) establishing a positive relationship between local communities and government agencies;
- iii) identifying and establishing a system of positive incentives for local communities to adopt conservation management;
- iv) enhancing elements of good governance such as efficiency, participation and transparency;
- v) incorporating local information into the formal system of scientific knowledge so as to make it richer and more immediately relevant; and
- vi) ensuring that folk knowledge of conservation management and sustainable resource use is preserved and at the same time giving recognition to the validity of such knowledge.

Data from the biodiversity surveys will be used as indicators of project impact. MAP-Indonesia builds on increased community appreciation for biodiversity, by undertaking population studies on target fisheries. In this way, cooperatives are able to understand and regulate fisheries catches, placing limits on size, equipment, fishing effort, etc. These self-imposed limits are necessary in Indonesia, where no other forms of fisheries regulations exist. Below is an excerpt on how

Fish and Crab Trap Making

Facilitator: Pak Yono, Jaring Halus - North Sumatera
Location: Amaiteng Village, Simeulue Island, Aceh

Most fisherfolk around Indonesia have a history of fish trap making. In some places, trap making skills have been lost, or are only in the hands of a few elders. Fish traps enable fisherfolk to catch fish while still pursuing other livelihood activities, such as farming or hook and line fishing. Fish traps are also often used by village youth as an added livelihood activity. Learning how to make traps for both crabs and reef fish was identified as a need during the assessment. Fishermen from Simeulue currently catch small grouper and jack trevally by hook and line for grow-out in floating fish cages. Use of hook and line leads to higher mortality of stocked fish (due to stress during the catching process). Others are flying in juvenile fish for stocking from mainland North Sumatera, which incurs a high cost, and is difficult for practitioners without access to capital. Crabs are caught in healthy mangrove areas by hand at night, and crab traps are seldom employed by Simeulue residents.



A fisherman from Jaring Halus village - North Sumatera, was brought in to train Simeulue fishermen on how to make a variety of fish and crab traps out of locally available materials including bamboo, nylon netting and large gauge framing wire. This activity was a big hit among the male participants, who began studying on day 3, and requested a full day session on day 4 as well. Pak Yono, the trainer from Jaring Halus, stayed on for an additional few days in Simeulue to continue making traps with workshop participants. Currently, communities are monitoring crab populations by saving data on crabs trapped and sold, a pre-cursor to placing limits on mangrove crab capture.



**Mangrove
Capture
Fisheries**

c) Project Beneficiary Targeting and Identifications. Determining socio-economic structure of the program region takes place as part of the resilience assessment. Nonetheless, at the village level, further participatory action research activities will be undertaken to more accurately identify and agree upon the specific target groups, especially poor and vulnerable households, as a base for future stakeholder involvement. MAP-Indonesia and implementing partners will identify beneficiaries based on the criteria that will be developed based on the results of this and previous assessments. The project will ensure that priorities will be given to the households which are classified as the poorest households, vulnerable households, and marginalized women.

d) Trainings for Partners in Outcome Mapping. Continuous monitoring and evaluation will be part of the project's adaptive management system, allowing for the development of reflective practitioners (fishers and farmers, natural resource managers) and also provide opportunities for shared learning. The process used to monitor and evaluate is known as Outcome Mapping. Outcome mapping focuses on one particular category of results - changes in the behavior of people, groups, and organizations with whom a program works directly. These changes are called "outcomes." Through outcome mapping, development programs can claim contributions to the achievement of outcomes rather than claiming the achievement of development impacts. Although these outcomes, in turn, enhance the possibility of development impacts, the relationship is not necessarily one of direct cause and effect. Instead of attempting to measure the impact of the program's partners on development. Outcome mapping requires the involvement of program staff and partners throughout the planning, monitoring, and evaluation stages.

All project partners will be trained in the methods and means of outcome mapping. Trainings will take place before major project interventions (although some entry-point activities may precede outcome mapping training), in order to a) provide baseline data, b) assure that participants are involved in determining monitoring practices.

e) Carbon Financing Options Assessment. Carbon finance is planned as a strategy for long-term support of adaptive management process as part of this project. An options assessment, consisting of three components will be carried out as part of the carbon finance strategy. These three components are sketched out below.

- Initial assessment. This phase will address the following issues in relation to the suitability of carbon finance project activities.
- Setting project parameters, baselines and carbon documentation.
- Monitoring and Improvement plan for the projects, capacity building and consultation on the equitable management and use of the anticipated carbon revenues.

Activity III: Learning to value social, economic, and ecological resilience through development of sustainable resource utilization in a minimum of 17 cooperatives in Sumatera and development of livelihoods in 2 regions in Wallacea.

The majority of Indonesia's rural coastal residents are first-hands users of natural resources, making their livelihoods from fishing, farming or a mixture of the two. Vulnerability of first-hand natural resource users occurs as environments degrade (due to poor internal management practices as well as external pressures), as well as "optimization" strategies based on exploitation on a limited array of resources (monoculture of agricultural crops, single species fisheries, etc.) As environments degrade, external inputs are usually required in order to achieve levels of high productivity (never sustainable). First hand resource users quickly become reliant upon external systems and resources for their livelihood, and lose what little bargaining power they may have had.

The activities below are designed to improve the condition of available natural resources, while at the same time learn new ways of livelihood management which are not based on optimization of one or a select few resources. All of the following activities are in place to enable communities to value social, economic and ecological resilience.

Coastal Field Schools as an Entry Point to Sustainable Livelihoods

The Field School approach is an education model which stresses participatory discovery learning. Field Schools began in the 1980's by engaging rice farmers in a season-long study of rice field biology and agronomic issues, but have since been run in a variety of agro-ecosystems. A variety of alternative field schools have been developed over the years, on topics from micro-finance to bamboo, all of which are being used to transform a range of assets (including natural, human and social capital) into a number of livelihood outcomes (including security of incomes, food supplies and health, and improvements in rural civil society).

Although the field school approach proliferates in terrestrial systems, the majority of coastal managers have yet to adapt the field school methodology to coastal outreach programs. A variety of new field school types will be created for this mangrove system resilience building program. Coastal field schools have been broken down into those which take place within the mangrove area, and those which take place in the hinterland.

Below is an example of how a field school on exploring mangrove herbs developed into several sustainable livelihood alternatives, and eventually small businesses. Revealing immediate economic values of the back mangrove has led increased community awareness and protection for this integral part of a whole mangrove ecosystem.

Mangrove Non-Timber Forest Products (NTFP's)



Harvesting of *Acanthus ilicifolius* is best done with a pair of gloves and pruning shears. (Top right) Small women's cooperatives have been formed in Sulawesi, Sumatera, Java, and Kalimantan based on the sustainable use and processing of herbs and other non-timber forest products collected from healthy mangrove forests. Most of these products exist in the back mangrove interface with the terrestrial zone, providing financial incentive for conservation of the whole mangrove ecosystem.

Mangrove Field Schools in the following thematic areas: 1) mangrove fisheries, 2) non-timber forest products, 3) fish processing for added value, 4) sustainable timber, 5) sustainable charcoal and 6) fish farmer field school

Hinterland Field Schools in the following thematic areas: 1) farmer field school for perennial agriculture, 2) shelterbelt forestry for agro-ecosystem enhancement and increased linkage (using techniques such as analog forestry, sustainable and bamboo forestry).

Specific Activities under Activity III:

a) Development of Coastal Field School Modules and Pilots. Production and collation of English and Indonesian versions of all field school curriculum, for both training of trainers and season long field schools. Special topics will include; local resource assessments, whole farm planning and environmental design, and learning the potential of collaboration. At least 2 pilots will be run of each field school type, to appraise the appropriateness of the modules. Development of modules and pilots will take place in year one.

b) Training of Trainers (TOT) on Field Schools. One TOT per thematic area in a central location for program-wide trainers and one TOT per thematic area in each project site for regional trainers. TOT's will take place after modules and pilots are complete. These will take place in years 1 and 2.

c) Coastal Field School Implementation. Minimum of 1 field school with each community group in Sumatera (17), and an additional 10 field schools in Wallacea. Coastal field schools will take place in years two, three and four. Each field school has 30 participants, composed of approximately the same participants as future cooperatives. Each field school meets once a week for a period of 12 weeks. Field schools are evaluated both by participants as well as trainers. In the event that social indicators show that field school is not leading to community desired outcomes, MAP-Indonesia reserves the right to discontinue field school in a certain location. What is important is that at least 33% of villages in a given mangrove eco-region are being served.

Activity IV: Rehabilitate at least 500 hectares of degraded mangrove ecosystems and degraded hinterland, linking agro-ecosystems with mangrove systems and enhancing coastal buffer capacity.

Improving linkages between landscape types builds resilience by enhancing environmental flows between systems. Increases in biodiversity and micro-habitats are the most notable outcomes of this improved landscape connectivity. Landscape connectivity can be enhanced in two ways, conservation and rehabilitation. Improved management and conservation of existing landscape types will be accomplished by the development of resilient natural resource based businesses in target ecosystems, which involve environmental design processes. In some cases, however, enhancement will need to take place vis-à-vis habitat rehabilitation. This section outlines a preferred processes to accomplish critical habitat rehabilitation; known as ecological mangrove rehabilitation (EMR).

Ecological Mangrove Rehabilitation: Most mangrove restoration projects in the world fail, due primarily to lack of analysis of ecological requirements for mangroves. Community involvement in the process as well as settlement of land use planning and tenure issues is also essential to the success of the effort. Mangrove Action Project together with Lewis Environmental Services have developed a six-step method, called Ecological Mangrove Restoration™, which guarantees that pre-determined success criteria (quantitative goals such as total number of seedlings established growing at a satisfactory rate) are met within a time period of three years after rehabilitation. The six-step method is outlined below.

Six (6) Steps to Successful Mangrove Forest Restoration Emphasizing the Hydrologic Restoration Method:

Work together with local community organizations, NGO's, academic institutions and government agencies to undertake the following:

1) Ecological Assessment: Understand both the autecology (individual species ecology) and community ecology of mangrove species at the site, paying particular attention to patterns of reproduction, propagule distribution, and successful seedling establishment;

2) Hydrological Assessment: Understand the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species; This step involves participatory mapping.

3) Assessment of Disturbances: Assess modifications of the previous mangrove environment that currently prevent natural secondary succession;

4) Site Selection: Select appropriate mangrove restoration sites through application of Steps 1-3, above, that are both likely to succeed in restoring a sustainable mangrove forest ecosystem, and are cost effective. Consider available funds and staff/labor to carry out projects. Community organizing may be required at this stage if not already working through a local community organization. This step includes resolving land ownership/use issues necessary for ensuring long-term access to and conservation of sites;

5) Design: Design restoration plan at appropriate sites selected in Step 4, above, to initially restore the appropriate hydrology and take advantage of natural volunteer recruitment of mangrove propagules for plant establishment. In the restoration plan, be sure to include adequate monitoring of at least three years to measure progress towards meeting quantitative goals established prior to restoration.

6) Monitoring and Implementation: Take baseline monitoring data for the restoration area, before implementation of the restoration plan. When baseline monitoring is complete, implement the plan. Note: Utilize actual planting of propagules, collected seedlings, or cultivated seedlings only after determining through Steps 1-5, above, that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilization, or rate of growth of saplings established as quantitative goals for the restoration project.

Specific Activities under Activity IV:

a) National Ecological Mangrove Rehabilitation Seminar. This seminar will be held in Tiwoho Village, Bunaken National Marine Park, North Sulawesi, at the Coastal Community Resource Center. The training site is adjacent to a 25 hectare ecological mangrove restoration project undertaken by local community, MAP-Indonesia and KELOLA. The project was co-designed by PhD. Rignloda Djameluddin, Roy R. "Robin" Lewis III, and Ben Brown who will be teaching the course.

The workshop includes an introduction to mangrove forest ecology, management options and problems, and restoration design issues. The classroom segments of the program are given in a PowerPoint format, and each student is provided with a print out of the presentation and additional handouts including monitoring reports for typical restoration projects. Case studies of five successful mangrove restoration projects, and several unsuccessful projects, are discussed. Field trips are taken each day into the 25 ha Tiwoho mangrove restoration project (now 8 years old), to develop hands-on skills in the six-steps of EMR.

Emphasis is placed on cost-effective, successful mangrove management and restoration, and cost figures for typical projects are discussed and explained. The hydrologic restoration of mangroves is emphasized as a best-practices approach to successful restoration at minimal cost (see Erftemeijer and Lewis 2000, Lewis 1999, 2000a, 2000b, Lewis and Marshall 1998, Lewis and Streever 2000, Stevenson et. al 1999, and Turner and Lewis 1997, for further discussion about hydrologic restoration of mangroves). Planting of mangroves is discussed in light of the many failures of planting-only projects.

b) Local EMR-Trainings. The six steps of EMR will be introduced to stakeholders vis-à-vis week long training courses. MAP Indonesia will host these trainings in each region. Participants will be selected based on their commitment to implementing EMR after training. Courses for local community leaders will be run separately from courses for government, NGO staff and academia. Sample training agenda available upon request.

c) EMR Implementation. Subsequent to training courses, EMR projects will be implemented in target regions based on previous site-selection and prioritization. Implementation will follow the six-step Ecological Mangrove Restoration method detailed above. Funds will be ear-marked to enable EMR workshop participants to engage in follow-up projects. See Work Plan for specific activities under the EMR methodology.



Ecological Mangrove Restoration



Time zero

Pre-existing *Nypa fruticans*



Time Zero + 24 months

Measuring the Tidal Zone: After having determined mean sea level (marked in this case with packing tape), the group measured up on the PVC pipe 42 cm and used a water-hose level to mark the actual highest high tide on the beach. Permanent tidal markers, using concrete posts with aluminum markers can be erected at need. (*top left*)

Learning Autecology: Simeulue Island is home to over 20 species of true mangroves, yet previous restoration efforts only consisted of planting two species of *Rhizophora*. Here, villagers learn about the diversity of species and their specific niches in local mangrove environments (*above right*).

Before and After: Strategic breaching of dike walls in a set of abandoned shrimp ponds in North Sumatera resulted in rapid growth of natural recruits (background) as well as planted seedlings (foreground). (*bottom left*)



Time Zero - 1995



Time Zero + 8 Years - 2003



Robin Lewis Designed EMR Projects in Florida:

Left Series of 5 Photos:

Heavy machinery is sometimes required to regrade a disturbed mangrove area, back to it's original slope and substrate depth.

Salt tolerant grasses are used to stabilize the substrate, and also act to catch mangrove propagules.

As mangrove propagules develop, they outgrow and eventually shade out the grasses (a form of natural succession).

Right Series of 2 Photos:

Tailings from dredging of this channel were dumped into a mangrove area, changing its hydrology and killing the mangroves. Invasive *Casuarina* pine grew on the newly raised land.

To restore the area back to mangroves, the entire 500 hectare area was regraded, and a mosaic of tidal creeks were re-dug in imitation of the natural condition of the mangrove forest before disturbance.

Other projects have intentionally dug out open water areas as habitat for migratory shore birds and increased diversity of fisheries.

Activity V: Development of good business processes, adaptive management systems and carbon financing to ensure long-term improved management of all focus mangrove ecosystems (approximately 5,000 hectares, with a minimum of 1000 hectares ascribed to Danone Group).

This objective will be achieved by four program components; 1) Development of good business practices, 2) development of grassroots policy for sustainable resource management, and 3) involvement of key stakeholders in adaptive management of both policy and practice, and 4) development of carbon financing to support long term collaborative adaptive management.

Activity V-1) Improving small-scale fisheries, forestry and farming business processes in mangrove areas through creation of a guided business planning process:

A key problem with poor communities who lead natural-resource based livelihoods in mangrove areas is the insufficient income they receive in order to live more stable lives. The consequence of financial instability is that unsustainable, inappropriate resource management practices are undertaken for even basic subsistence. From a business perspective, natural first-hand natural resource users are forced into bad business practices due to lack of resources, skills and knowledge. There are clear opportunities to provide resources and assist poor mangrove fisheries communities, in improving their business processes in order to increase daily incomes. Once daily income targets are achieved, these communities will be much more open to work together in improving the ways in which they run their businesses. This process of preparing the psychological outlook of small-scale fishers and farmers is a delicate, incremental process that must advance at a pace determined by the practitioners. The process leads practitioners from a reality of subsistence and struggle to one where daily monitoring of each aspect their business process becomes important and eventually second nature.

The following business process will be initiated in 17 cooperatives in Sumatera and 10 cooperatives in Wallacea:

1. Assist communities in the formation of grassroots business ventures which incorporate simple and effective ways in which to increase profit and reduce expenses.
2. Facilitate the training of local farmers and fishers, focusing on problem identification in current systems and presenting several key, practical solution options.
3. Incorporate a simple business planning processes which first-hands resource users to explore the potential of various new commodities, management and processing methods and opportunities, to assist in making their businesses run better.

Step 1: Setting objectives (Operational and Sales)

Step 2: Creating a "Limits-to-Growth" decree from the onset of a MANGAL cooperative (MANGAL being an example trade/franchise name for a collective of cooperatives).

Step 3: Defining the concept of the business in the mission statement.

Step 4: Identifying keys to success, what must be done to succeed.

Step 5: Calculating the break-even point:

Step 6: Company summary, describing the company.

A key element here is opportunity for community members to collaborate in simple ways which are not overly binding, but allow the community to building bridging relationships between each other (networking) as a basis for building trust.

4. Once this network has been established the opportunity to form a cooperative agreement between the fishers/farmers is explored. This leads to business development and eventually even franchising.
5. Once this cooperative agreement is activated, an assisted business planning process begins by clarifying the strategy by which all the community members can equitably (but not equally) process their harvested products in an integrated manner that improves both the effectiveness of the system and subsequently the efficiency of continued business processes.

Specific Activities under Activity V-1:

Additional Activities under Business Development

a) Review, analyze and identify market access opportunities. To develop sustainable livelihoods based on utilization of a variety of resources, the community members should have an adequate understanding of available market opportunities. For this, the project will conduct a market survey at the district and provincial level, and at the field-level field staff will engage community members in critically reviewing the results of the surveys and consider the available market opportunities from the communities' perspective.

b) Maximizing the potential of financial management: Improving access to or development of effective saving mechanisms & credit. The project will initially make funds available which can be used by cooperatives as financial capital for their group enterprises. For this field staff will facilitate the community to manage these funds as a revolving fund, and assist in formulating the appropriate rules and regulations to ensure accountability and the continuation of the revolving fund. More important than seed funds, is understanding of how to use cooperative equity to access small and medium business loans in the Indonesian context.

c) Conduct training workshops on financial management for enterprise members. These will be small group trainings to be conducted by the field-staff in the villages. Group members who receive a capital loan from the community's revolving fund will be required to attend this training to ensure proper accounting and management of their own enterprises as well as to ensure the continuation of the commonly owned revolving fund.

d) Training to improve production and quality of coastal resource products. When the group enterprises are up and running, they will need training in quality control, field staff will identify appropriate resource persons and facilitate the necessary trainings in the villages.

e) Re-investing in natural capital. Efficient ecosystem management practices, focus on key elements of ecosystem health, habitats, limits on capture fisheries etc. (Crab banks described above)

f) Ensuring economic diversity. Investigations, research and development on alternative uses of available natural resource base.

g) Restructure resource management of first hand resource users so as to enhance their income generating capacity in order to transcend prejudice in community towards equal opportunity for all.

h) Distribution Development of cost effective distribution channels.

i) Training on marketing strategies and techniques. Growing businesses face need to market their products, Training on marketing strategies and techniques will be provided for the enterprises

j) Market access development activities. In support of the group's enterprises, the project will provide assistance in various market development activities. These activities might include product innovation, building market networks, promotion of products, improve packaging, etc. The field staff will facilitate these activities.

k) Advocate for support from district government to access markets. As the development of small and medium enterprises is part of the national government's program and of many district governments, it might be possible to obtain support from the district government in accessing certain markets. The community groups will be assisted in lobbying the government for this.

l) Facilitate sharing and dissemination of best practices on economic resilience options and tools. Establish a case study library for 3 different topics: 1. successes 2. failures 3. lessons learnt

m) Enhancing micro-insurance opportunities at community level.

Activity V-2 Development of Grassroots Policy

"Wherever local forest-dependent people's rights are ignored, whenever they are excluded from forest resources and their management or marginalized by external forestry managers or forced to interact 'illegally' with their natural ecosystem, the results are socially unacceptable, economically inequitable and ecologically devastating." (Campbell & Raharjo, Feb 2000)

Specific Activities under Activity V-2

a) Coffee shop policy discussions/role play with program participants. MAP-Indonesia has developed a curriculum for coffee shop policy discussions used at an IHOF workshop in Aceh, evaluated as an effective way to introduce the concepts of the need for community involvement in policy making for management of local coastal resources. This activity will take place in each participating village.

b) Participatory development of policy scenarios. Scenarios will be developed in a workshop format, in each of the seven target villages.

c) Involvement of appropriate government agencies. This is initiated by small meetings with key government officials at their offices. It is followed up by a field trip to the work location, usually coinciding with a field school. Focus will take place on Sub-district government which is the most accessible government level for rural fisherfolk.

d) Policy review and legal drafting. Takes place in small workgroups, consisting of field managers, coastal community members and supporting government officials.

e) Development of policy roles and responsibilities of involved stakeholders, leading to development of adaptive co-management systems. Takes place in small workgroups, consisting of field managers, coastal community members and government officials.

f) Recipient Country Government Support. In Indonesia, the sub-district (Kecamatan) will be the focus for the integration of localized coastal development activities with government programming. Sub-districts will play the role of nodes that can be linked up in a wider network as well as influencing the immediate area.

- The sub-district level is the focus for developing nodes because:
- The sub-district is the highest level in the Indonesian governmental system where there can be found some level of homogeneity in terms of culture, ecosystem, and availability of resources.
- Most of the institutions that effect village exist at the sub-district level.
- Fishers and farmers have easier access to governmental resources at the sub-district level than at district or provincial levels.
- A fisher or farmer can easily get to a bus, travel to a meeting, and return home before nightfall within the borders of most sub-districts in the major rice growing areas of Indonesia.
- The Sub-district Head (Kepala Camat) can implement policies that affect the village easier than those governing officials at higher levels.
- The sub-district can offer more immediate support to a cooperative or community organized coastal resource management program than any higher level of government. Organizing effective nodes requires forums that allow fishers and farmers to communicate, plan activities, and share results of planned activities. Plans can be used to lobby officials for support.

The project will also engage the multi-stakeholder forum, Konsorsium Mitra Bahari, which has been established in each focus province by the National Fisheries Department. The consortium is comprised of Provincial Departments of Fisheries, Forestry and Planning, local NGO's, University Faculty and in some occasions relevant private business. Konsortium Mitra Bahari noted their interest in external assistance in developing capacity for outreach. This project will provide opportunities to become involved in outreach together, (Field Schools, Ecological Mangrove Restoration etc.) and in exchange will request technical assistance from the consortium to support policy initiatives as well as academic studies. As a matter of principle MAP-Indonesia works within local and central government development plans priorities. This project is also directly in line with the government of Indonesia climate change policy which states that one of the strategies is to restore mangrove forests to mitigate climate change.

Much of this will be accomplished through field based visits, by boundary partners to interact with resilience-in-practice. The goal of this is to re-enforce that resilient coastal resource based business IS a practical demonstration of the government's millennium development goal of triple bottom line.

Village coffee shops are chosen to provide a relaxed atmosphere where villagers feel at ease to speak their minds during the three hour discussions. Coffee shop discussions are common in Indonesian coastal communities, over a range of subjects from politics to family matters to fishing. Coffee shop discussions also allow for informal dissemination of information to villagers who may not be a part of formal, organized activities.

Coffee shop policy sessions consist of three activities; 1) discussion on community based mangrove management in Indonesia, 2) discussion about the concept of policy and legislation, 3) simulation on problem identification and policy formulation.

Principally, good local policy needs to be created using a bottom up approach, because communities best understand what is at the core of problems that are taking place at the local level and what specific policies are needed to address local issues.



Coffee Shop Policy Discussion

Activity V-3 Developing stakeholder capacities in Adaptive Management

While there is an increasingly growing body of knowledge on development, on the ground experiences in how to facilitate community empowerment processes to enable communities to effectively deal with the intricate relationships of environmental governance and sustainable livelihoods is a niche where this project can make a contribution to the wider efforts of many others. Reflection on the project's experiences and learning from those experiences will be an integral of the project. One challenge will be how to cultivate lessons learned, document and share them with colleagues and partners. The process that will be adopted to meet these ends is one of adaptive collaborative management or simply adaptive management. The process of adaptive management is cross-cutting throughout all project phases; introduced initially in field schools, undertaken as monitoring and maintenance of rehabilitated areas, and as on-going collaborative processes in both small-scale sustainable businesses as well as multi-stakeholder coastal resource management.

Adaptive Management (AM) is a rigorous approach for learning, through deliberately designing, and applying management actions as experiments. AM will be essential for achieving sustainable mangrove resource management, as it can help management to adapt to uncertainty and changes in environmental conditions, economic markets, scientific and experiential knowledge, technologies, and social values. Change is inevitable. Adaptive management is the process to guide communities through difficult changes.

Specific Activities under Activity V-3

a) Development of an Adaptive Management Network (already completed in Bengkalis, and Tomini Bay). In each region, this network will be comprised of cooperative leaders, local (village, sub-district) and regional (district, province) government officers, NGO representatives, academic institutions and related business interests. The Coastal Partners Consortium (Konsorsium Mitra Bahari) will also be aligned with this project, in order to avoid creation of a new coastal resources management network, and to garner influence at higher levels of government without necessitating visits to multiple provincial offices.

b) Participation in regular AM network meetings. These meetings will largely be concerned with going through the 6 step process of adaptive management.



In July, 2006 four parties signed an MOU for collaborative management of a 500 hectare area within the 9000 hectare SE Langkat Wildlife Sanctuary. The parties include the Youth Fisherfolk Alliance of Jaring Halus Village (IP-ANJAR), Mangrove Action Project - Indonesia, the Federal Natural Resource Conservation Agency (BKSDA I), and USAID Environmental Service Project.

This ten year agreement sets a precedent in Indonesia as the first legal document granting local communities management rights within a Wildlife Sanctuary.

In order to ensure the long-term collaboration, adaptive management mechanisms inclusive of continued funding for meetings and initiatives need to be developed.



Collaborative Management

c) Information sharing among AM network members. Well documented, valuable and relevant information on issues, strategies, methods and techniques, and activities from the project will be shared with a wider audience through a range of photographic, printed and electronic publications.

d) Support advocacy initiatives among AM network members. Many agencies engaged in policy advocacy need convincing field data in their efforts. To support the efforts of others with a similar or compatible advocacy agenda, the project will share any relevant project information.

e) Quarterly learning and sharing meetings with all program partners. Learning and sharing will be an integral feature of the project, as part of its monitoring and evaluation system, and for the wider purpose of human resource development, the project will encourage this shared learning through quarterly meetings with all of its partners.

f) Development of a monitoring and evaluation framework. Based on base-line data provided by the resilience and other assessments, and the overall project plan as described in this proposal, a comprehensive monitoring and evaluation will be developed as the main reference for all monitoring and evaluation activities. Especially relevant to adaptive management is the process of outcome mapping, which is described in detail in that section.

h) Sharing of research for wider dissemination. All project related research of relevance and sufficient quality will be published both in Indonesian and English and made available to colleagues, partners, and networks.

i) National and international exchange visits (in-kind). In addition to the cross visits to encourage the development of a wider vision and continued learning among its staff, partners, and participants, the project will also facilitate national and international exchange visits to connect to existing wider national and international networks.

j) Sharing of project impact evaluation study. The final evaluation report will summarize the most important lessons learned all throughout the project's duration and that those lessons will be shared with a national and international audience. For this purpose, the report will be published both in Indonesian and English

k) Exchange/cross visits to promote learning and sharing of best practices. To enrich the learning of both staff and community members, various cross visits to exemplary areas or projects will be arranged. Locations and participants for cross visits will be carefully chosen and are also expected to be a motivation and an opportunity for networking.

Activity V-4 (Look up intro to this section from CBD's carbon section)

Carbon finance will play a role in the continuation of adaptive collaborative management of the system. The project is designed to quantify carbon credits that the Danone Group will be able to use for the purposes of achieving its voluntary carbon neutrality targets. Two voluntary carbon standards will be developed in order to facilitate this goal; 1) Based on CO₂ sequestration by mangrove rehabilitation supported and enabled by project activities, 2) Carbon storage in mangrove and adjacent habitats that qualify for REDD credits (where the trend in the region would be mangrove degradation without Danone Group support for conservation).

Specific Activities Under Activity V-4

Carbon Financing for Project Sustainability and Achieving Danone Voluntary Carbon Neutrality Targets.

a) Options Assessment

a1) *Initial assessment*. This phase will address the following issues in relation to the suitability of carbon finance project activities.

- Assessment of project eligibility,
- Definition of project boundaries and activities,
- Identification of appropriate methodologies and combinations of approaches,
- Initial quantification of expected emission reductions (ER's) and feasibility threshold. This would entail an assessment of the most suitable configuration of the project design as either a Program of Activities (PoA) or singular activities, voluntary or compliance market standards small scale or bundle there of.
- Assessment of transaction costs of project, including registration and verification.
- Identification of the highest possible carbon standard and project design consideration.
- Development of necessary research themes for assessment and standard compliance
- Identification of risks to issuance of credits

a2) *Setting project parameters, baselines and carbon documentation:*

This phase will develop all necessary documentation to start the process of registration and verification of the projects and inputs into the project design to ensure compatibility with carbon finance. Based on the outputs of the previous phases of work and in order to ensure that the relevant data and information is collected to complete validation and that the project design meets the appropriate standards:

- Analysis of the project design
- Development of Project Idea Note (PIN).
- Baseline development, achieved through the development and implementation of research studies to determine impacts of action emissions baselines and other project parameters, including:
 - Measuring and monitoring plans for baseline
 - Baseline greenhouse gas emissions for project locations,
 - Baseline development and estimation of carbon benefits
 - Scenario estimation of carbon benefits for change in forest management
- Quantification of the potential emission reduction and carbon sequestration of the project under a range of scenarios
- Performing a gap analysis for completion of Project Design Documents (PDD) This will provide information on the data and studies required to complete the project documentation, for example baselines studies and PDD.
- Analysis of options to enhance project design to optimise number of ER's
- Developing monitoring plan.
- Completion of Project Documentation
- Identifying risks to issuance
- Validation
- Identifying monitoring requirements and ways to address them
- Verification

a3) *Monitoring and improvement plan for the projects, capacity building and consultation on the equitable management and use of the anticipated carbon revenues.*

Define carbon finance sharing models

- Select, with stakeholders, the most appropriate sharing model
- Set up all bodies, regulations and processes to ensure sustainability of the model (at community level)
- Perform capacity building activities to stakeholders of the project, to ensure proper monitoring and subsequent funding of the activities after project completion.
- Identify ways of maintaining the project once donor funding has expired

After these phases MAP-Indonesia will identify buyers and asset management platforms, provide market intelligence and assist with securing equitable ERPA and possibly participation to a key event of carbon finance. We will seek contacts and commitment of carbon key buyers (term-sheets).

Activity VI: Media and Communication

Specific Activities Under Activity VI:

- a) Publication of quarterly project newsletters (electronic and printed)
- b) Participatory media
- c) Community trainings on learning from experience, organizing, analyzing and documenting field-based information.
 - Use of participatory media for community based advocacy
 - Media production as an outcome of outcome mapping
- c) Development and use of educational media/knowledge products

Knowledge Products to be developed by MAP-Indonesia and Ishwara during this program

- Coastal Field School Training of Trainers Modules
 - ◆ Capture Fisheries in Mangroves
 - ◆ Non-timber Forest Products
 - ◆ Mangrove Associate Field School
 - ◆ Fish Farmer Field School
 - ◆ Bamboo Field School
 - ◆ Analog Forestry
- Season Long Coastal Field School Curriculum
 - ◆ Capture Fisheries in Mangroves
 - ◆ Non-timber Forest Products
 - ◆ Mangrove Associate Field School
 - ◆ Hinterland Shelter-Belt Field School
 - ◆ Fish Farmer Field School
 - ◆ Bamboo Field School
 - ◆ Analog Forestry
- Revised 6 Step Ecological Mangrove Rehabilitation Manual
- Business Process Templates for integrating crops in the hinterlands
- Business Process Templates for integrating shelter belts in the hinterlands
- Business Process Templates for mangrove businesses

Activity VII: Project Monitoring & Evaluation

In addition to the internal participatory evaluation processes which will be part of the project's on-going activities, more formal and structured evaluations of the project will also be carried out to inform the project's management and decision making.

Specific Activities:

- a) Outcome Mapping as a Tool for Adaptive Management as well as Internal Project Monitoring
- Outcome Mapping will be used as a favored process for characterizing and assessing the contributions this project makes to the achievement of outcomes in each partner community.

Outcome Mapping focuses on changes in:

- Behaviors,
 - Relationships,
 - Actions and/or Activities
- of the people and organizations with whom a development program works directly.

Outcome Mapping will be adapted for use at program/activity, project, and organizational levels as both a monitoring system as well as to evaluate on-going or completed activities.

Activities under Outcome Mapping:

Outcome Mapping Training of Trainers. During the first year of the project when field level activities are beginning the project will conduct a project monitoring, evaluation, documentation and reporting workshop for all of its staff and partners adhering to the principles and practices of Outcome Mapping. Workshop participants will develop the monitoring and evaluation framework and how to implement. Participants will also agree on documentation and reporting requirements.

Outcome Mapping Workshops with all Boundary Partners. Workshops will be held in each focus region, for each cooperative formed, totaling 35 cooperatives as well as other boundary partners.

Project partners quarterly evaluation and planning workshops. Part of the project's management system includes quarterly project monitoring, evaluation, documentation and reporting workshops for local partners. These workshops will focus on progress of the project, emerging issues and opportunities, and development/adjustment of project plans in light of issues raised and opportunities. These workshops are to be preceded by internal meetings of the project partners to prepare and agree upon the issues and ideas to be brought to the quarterly meetings.

Monitoring and field visits by MAP-Indonesia project staff. MAP Indonesia's project manager and project officers will regularly visit the program partners and the villages to monitor project activities, provide technical supervision and assistance, and encourage staff and participants.

Monitoring by local partner's staff. As part of their direct and constant engagement with the communities, staff of local partners will continuously monitor all project activities at the district and village levels. This includes mangrove restoration monitoring by MAP at the following intervals (Baseline (0 months), 3 months, 6 months, 9 months 1 year, 2 years and 3 years after intervention)

Evaluation visits by MAP-Indonesia and donor organization representatives. The project will also facilitate the orientation and evaluative visits from MAP-Indonesia with representatives from the donor organization.

Project progress documentation and reporting. All project staff, including partners, will be required to submit regular reports. While reporting protocols, formats, and schedules will be established and agreed upon by project staff and partners, it is expected that reporting will be sufficiently substantive and regular as to support timely decision making at the project management level

Regular project reporting and final reports. Referring to reporting required by the donor organization following provided guidelines. The project management will consult the donor organization to get clarity on the amount of report that must be submitted by the project along project periods and other requirements that must be fulfilled by the project in term of reporting and documentation.

Although outcome mapping dictates that the true measure of the degree of success of this project will be determined by the stakeholders themselves, both via their perceptions as well as changes in behavior, below are provided additional indicators of social, economic and ecological resilience based on expected benefits for beneficiaries. With regards to outcome mapping, indicators known as progress markers*, will be developed in a participatory manner.

b) SANE Analysis. Reporting and monitoring usually focus on goals and finances. Field workers rarely have the opportunity, time or mechanism for sharing their experiences, yet it is usually they that have gained the practical knowledge and learnt lessons as to what works and what does not. Systematic analysis of experience (SANE) is a simple method of learning from projects (IUCN International Assessment Team 1997). Steps of SANE Analysis; 1) Tell the story, 2) Identify turning points 3) Identify phases of experience. 4) Phase analysis. 5) Analysis. 6) Lessons learnt. 7) Communication.

c) A project and financial audit. In accordance with USAID requirements will be completed

* Progress Markers: A set of graduated indicators of changed behaviours for a boundary partner that focus on depth or quality of change.

d) Midterm review. Will be led by independent evaluators, ideally consisting of both U.S. and Indonesian consultants to be agreed upon by all project stakeholders, who will review the project and facilitate discussion and reflection on the achievements and processes of the project and assist in making any necessary improvements in the project.

e) A Final Evaluation. This will be carried out by small team(s) of independent evaluators who will work closely together with MAP-Indonesia and other project proponents.

f) Carbon Audit. The audit will assess the GHG emissions and make mitigation recommendations related to the project, stemming from:

- Transport
- Energy use
- Materials use
- Water use
- Solid Waste

The audit will analyse all data that has been collected (as part of the monitoring plan) and use internationally accepted conversion factors to assess the GHG implications of the project. This will be performed by Ishwara Environmental Institute once every 2 years and be further validated by an external evaluator.

5-C) Methods and Technologies To Be Used

Specific Methods and technologies are mentioned above in the activities section. As a review, some innovative methodologies include;

Resilience Assessment – Assessing key social, economic and ecological indicators during a baseline survey and periodical monitoring. Developed by Resilience Alliance

Participatory Biodiversity Assessment – Assessing biodiversity changes that are relevant to local communities.

Carbon Financing Options Assessment – Understanding how VCS and REDD mechanisms will be used to enhance long term adaptive management of the system.

Coastal Field Schools – A proven methodology for experiential learning on livelihoods, highly successful in agricultural outreach in Asia, adapted for use in mangrove systems by MAP-Indonesia and partners.

Ecological Mangrove Rehabilitation™ – A six-step process focusing on hydrological restoration of a mangrove area to guarantee successful, reforestation of a high diversity of mangrove species. Developed by MAP and R.R. Lewis

Cooperative Business Development – Essential way to build social-economic resilience amongst coastal communities while providing economic incentives for mangrove conservation.

Grassroots Policy Development – Making use of existing Indonesian laws to ensure community access to their resources.

Outcome Mapping – A participatory evaluation method which focuses on changes in, behaviors, relationships, actions and/or activities of the people and organizations with whom a development program works directly. Developed by VECO

Carbon Financing - Setting project parameters, baselines and carbon documentation. Monitoring and improvement plan for the projects, capacity building and consultation on the equitable management and use of the anticipated carbon revenues.

5-D) Project Schedule and Milestones

Propose a timeline for the development and implementation of the project activities. This should include to the extent possible, time-bound and measurable milestones with respect to the delivery of key project outputs.

See Attached Tentative Project Implementation Schedule

5-E) Project team

Ben Brown – MAP-Director; Co-Founder of Ishwara Environmental Institute. 20 years experience in watershed enhancement, environmental education, 10 years as director of MAP-Indonesia. Ecological Monitoring/Evaluation (MonEv).

M.Sc. Jajang Sonjaya – Lead Community Organizer, Senior Researcher. Social MonEv. With MAP since 2003

M.Sc Ratna Fadillah – Sustainable Livelihoods Manager, with MAP since 2003.

T. Lukmanul Hakim – GIS Analyst, Financial Manager, Economic MonEv.

Gde Suarja – Cooperative Formation, 15 years experience with VECO, Outcome Mapping

Arief Rabik – Business Process, Co-Founder of Ishwara Environmental

M.Sc. William Batteye – Chief carbon analyst, program design and coordinator of carbon monitoring.

PhD Jim Davie – Technical Advisor, Mangrove expert from James Cook Univ, Queensland. 30 Years experience in environmental project mgmt in Indonesia.

R.R. Lewis – EMR Advisor. Founder of Ecological Mangrove Rehabilitation, 35 years experience in 16 countries.

Junior Researchers (4)

Junior Foresters (4)

Junior Community Organizers (4)

Key CV's available upon request.

5-F) Community Participation and Benefits

Nearly all processes used in this program are participatory in nature. This includes all assessments, project implementation planning, monitoring planning, project monitoring and implementation, cooperative development and business development, grassroots policy development and outcome mapping. Carbon financing also uses an iterative process to determine benefit sharing.

Expected benefit for beneficiaries:

- Increased knowledge and skills of first-hand coastal resource users to manage coastal resources to strengthen their livelihoods.
- Increased capacity of civil society to self-organize and engage in processes which effect their lives.
- Women and men with capacity to engage in development planning and decision making processes at local, sub-national and national levels in order to build resilience.
- Resilient community based adaptive coastal resource management (CBACRM) systems established in three mangrove ecosystems which will strengthen livelihoods.
- Government policies and practices accommodate poor and vulnerable household's interests to reduce poverty.
- Measurable increases in income generation and decreases in expenditures of the poor and vulnerable households through community based coastal resource management activities
- Strengthen mechanism of coastal village communities to adapt to climatic variation through mangrove ecosystem rehabilitation and conservation.

Expected benefit at Indonesia-wide scale:

- *Development of field school methodologies to enable "scaling-up" of future coastal outreach initiatives in Indonesia*
- *Contribute to and help implementation of conservation policy in Indonesia*
- *Strengthen local government capacities to implement coastal conservation policies by considering the need of the poor and vulnerable including women living in coastal areas.*
- *Contribute to the achievement of Millennium Development Goals by district and provincial government in project areas.*
- *Increased engagement between government, academic, private and civil society sectors increasing transparency, good governance and poverty reduction.*

- Strengthened body of knowledge and networks to address and engage in the processes of ecological restoration and natural resource management.
- Strengthen government capacities with, focus on sub-district, to take in mitigating the impact of climate change in Indonesia.
- Contribute to climate change mitigation by creating effective carbon stores by restoring and conserving mangrove forests and adjacent terrestrial systems.

5-G) HOW MUCH – Project Finance

Description of total project value

First, without considering carbon, each hectare of mangrove conserved due to the impact of this project has a value of approximately \$20,000 per year to local stakeholders. This value is based on the value of goods and services. Not counted in this value are options values or non-use values.

In Sumatera alone, this project guarantees 500 hectares of successful rehabilitation, totaling 1,000,000 per year of value to beneficiaries. It also includes the direct and indirect conservation of a minimum of 3000 hectares of mangrove, valued at \$10,000,000 per year. Total value of mangroves in Bali and Sulawesi are on a similar order, \$20,000/ha without considering carbon, options values or non-use values.

The potential for premium carbon credits from this project is also considerable. The reforestation area in Sumatera is expected to generate 1000 tCo2e/year (1000 tons of CO2 equivalent sequestration per year). The credits generated will be validated under the highest possible standard and are expected to be of high value due to social-economic and ecological additionalities. On the voluntary market, while prices are highly variable and dependent on many drivers, we estimate the Emission Reduction to be valued at 10-30 Euros per ton or Euro 10,000 – 30,000/yr.

The peat layer in the mangroves at Bengkalis is over 2 meter depth (in some places 3-4), while existing mangrove in Simeulue has less significant peat. In Bengkalis alone, the 1800 hectares of mangrove under conservation totals (1800 x 2 x 700 =) 2,520,000 tons A portion of this, will be negotiated for under a voluntary REDD system, to be ascribed to Danone through this project.

This program, prescribes direct, immediate action in Sumatera. All carbon sequestration totals from restoration in Sumatera will be ascribed to Danone. An agreed percentage of carbon storage totals (ex-ante and ex-poste for voluntary REDD) in Sumatera will be prescribed to Danone, based on the proportion of Danone support for conservation compared to other project supporters. In Wallacea, further analysis will be needed to determine amounts of carbon sequestration and carbon storage ascribed to Danone for restoration and conservation support.

Estimate of total project cost: See attached Excel File

Total DFN investment sought

Minimum Scenario	Maximum Scenario
Amount of funding being requested from DFN: € 1,298,232	Amount of funding being requested from DFN: € 1,743,692

Sources of co-financing

Bengkalis Island – USD 50,000 provided to the ten community steward groups for 2009-2010 for sustainable livelihood development. GEF-SGP (Global Environmental Fund – Small Grants Program).

Tomini Bay – CIDA has granted CAD 4.7 million to the SUSCLAM program, managed by IUCN Ecosystems and Livelihoods Group from 2007 - 2012, for improve community based coastal resources management in three provinces surrounding Tomini Bay in Northern Sulawesi. Budgets for GIS mapping of mangrove areas, designation of conservation zones, governance, and livelihoods totaling CAD \$400,000 are being ascribed as a match to Danone Group funds in order to identify and restore critical mangrove habitat, further develop livelihood potential, and designate conservation areas.

Sulawesi – A proposal from MAP-Indonesia and OXFAM-GB has been into CIDA since 2007, for a CAD 7 million project in Sulawesi on “Building Social-Economic-Ecological Resilience in Sulawesi Intertidal Regions.” The project is in the final stage of approval awaiting only signature by the Ministry, and slated to begin in January-February 2010. CAD \$1 million of these funds are earmarked for mangrove restoration and sustainable livelihood development in Sulawesi, with a CAD 225,000 - 325,000 that can be ascribed as matching funds to this project, in the forms of regional EMR seminars, development of livelihoods methodology (Coastal Field School), and trainings in EMR. No funds will be available for physical rehabilitation or livelihoods work in Tomini Bay from this fund. Please contact Paul Martins, Senior Development Officer of CIDA for clarification (PAUL.MARTINS@acdi-cida.gc.ca)

Bali - \$25,000 is budgeted for 2010 by the Mangrove Task Force of the Department of Forestry for sustainable livelihood development in mangrove areas. We also have use of the Mangrove Information Center in Bali, as a location for trainings on livelihoods and restoration, a USD\$6 million facility, currently under-utilized by the Forestry Department.

Financial Analysis

If available, provide a separate financial analysis of the project including the forecasted internal rates of return with and without the carbon credits.

To be completed in the full proposal. Not possible now to prepare with any accuracy.