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STATUS OF MANGROVE WETLAND PROTECTION AND SUSTAINABLE USE IN PAPUA NEW GUINEA

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A STATUS REPORT PRESENTED 1N THE PACIFIC REGIONAL WORKSHOP MANGROVE WETLAND PROTECTION AND SUSTAINABLE USE
11TH JUNE - 16 JUNE 200 1
SUVA, FIJI

INTRODUCTION

The ecological, environmental and socio-economic importance of mangrove forests is widely accepted by international agencies, governments. NG0s., scientists and tropical coastal communities alike. It is appreciated that mangrove ecosystems provide a unique and valuable range of resources and services, making them far more valuable than the sum of the products they generate. Nonetheless, responsibility for mangrove management historically has generally been assigned to sectorial institutions, normally Forestry Departments or Fisheries counterparts, or in urban settings to infrastructure or utility authorities.

Only to limited extent have these institutions catered for the multiple functions of mangrove ecosystems. As early as the 1920s the Malaysian Forest Department, for example recognized the legitimate needs of fishermen for various secondary products, but admitted them to be somewhat vexatious complications' in an otherwise straightforward scheme for fuel and pole wood production (Watson, 1928).

From such beginnings, mechanisms for mangrove management have continued to but still largely along sectorial lines. Inevitably, individual agencies have approached coastal resource management with prejudices that limit their priorities to those directly related to agency jurisdiction and goals.

Multiple use management, though much talked about, is still the exception in practice, rather than the rule. Tomlinson succinctly describes the problem in 1986: ‘A forestry

department will emphasize utilization that may degrade the resource, a fisheries department will emphasize conservation with minimum disturbance, and an agriculture department may advocate conversion and replacement by some putatively and more valuable resource. *This conflict is the background to mangrove management.*

In PNG, the management of multiple or mono cultural use of mangroves and the wetlands on economical scale remains strictly prohibited as far as the PNG logging Code of Practice and environmental laws are concerned but has appreciated a somewhat multiple use by the traditional users without set management guidelines and control mechanisms, simply because the coastal people, the river deltas, and the waterways lives are greatly dependent on these fragile resources for food, shelters, transportation, shoreline and river protection and etc, from generation to generation.

The management plans and guidelines for the multiple use of wetland, particularly the mangroves by the traditional users remained to be seriously, considered, as the pressure from the wetland owners in the Gulf of Papua and the Western part of PNG to exploit their fragile forests generate rural cash economy have escalated in the last decade.

In the Nation's capital, Port Moresby, the Mangrove resources that occur in small patches in its surrounds are somewhat under threat. The population pressure from the nearby villages has forced the coastal communities to exploit this fragile and valuable resource to generate cash income through sales of fuelwood to the city residents.

At the same time the toxic wastes from the city may also caused harmful effects to these important resources, but no studies have been conducted to verify this statement. The National Botanical Gardens of PNG has attempted to re-afforest certain areas under serious threat, but the program had failed due to funding problem and lack of Public awareness on it's importance.

FRAGILE FOREST RESOURCE INFORMATION

The most extensive and luxurious mangroves and wetland resources extend and best developed in the delta systems of major rivers in the Gulf of Papua and Province of Papua New Guinea.

There are about 14 fragile forest types as defined and described by the department of environment and conservation in PNG. The current area size, as adjusted since 1975 is 26,280,554 hectares. It was also recorded that 1,019,499 was converted to agriculture and 394,636 was logged some decades ago (FIMS, NPS png, 1994).

From the above total, the mangrove forest area size is 550, 942 hectares for all the twenty (20) Provinces in PNG, and the fragile areas described as wetland is 11,951,729 hectares (FIMS, NFS png, 1994). See attachment for further detail.

Whilst PNG is blessed with it's extensive and luxurious mangroves and wetland resources which are protected and conserved under the environmental laws and the PNG

Logging Code of Practice, the WWF has seen fit to establish an agency called, the Kikori, Integrated Conservation and Development Project in the Kikori Basin of the Gulf of Papua.

This particular project has created concerns amongst the indigenous and government agencies; particularly it's involvement in the Eco-forestry project development of wetland and mangrove harvesting involving 18 incorporated landgroups in the Kikori Basin.

However, in this presentation and throughout the workshop, I wish to focus on this particular project development and find a balanced equation between conservation and sustainable use at economical point of view. What PNG and the other Pacific Island countries can do to accommodate the increasing; pressure to sustain population growth and the expansion and diversification of national economies.

WWF'S KIKORI INTEGRATED CONSERVATION & DEVELOPMENT PROJECT

WWF's Kikori Integrated Conservation and Development Project in PNG operates within one of the largest remaining tracts of undisturbed tropical rain forest in the southern hemisphere. The Kikori Basin covers an area of 2.3 million hectares and stretches from the extensive mangrove wetlands of the, Gulf Province to the alpine grasslands of Doma Peaks in the Southern Highlands Province.

The operation started in 1994, and involved project works with various village communities in the Kikori Basin to conserve their forest and aquatic resources while addressing, their development needs. The project is promoting rural development and income-generating activities that contribute to the sustainable management of the area's natural resources.

The Kikori Basin which is characterised by numerous waterways, has always been the main means of transport for locals, barging of logs, shipping of merchandized goods, and the oil pipeline.

Due to the heavy use of the waterways within the Kikori Basin, the WWF has conducted 13 bio-diversity surveys, and confirmed the extraordinary flora and fauna of the area, focusing on fresh water fish, reptiles, amphibians, aquatic insect, moths and butterflies.

ECO-FORESTRY

On the other hand, WWF has established an Eco-forestry umbrella company, Kikori Pacific which acts as a marketing agent and provides training for community-based eco--forestry groups in the Lower Kikori area.

Kikori Pacific is buying milling and selling timber on a sustainable basis and continues to export timber to an international buyer in Australia. The Company is working closely

with the 18 incorporated landgroups who have withdrawn and their boundaries excised from the original Forest Management Area, Turama Extension.

The actual program started in 1994 and initially established four (4) Eco-forestry enterprises to work with Kikori Pacific Ltd. These villages based companies are.-

- Hope Forest Ltd
- Darken Lumber Investment Ltd
- Iviri Timber Investment
- Keboi Kerowa Investment Ltd

These projects are all aimed lit sustainable development by way, of producing sawn timber for their own use, and generating cash income for the communities through proceeds of sawn timber sales to 1Jkori Pacific Ltd.

However., due to technical and financial problems experienced by most of these projects, the only, maintained groups and individuals are from the Veraibari village, and they are:-

- Darken Lumber Investment Ltd
- Iviri Timbers
- Veraibari Village

OPERATIONAL AREAS

The operational areas are confined to the clan's tribal boundary, mostly along the main Kikori river system and the delta areas.

These areas are within the Turama Forest Management Area, catergorised as block 1 and 2, which are defined as semi and permanent flood plains, hence are restricted for logging by the large-scale operator.

These fragile areas are being negotiated between the developer, the landowners and WWF, so that these wetland areas can be released back to the resource owners to develop by way of small-scale sawmilling operations with low impact. There had never been a concrete agreement between the parties and the state to date.

SAWN TIMBER SALES

The sawn timber produced have found comfortable markets, locally and internationally. The main species processed and marketed is Xylocarpus sp. or commonhy known as the mangrove cedar.

It was reported that the volume harvested and marketed is less significant. The hard data could not be accessed from WWF Eco-forestry enterprise despite numerous attempts.

LEGAL IMPLICATIONS

The operations of these Eco-Forestry Projects established including Kikori Pacific Ltd do not have the legal cutting power called the timber authority, as far as the Forestry Act and Regulations are concerned.

The attempts over the issuance of timber authority have been made but were unsuccessful, due to the legal fact that areas applied for all timder the Turama Forest Management Agreement Area (.FMA).

The Eco-forestry projects are not licensed to operate, as far the Act and Regulations are concerned, and this also include the Kikori Pacific Ltd. Attempts have been made to license these community based operators.

The areas, although are located in the river deltas, legally are within the boundary of the stale acquired Forest Management Area, and the permit to operate this area has been issued to a different operator called, Turama Forest Industry (TH).

ECONOMIC IMPLICATION

The promotion of resource owner participation m the utilisation of their own forest resource is one of the objectives of the NFS in the Forest Resource Development Sector. However, this may not always be the case with the waterway and the river delta people, when one looks at the large-scale operations in the Gulf Province.

These 18 incorporated land groups have decided to withdraw from the large-scale timber concession area due to the fact that they hive little say over the timber resources on dry land, unrestricted for harvesting. These people are waterways, and liver deltas, however, they are still beneficiaries of the proceeds of sale from the large-scale operations in terms of 100% of 7% premium based on F.O.B exports. At the same time they also receive indirect and direct monetary benefits from the delta infrastructure, and the annual waterway *funds,* except for the timber royalties.

The Eco-forestry projects set-up in the villages along the waterways and the river deltas have attempted to generate extra income from the sale of semi-processed product, particularly the mangrove cedar at K24.00 stumpage. However, when taking into account the escalating running costs of this type of operation. in terms of *fuel* arid parts, perhaps the cash flow may be far from sustainability.

The extreme scenario is the travelling distance which one would find the furthest and most Mangrove Cedar harvested is from the Veraibe village some 15-20km downt he river system and to the coast. The logs are normally floated with the river current, which sometimes take about a week to reach the centralized milling point at Kikori.

At the same time the waterway people greatly rely on the marine and aquatic food to sustain living. The main supplies of local fresh water crabs, prawns and barramundi come from the Gulf and Western Province of Papua New Guinea.

ENVIRONMENT IMPLICATION

The environment regulaton on the exploitation of mangrove and wetland timber resource will remain unchanged for the years to come.

Ironically, the current operation of Eco-Forestry Projects in the delta region which concentrates on the harvesting of one type of mangrove species called the Mangrove Cedar is a total breach as far the environmental laws and the Logging Code of Practice are concerned. This practice will definitely have an impact on the species in a long run, if not properly managed and regulated.

Mangrove cedar of Xylocarpus sp. does not exist in large composition in swamp areas, but scattered or occurs in small patches of less than 4 to 6 cu m/ha. The species occurs in almost pure stands along the riverbanks to the extent of brackish water associated with tidal.

However. the regeneration of this species is quite poor in the area, as the tide level does not always allow the base of the standing tree free of water thus, reduces to some degree, the germination and survival rate of seeds and saplings. The seeds are normally floated around as the high tide comes in daily and sweeps them into the river system licence floated away from their place of origin. It is assumed that the continuos floating of seeds greatly contributes to the loss of viability and increased mortality, but those by any chance discharged on the dry land have better chance of survival.

PLANNING IMPLICATION

The Kikori Integrated Conservation and Development Project (KICDP) with it's establishment has introduced Eco-Forestry Projects in the delta area of Kikori Basin. The aim to achieve sustainable development of the Forest Resources, through small-scale sawmills, is a god management approach at the community level. However, it would be better if applied on non-fragile areas, and simultaneously the project can place more emphasis on conducting applied series of research on the mangrove wetland in the Kikori Basin in conjunction with other government agencies to help assist in the formulation of a better management plan and guidelines for the sustainable use of these fragile resources.

At present there is no management plans and guidelines in place to accommodate this practice, simply because it contravenes the act and regulation of PNG.

Nevertheless, the KICDP has tapped into a number of projects related to the management of mangroves and the wetlands in the Kikori Basin, and simultaneously has redefined some of it's objectives to enhance better management and sustainable use.

SOME RELATED PROJECTS UNDERTAKEN BY KICDP

The KICDP has identified and conducted a number of environmental studies, directly and indirectly related to the wetland activities by the Eco-forestry projects as established under the Kikori Pacific Ltd.

These projects and activities involved the: -

- establish environmental impact assessment protocols for Eco-enterprises.

(This activity is completed but information is not available)

- conduct environmental impact assessment for all Eco-enterprises.

  (Impact assessment has been completed on all Eco-enterprises, with some monitoring programs and guidelines completed)

- develop and implement monitoring programs of Eco-enterprises as needed.

- collect environment baseline data on all Eco-enterprises.

- complete the final technical reports of the baseline biodiversity surveys of Iviri, Keboi Kerowa and Dark-end eco-forestry areas when the remaining reports are received from the consultants.

- conduct community-based environmental monitoring of eco-forestry harvest areas in the lower Kikori and provide regular feedback to landowners of eco-forestry operations.

- complete the report on the establishment of bio-diversity-monitoring plots in Iviri, darkend and Keboi Kerowa Eco-forestry areas.

- re-survey Iviri monitoring plots to monitor impact of harvesting Xylocarpus trees on biodiversity indicators.

- Implement post-logging environmental impact assessments (PHA) as timber is felled.

SOME OBJECTIVES OF KCIDP PROJECT(as redefined)

The redefined objectives and forward steps taken for better management:-

- to create an enabling environment for biodiversity conservation in the Kikori catchment.
- Maintain communications with national and provincial government officials.

The Project Manager along wit other WWF staff within the South Pacific region met with the Director of the Office of Environment and Conservation (OEC), and two of his staff to introduce WWF's new representative for the region, David Hulse, and to discuss WWF and OEC collaboration. Following this meeting, the Project Manager and the Conservation Science Coordinator met with the project's Desk Officer at OEC.

Project staff have also met with individuals at the National Museum and Art Gallery, the University of PNG, and the Forest Research Institute staff to keep them updated on project activities, and to discuss ways to further improve collaboration between WWF the private sectors and governmental agencies directly and in-directly involved.

- conduct advocacy campaigns with the Government of PNG.

The project's Eco-Forestry Officer continued to maintain dialogue with the Gulf Provincial Forestry Officer, Allanson Avae, on the state of the project's submission on community based eco-forestry. At the same a submission on the entire project and activities has been submitted to the Provincial Forest Management Committee (PFMC) of the Province to deliberate in its next meeting.

CONCLUSIONS AND RECOMMENDATIONS

Mangrove communities and the associated wetlands definitely, will come under serious threat for, exploitation with rapid increase in population growth and the expansion and diversification of national economics. Thus, the policy and regulations on the use and sound management of mangroves and the wetlands are expected to change in order to accommodate for this growth.

In order to achieve a better mangrove and wetland management and conservation strategies in PNG and other Pacific Island countries, the following needs to be seriously considered.

1 . Formulate policy and regulations for the mangrove and wetland management

2. Introduce major technological developments in mapping and resource analysis of mangrove communities and the fragile areas.

3. Formulate management guidelines and integrated plans for mangrove communities and other fragile areas of major environmental and economical importance.

4. Introduction and development of Integrated Coastal Zone Management (WZM) to achieve sustainability.

In PNG, and I believed the same with other Island countries, there are still some institutional barriers to intergrated environmental management because of the sectoral

division of responsibilities between government agencies. And an adequate environmental legislation is, in most cases, either lacking or poorly implemented and monitored.

5. Emphasis on planning, coordination, implementation and legislative enforcement in policy development.

6. Conduct Public Awareness, Education and Research on communities and the associated wetlands.

Therefore, the future development of Coastal Zone Management (CZM) with respect to mangrove ecosystems must emphasize planning, coordination, implementation, and legislative enforcement in policy development. Thus, the greatest challenge for the future is to achieve a restructuring of responsibilities at the various government levels, from national to local, applicable to M1, and introduce effective coordinating mechanisms within government agencies, and between government and coastal communities.

Finally, I believe this workshop will attempt to address issues and problems faced by, Pacific Island countries relating to the conservation and management of mangrove and wetlands uses, and find some solutions to them.

At the same time establish relationship and open up dialogue for the purpose of disseminating information on projects created on the wetland and mangrove communities.

For example., in the Asia-Pacific region, national mangrove committees have been set up at governmental level and a Regional Task Force, both instigated with the assistance from UNDP/UNESCO, have been particularly effective in influencing government policy in favour of mangrove conservation and better management.

At the community level, greater emphasis must be placed on involving local people in the decision-making process with regards to wetland management.

PAPUA NEW GUINEA FRAGILE FOREST AREAS

Fragile Areas by Province

Province	Fragile_Veg_Area
1	4,760,717
2	1,156,095
3	664,461
5	124,998
6	465,780
7	36,743
8	587
12	100,650
13	331,244
14	2,931,706
15	857,735
16	37,572
17	54,849
18	58,874
19	228,602
20	141,116

Total Area **11,951,729 ha**

Mangrove Forest by Province

Province	Sum(Area)
1	87,571
2	251,122
3	66,296
5	41,867
6	17,122
12	3,185
13	847
14	32,024
15	659
16	7,814
17	19,849
18	2,226
19	15,836
20	4,524

Total Area **550,942 ha**

M - Forest Inventory
Mapping

National Change Summary - by Forest Type

06-Jun-01

Forest Type			Resource As at 1975			Change 1975 - Current			Current Resource		
			Forest Area (ha)		Gross Vol (cu m)	Logged Over Area (ha)	Conv to Land Use		Forest Area (ha)		Gross Vol (cu m)
Code	F	Description	Gross (a)	Adjusted		(b)	Logged (ha) (c)	Cleared (ha) (d)	Gross (e)	Adjusted	
a/Wsw	☑	Woodland/Savanna/Swamp woodland	4,586	2,981	56,639	0	0	0	4,586	2,981	56,639
aMl	☑	Woodland/Savanna with Melaleuca leucadendron	116,291	75,590	1,424,034	0	0	0	116,291	75,590	1,424,034
aMl/D	☑	Woodland/Savanna with Melaleuca leucadendron/Dry ev	13,905	8,552	162,488	0	0	25	13,880	8,536	162,184
c	☑	Woodland/Scrub	88,737	0	0	0	0	1,528	87,209	0	0
/D	☑	Swamp woodland/Dry evergreen forest	612	214	5,350	0	0	0	612	214	5,350
/Fsw	☑	Swamp woodland/Mixed swamp forest	2,325	0	0	0	0	0	2,325	0	0
/Fsw/D	☑	Swamp woodland/Mixed swamp forest/Dry evergreen for	747	112	2,800	0	0	0	747	112	2,800
/Fsw/H	☑	Swamp woodland/Mixed swamp forest/Herbaceous swa	10,342	1,551	38,775	0	0	0	10,342	1,551	38,775
/Gsw/D	☑	Swamp woodland/Swamp grassland/Dry evergreen forest	7,880	1,182	29,550	0	0	0	7,880	1,182	29,550
/Hm	☐	Swamp woodland/Medium crowned forest	213	60	2,520	0	0	0	213	60	2,520
/Hmd	☐	Swamp woodland/Medium crowned depauperate/damag	46,962	15,597	472,350	0	0	0	46,962	15,597	472,350
/Hsw/H	☑	Swamp woodland/Herbaceous swamp/Small crowned for	3,377	419	13,450	0	0	0	3,377	419	13,450
/Hsw/P	☑	Swamp woodland/Herbaceous swamp/Open forest	2,554	383	15,320	0	0	0	2,554	383	15,320
/Ps.f	☑	Swamp woodland/Small crowned forest - Flush of leaves	547	191	6,685	545	0	0	2	1	35
Ml/D	☑	Swamp woodland with Melaleuca leucadendron/Dry ever	3,728	1,305	32,625	0	0	0	3,728	1,305	32,625
Ml/Hs	☑	Swamp woodland with Melaleuca leucadendron/Small cr	541	189	5,670	0	0	0	541	189	5,670
National Totals			32,821,767	29,241,136	1,181,432,450	2,174,012	394,636	1,019,499	29,233,646	26,280,554	1,071,864,163

usted Forest Area = Gross Forest Area, less area of disturbance and the non-forest proportion of FMU's mapped as complexes

rent Gross Forest Area = Gross Forest Area in 1975, less areas of Logged Over or Converted to Land Use between 1975 and current date

Fragile Forest Type (as defined by DEC)

= (a) - (b) - (c) - (d)