

**Environmental Management and Biodiversity Conservation of Forests,
Woodlands, and Wetlands of the Rufiji Delta and Floodplain**

**Designing an Environmental Management Plan for the
Rufiji Districts' Floodplain and Delta: The Second
Stakeholders Planning Workshop**

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¹ The Rufiji District Council implements Rufiji Environment Management Project with technical assistance from IUCN – The World Conservation Union, and funding from the Royal Netherlands Embassy.

Rufiji Environment Management Project - REMP

Project Goal: To promote the long-term conservation through 'wise use' of the lower Rufiji forests, woodlands and wetlands, such that biodiversity is conserved, critical ecological functions are maintained, renewable natural resources are used sustainably and the livelihoods of the area's inhabitants are secured and enhanced.

Objectives

- To promote the integration of environmental conservation and sustainable development through environmental planning within the Rufiji Delta and Floodplain.
- To promote the sustainable use of natural resources and enhance the livelihoods of local communities by implementing sustainable pilot development activities based on wise use principles.
- To promote awareness of the values of forests, woodlands and wetlands and the importance of wise use at village, district, regional and central government levels, and to influence national policies on natural resource management.

Project Area

The project area is within Rufiji District in the ecosystems affected by the flooding of the river (floodplain and delta), downstream of the Selous Game Reserve and also including several upland forests of special importance.

Project Implementation

The project is run from the district Headquarters in Utete by the Rufiji District Administration through a district Environmental Management Team coordinated by the District Executive Director. The Project Manager is employed by the project and two Technical Advisers are employed by IUCN.

Project partners, particularly NEMC, the Coast Region, RUBADA, The Royal Netherlands Embassy and the Ministry of Natural Resources and Tourism, collaborate formally through their participation in the Project Steering Committee and also informally.

Project Outputs

At the end of the first five –year phase (1998-2003) of the project the expected outputs are:

An Environmental Management Plan: an integrated plan for the management of the ecosystems (forests, woodlands and wetlands) and natural resources of the project area that has been tested and revised so that it can be assured of success - especially through development hand-in-hand with the District council and the people of Rufiji.

Village (or community) Natural Resource Management Plans: These will be produced in pilot villages to facilitate village planning for natural resource management. The project will support the implementation of these plans by researching the legislation, providing training and some support for zoning, mapping and gazettement of reserves.

Established Wise Use Activities: These will consist of the successful sustainable development activities that are being tried and tested with pilot village and communities and are shown to be sustainable

Key forests will be conserved: Forests in Rufiji District that have shown high levels of plant biodiversity, endemism or other valuable biodiversity characteristics will be conserved by gazettement, forest management for conservation, and /or awareness-raising with their traditional owners.

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1 Background to the Workshop by Francis Karanja²

1.1 Introduction

The Rufiji District of central coastal Tanzania is the site of the largest tidal (mangrove) forest on the eastern coast of Africa. These mangroves support an extensive inter-tidal fishery, provide nursery grounds for nationally important prawn industry, and have considerable importance locally and regionally. Rufiji district also harbours many other forest and woodland associations – many of which are influenced by the floods from the Rufiji River which provide surface and sub-surface waters to the riparian forests, swamp forests, fringing woodlands, thickets and wetlands on and adjacent to its lower floodplain. Over 150,000 people inhabit the Rufiji Delta and Floodplain, the majority of whom subsist on fishing, cultivation, and extraction of forest, woodland, and wetland products. There are some very valuable dry coastal forests in Rufiji District in the uplands away from the delta and floodplain which certainly contain biodiversity of local, national and probably international importance – such as Kichi Hills forest and the Nyamuete-Namakutwa, and Mchungu Forest Reserves.

Over the last decade, however, the Rufiji forests, woodlands and wetlands have come under increasing pressures from a wide variety of factors, including population growth, unsustainable harvesting of both timber and fish resources, the conversion of mangrove areas to cultivation and the use of riparian forest and woodlands for fuel. In the past a proposal was put forth to develop a large semi-intensive prawn farm, that would greatly threaten the integrity of the mangrove forest ecosystem.



The mangroves, Floodplain, forests and freshwater wetlands are also threatened by developments within the district like improvement of the road network, including a bridge over the Rufiji River, mining exploration activities, as well as by upstream development activities that include the construction of hydroelectric dams and water extraction schemes. Management interventions to address these pressures have been hampered by a lack of ecological and socio-economic information, inadequate inclusion of all stakeholders, inadequate data on the extent and scale of land-use changes, and insufficient capacity for long-

term integrated planning and management at the district level. It was against this background that IUCN in collaboration with the Rufiji District Council, and other stakeholders at both regional and national levels developed the current project phase I of the Rufiji Environmental Management Project. The Rufiji District Council implements the project, with technical assistance from IUCN. The Netherlands government provides the project funding.

1.2 Goals and Objectives of the Project

The goal of the Rufiji Environment Management Project is *to promote the long-term conservation through wise use of the lower Rufiji River forests, woodlands and wetlands, such that biodiversity is conserved, critical ecological functions are maintained, renewable natural resources are used sustainably, and the livelihoods of the area's inhabitants are secured and enhanced.* Two of the principal objectives and activities of this phase of the project focus on the Environmental Management Plan development and implementation process. These are:

² Programme Officer Natural Resources – IUCN EARO

1. To establish a framework for harmonising conservation objectives and human development needs, through preparation of an Environmental Management Plan for the low-lying areas (and other important areas for biodiversity) of the Rufiji District – with emphasis on forests and their attendant woodlands and wetlands as well as involvement of ALL stakeholders in the planning process,
2. Test and then implement the Environmental Management Plan for the Rufiji District with the involvement of the district authorities and communities and simultaneously assist pilot villages to develop and implement community environmental management plans for the natural resources of particular areas.

To date the project has been on the ground for close to two years. During this period, the emphasis has been to undertake various ecological and socio-economic assessments, so as to improve understanding of their conditions. As part of the natural resource assessments several studies have been commissioned ranging from aerial surveys and GIS work, biodiversity inventories, assessment of the current status of timber resources in the wooded areas, to wetland dynamics.

For the socio-economic conditions assessment, the project has already studied the four pilot villages, and presently we are in the process of assessing ten further villages; and assessing the economic value of the natural resources from a “use” perspective.

In the past two years the project has commissioned various studies aimed at providing baseline information on the status of the natural resources and on social economic conditions. Additionally, the project has been collating secondary information from past studies carried out in Rufiji. Hand in hand with these information generation approaches, there have been regular consultations with the various project partners at the village, ward, divisional, district, region, and national levels. The consultation has been both informal and formal through public meetings, focus group discussions, and workshops.

As part of the above consultations, and as a mechanism of creating awareness on and obtaining input from the stakeholder groups, the project organised a workshop at the district level on June 2000 at Utete. This workshop was limited to the stakeholder groups at the district level especially the key resource user groups who depend on the natural resources for their livelihoods, policy implementers at lower levels, and the Rufiji district council, in addition to local non-governmental organisations/community-based organisations. This 3-day workshop discussed an array of issues affecting natural resources management in Rufiji, and identified key management issues that need to be addressed while designing the EMP. The stakeholders who ought to be involved in the environment management planning process and its eventual implementation were identified. The group also discussed the management options that could be employed in enhancing natural resources management in the Rufiji district. A copy of the first workshop proceedings was circulated to all the invitees of the second stakeholders’ workshop so that they could grasp issues to be discussed. The second workshop, therefore built on, and further polished the deliberations of the first workshop. An overview of the first workshop is given in section 3.1.

1.3 Present Workshop Objectives

The objectives of this second stakeholders workshop were:-

- i. Identification of further issues to be addressed in the EMP process, and provision of useful insights into others that might have been overlooked during this first workshop..
- ii. Involvement of all relevant stakeholders in the process of designing an Environmental Management Plan for the Rufiji district through identifying constraints and challenges that hinder sustainable management and conservation of natural resources thereof,

- iii. Assist in further identification of stakeholders, major management issues and practical management options. Representatives of the stakeholders that were identified during the first workshop were all invited to the second workshop.
- iv. Formulate and reach consensus on the long-term and operational objectives, and broad guidelines and principles to guide the implementation process, and
- v. Obtain a common understanding and commitment of all relevant parties with a stake(s) in natural resources of Rufiji district, on the need for and strategies required for the conservation of these resources.

1.4 Workshop Approach

An external moderator guided the discussions. A highly participatory approach was used to ensure that the expected outputs are achieved. The workshop's discussions have been summarised into this concise report and distributed to the participants for comments. The final report, the recommendations from the first Stakeholders Planning Workshop, recommendations of the several studies commissioned by the project, and the ideas from stakeholders consultation process are being analysed and will form the basis for the Environmental Management Plan outline.

Day 1 – 22ND November 2000

2 Opening

2.1 Introduction

The workshop began with registration and self-introductions. The list of the workshop participants is attached as Annex 1. Participants were drawn from local villages, Wards, District, Regional and at National levels, in addition to Non-Governmental Organisations and commercial companies.

2.2 Welcoming Speech

Mr. F. Q. M Fissoo (District Executive Director – Rufiji District Council & REMP Coordinator)

In his brief speech, Mr. Fissoo welcomed all the workshop participants to the Rufiji district and thanked them for prioritising the REMP's Planning workshop over there many other equally important duties. This workshop, he said, was a very important one, as it builds on the first one that was held in June 2000 that involved stakeholder groups at district level, and aims at contributing to the ongoing environmental management planning process. He welcomed their active participation to the workshop, and urged all the workshop participants to share their experiences and lessons learned elsewhere with the Rufiji district council. In addition, the workshop with the mix of the stakeholder groups from the village, ward, district, regional, national, commercial companies and NGOs, should allow useful discussions and articulation of the pertinent issues that ought to be integrated into the environment management plan. With those few remark he welcomed the Regional Administrative Secretary to officially open the workshop.



2.3 Official Workshop Opening

Lt. Col. Magere (The Regional Administrative Secretary – Coast Region; Chairman – REMP Project Steering Committee)

In his speech, the RAS conveyed apologies for the Regional Commissioner – Coast Province who due to prior commitments could not join this workshop. His speech emphasised two main aspects namely the vision of the project and on the environmental planning process. Conservation, he said should ultimately contribute towards enhancing the livelihoods of the inhabitants of wherever those resources existed. The local inhabitants should benefit from conservation and wise use of resources, and any protectionist approaches/initiatives that aim at preserving nature while forgetting human needs should be discouraged. He reminded the workshop partnership that Tanzania government is working very hard towards poverty eradication, and all programmes, whether they be conservation- or development-oriented should ultimately contribute to this developmental goal. He reiterated that conflicting interests between conservation and development should be harmonised to ensure that one did not suffer at the expense of the other. He advised REMP



and the Rufiji District Council to employ holistic and participatory approaches while designing the environment management plan, and to put the interests of the local inhabitants at the forefront.

On the issue of designing the environment management plan, he emphasised the need to have starter activities initiated alongside the management planning process. In the past, there has been an instance whereby the planning process takes too long, and the final management plan ends up being dumped in office cabinets. Where pilot activities are initiated, they provide useful information that then feeds into the management planning process. Further, there are certain local natural resources initiatives that have proved sustainable which should be supported and encouraged in line with the desired environment management plan.

He noted that a lot of data/information has been gathered in the last two years of the project existence, and the emphasis should now shift into analysing these information to form the building blocks of the environment management plan.



With those useful comments, the RAS then officially opened the workshop and requested the participants to actively participate in the workshop process and to contribute their ideas as much as possible.

2.4 Levelling of Expectations

Mwajuma Masaiganah, Workshop Moderator

Each participant was given a card and requested to write their workshop expectations. There was a wide array of expectations. These expectations have been analysed and presented into six broad areas as seen in Annex 2. At the end of the workshop, these expectations were reviewed and how they were fulfilled assessed. Shortly after the registration and introductions the workshop proceedings commenced. The workshop programme is provided as Annex 3.



3 Workshop Proceedings

The workshop facilitator presented the main aims of this second workshop and explained that it had limited scope in meeting all the expectations expressed by participants. The following sections depict the deliberations and recommendations of the workshop. The workshop employed both group and plenary discussions. For each issue to be discussed, the workshop facilitator first gave instruction/advice and guidelines on what was required. She explained that the workshop participants would be sub-divided randomly into several groups. These groups would discuss the issue and then present to the plenary. The plenary deliberated whether to accept or reject the groups proposal before accepting.

3.1 Outcome of the First Stakeholders Planning Workshop

Mr. M. S. Chande, District Lands, Natural Resources & Environment Officer (DLNREO)

Mr. M. S. Chande gave the following summary of the first Stakeholders Planning workshop. “Of great interest/concern to the project is the Environmental Management Plan development process, which must be carried out in a participatory manner, to ensure sustainability in future. This will require working very closely with all the stakeholders at village, Ward, District, Regional and National level. A first participatory planning workshop that involved representatives of the stakeholder groups and other projects in the Rufiji district was held on June 28-30 2000.

This workshop achieved three main objectives.

- i. First identification of relevant stakeholders at local, district, regional and national levels
- ii. It produced pertinent natural resources management issues that require consideration in the designing of an environmental management plan for the Rufiji district, and possible management options.
- iii. charting out a flexible planning process that should be followed,

The agreed process is outlined below.

3.1.1 Environmental Management Planning process

1. **Review and analysis of available information:** The emphasis will be to analyse all the available information, identify ongoing activities by different stakeholders, and undertake an overview of existing and ongoing process with the project area, Rufiji District and the Rufiji River Basin area.
2. **Involvement of the stakeholders** (local) within the Rufiji District in the management planning process. The stakeholders will largely be drawn from the villages, Ward, Rufiji District Council, various natural resources user-groups (ranging from fishermen, loggers, saw millers, oil exploration companies, etc.), Rufiji District staff, Non-Governmental Organizations, conservation and development projects to mention a few. Consultation at this stage will involve a consultative workshop to discuss the myriad of natural resources management issues and their management options. After the workshop, there will be efforts geared towards following-up on the management issues raised either at village, ward levels of whatever is appropriate and with particular natural resource users, other projects, the District Council etc. Involvement of the local communities at lower levels (villages and wards) has been ongoing in some other villages within the project area, but with more emphasis in the four pilot villages.

3. **Involvement of District, Regional and Central Governments:** The project has been collaborating with several institutions and departments at the national and regional level. This range from the Forestry and bee-keeping division, NEMC, National Land Use –Planning Commission, Institute of Resources Assessment, University of Dar es Salaam; national NGOs such Wildlife Conservation Society of Tanzania (WCST), WWF; and other projects in the Rufiji River Basin. A second consultative planning workshop will be organized tentatively in November 2000. The purpose of this particular workshop will be to discuss and improve on the management issues and management options that will be raised during the first District Stakeholders workshop. It is envisaged that this workshop will also identify broad strategies that should be employed to promote integrated natural resources management and reduce potential for land use conflict.
4. **Technical Workshops:** to fill in identified gaps: Activities 1, 2, & 3 will certainly identify gaps related to various facets of the project. Based on this, technical workshops³ will be organized. For instance establishment of environmental impact assessment procedures which could be spearheaded by NEMC, designing a land use and development zoning scheme which could be spearheaded by the National Land Use Planning Commission, Upstream-downstream linkages with the aim of identifying management options for the wider catchment management etc.
5. **Development of a draft Environment Management Plan:** Steps 1-4 will generate enough information to enable the District Environment Management Team (EMT) to develop a draft environment management plan for the Rufiji Floodplain and the Delta. Any new information that will be generated between now and then will be incorporated into the plan. The plan will then be circulated to the identified stakeholders for their comments and advice on improvement. The EMT plans to have the draft EMP ready by December
6. **Consultative meeting to discuss the EMP:** The comments received from stakeholders will be compiled, analysed, and discussed during this workshop. Based on these comments the draft EMP will be revised accordingly and circulated to relevant stakeholders by December 2000.
7. **Pilot and test** the environment management plan during the next part of this project phase (3years)
8. **Update** the EMP based on lessons learnt.”

3.2 The Concept of Integrated Natural Resources Management

Dr. Olivier Hamerlynck, Chief Technical Advisor – REMF

3.2.1 Introduction

All around the planet the limitations of sectoral planning have become apparent. Hydropower dams, such as the Kariba and Cahora Bassa on the Zambezi, may achieve their energy production targets but at the same time endanger the livelihoods of hundreds of thousands of subsistence farmers in the downstream floodplains, starve the mangrove of the necessary floods, wreck the shrimp fisheries in the coastal waters and delta and cause dramatic losses of biodiversity.

Similarly, alerted by the famines of the seventies and eighties, governments in the Sahel focussed only on increasing agricultural productivity through the establishment of large-scale irrigation schemes. Tens of thousands of hectares were thus developed, at huge cost, in the floodplains of the Senegal and Niger rivers in West-Africa. No analysis of socio-economic factors, governing the traditional multiple use of the floodplains, was done. For example, the traditional recession agricultural techniques which

³ The examples given here are purely illustrative and the actual workshops organized will depend on the identified gaps based on the available information and stakeholders' needs.

have fed the basin's civilisations for centuries, though less productive per hectare, do not need any expensive inputs and require relatively little labour. After the harvest the fields are grazed which in turn brings in fertiliser from dung. These nutrients will boost fish productivity at the next flood. In a similar floodplain in northern Nigeria an economic analysis proved that, when adding up the benefits of the different uses throughout the year, the traditional system performs better than large-scale irrigation and the benefits are spread out over different groups of users.

If the local communities in the Sahel would have been invited to state their point of view they would certainly have pointed out the importance of the natural flood for all their activities and have proposed modernisation of traditional use to overcome the bottle-necks in their production (better seeds, improved storage techniques, etc.).

The lack of integrated planning in the Senegal valley led to the loss of some 20,000 tonnes of fish per year and dry season grazing for livestock has become a critical constraint for the nomads. As the sedentary small-scale farmers had no means to invest in hydraulic infrastructure, the communal lands they had always farmed were now allocated to "outsiders", often the business, military or political elite living in the capital and with no traditional ties to the land. The dry season lows of the river had always efficiently controlled parasites such as Bilharzia. With the permanent presence of fresh water, needed for double cropping to make the big irrigation plots economically viable, new diseases suddenly appeared: rift valley fever, cholera, new and more dangerous forms of malaria. The incidence of other waterborne diseases increased markedly. Cattle also became parasite-infested and needed expensive treatment or had to be kept away from the valley. The water-starved mangroves of the delta died and the once-famed spectacle of thousands of feeding flamingoes and hundreds of thousand of other waterbirds of the National Parks could no longer attract any tourists.

Moreover, many of the irrigation schemes failed after a few years because of increased soil salinity or produced rice at a price that was not competitive with the produce from South-east Asia. All these factors concurred to increase rural urban drift and created a socio-economic wasteland in the valley which, instead of becoming the "bread-basket" imagined, became a drain on already starved government resources. Reimbursement of the loans contracted for the infrastructure and development will weigh heavily on this and the next generation.

All of this could have been avoided had a more holistic view, looking at the whole river basin and its water as a system with economic, social and environmental components that influence each other, prevailed. If stakeholder views and traditional knowledge had been incorporated at the planning stage, if the interlinkages between water - soil - livestock - agriculture - forestry - fisheries and biodiversity had been made explicit before taking the decision to go for the "irrigated rice only" option, if the social and economic characteristics of the target groups been understood beforehand, a lot of damage could have been prevented. The water needs for each of the various functions of the area could have been weighed against each other and compromise solutions proposed. A lot of conflict could have been avoided had the different stakeholders been through a process together, giving them an understanding of the needs of the others and allowing them to become aware of the limits to their own sector or resource user's aspirations.

From such experiences all around the planet, lessons have been learned and guidelines been produced on integrated planning or ecosystem-based management for natural resource management. They are available through many institutions. Most recently, and especially relevant to the Rufiji Basin, through the work of the World Commission on Dams⁴. A very practical, less dam-oriented publication, is "Ecosystem-management: lessons from around the world. A guide for development and conservation practitioners" which can be consulted in the REMP information centre in Utete and ordered from www.iucn.org/bookstore/.

⁴ The World Commission on Dams' report « Dams and Development. A new-framework for decision-making » has been presented in November 2000 and is the product of an unprecedented global public policy effort to bring governments, the private sector and civil society together in one process. Most information can be downloaded free from www.dams.org. A copy is available in the REMP information centre in Utete. It is also available from EARTHSCAN at 29.95 \$US.

3.2.2 Condition for Successful Integrated Planning

- **Awareness:** this is the primary condition. If people at all levels, from the village to the top decision-maker, are not aware of the risks that lack of planning entails, if they are not aware of the intimate linkages between the different components of the ecosystem, then they will not see the need for integrated planning. If they are not aware that the natural resources are limited and that their sustenance depends on processes that may be affected by human intervention, then everybody will just use the resources the way that seems most convenient to the individual or the institution at that particular time. Examples of this attitude abound in Rufiji district. A recent one is the clearing, for sesame and cashew cultivation, of a forested slope on the edge of Lake Uba, just behind the primary school. Though, in the short term, some private income will be derived from that activity, in the long term the soils will become impoverished. These soils are very course-grained and were only held together and continuously fertilised by the presence of the woodland. The soil will therefore lose its cohesion and erode, gradually starting to fill-in the lake, thus reducing the capacity of the lake to store water during the dry season and destroying the lake edge habitats essential for spawning and negatively affecting fisheries productivity. As most of the lakes along the northern floodplain are shallow and have relatively steeply sloping edges, they are very fragile to these kinds of interventions and clearing of slopes along the lakes should be absolutely avoided. More sedimentation into the lakes can also influence their connections to the river and in years of low floods and rainfall the lakes may eventually dry out, as has happened to Lake Uba in the thirties and to Lake Mtanza in the late nineties. If the lakes dry out this will create serious problems for the adjacent communities who depend on them for many functions. It is also clear that the revenue deriving from the agriculture on the slopes, even if it would be a communal good, could never finance the replacement of these functions (creation of boreholes and pumping systems for domestic water, fisheries revenue, bushmeat production, transport by canoe, groundwater recharge for tree growth, etc.). Certainly the decision to clear the slope was not intended to endanger the livelihood of other members of the community but the awareness to prevent it from happening did not exist at the appropriate places.
- **Stakeholders should identify needs:** in order to be able to harmonise the needs of each of the stakeholders these should be clearly expressed. This would seem to be an obvious condition but it is often not that easy for the stakeholders because some everyday things are just taken for granted. For example, people may consider the lakes will always be there and therefore not mention that their continued functioning is of vital importance to them. Also, not many people are trained to note the first indices of change that will affect them. Identification of needs is therefore closely linked to the awareness issue. Traditional, small-scale use and ecosystem needs are often overlooked. It is relatively easy to calculate the water needs of a large-scale irrigation farm but much more difficult to know how much water the mangrove needs to continue to produce high quality poles in sufficient quantity, or how much of the floodplain has to be covered by the annual flood to create optimal conditions for spawning and growth of fishes. Often for traditional uses the only information available is qualitative, the fishermen know that years of good floods are also years of good catches, the farmers know that good floods at the right time bring good harvests, etc. There is a need for these individual and collective needs to be expressed in stakeholder meetings, rather than dogmatic viewpoints such as “we need a dam because it is modern”.
- **Stakeholders set common objectives:** the purpose of this workshop is exactly this, to bring the stakeholders together after they have identified their needs in order to develop a common vision of the kind of development they want to see. This is the difficult process of the harmonisation of the different needs. Some water uses may be incompatible. For example, agriculture needs water during the flood season but the inhabitants of Dar es Salaam want electricity all year round. Some stakeholders may therefore want to store water behind dams for as long as possible (in case the next rains fail), while others will want to release water in April to support the flood for their crops.
- **Stakeholders share responsibility:** the costs and benefits of the developments should be shared. If users downstream of a sugar cane plantation cannot safely drink the water anymore because of high concentration of pollutants (fertiliser, pesticides), the responsibility for clean waste water

should clearly be put on the stakeholder that reaps the profit from the water use, i.e. the plantation. Every stakeholder should realise that any benefits he derives from the use of resources that are no longer available to others may entail a compensatory cost.

- **Human needs should be balanced with environmental needs:** development and conservation are not opposites. Development cannot be sustainably achieved without conserving the processes within the environment that are the basis of the production systems. If we continue destroying the mangrove by conversion to rice fields and by overexploitation of the wood for poles, charcoal, salt-making, lime-burning, etc., if we continue to increase upstream abstraction thus reducing dry season river flows, we will reach a point of no return where the whole system collapses. All the mangrove functions will be lost indefinitely, shrimp and fish will no longer reproduce as they will not find the nutrient rich mangrove leaf litter on which the young depend, the coral reefs of the Mafia Island channel will be smothered in silt, the coastal land will become unstable and waves will erode the villages on the islands now protected by the mangrove root systems, etc. This is not as farfetched as it may seem, it has happened elsewhere, in Asia, in Central America and on scales vaster than the Rufiji. In Ecuador for example virtually all the mangrove has been converted into shrimp farms to the point where there are virtually no more young shrimps in the ocean to stock the farms. The rich large-scale aquaculturalists now fly in shrimp juveniles from Brazil, the poor small-scale farmers desperately try to find adult female shrimp carrying eggs. This frenzy has led violence with gangs shooting at each other for the possession of a single female shrimp, sold for up to 2000\$US now, abundant and almost free twenty years ago. Some countries such as Singapore, having been confronted with the impacts of sectoral development, are now embarking on expensive mangrove rehabilitation programmes. Similarly, once a species is extinct it can never be brought back. Conserving biodiversity is not a luxury, it is a necessity to safeguard the development options of future generations. These may one day need a certain plant to treat a new disease or they may want to enjoy the beauty of watching a pack of wild dogs hunt. We have no right to deny them that possibility. Unfortunately the situation of Tanzania is highly critical in this respect. The country figures in the top twenty for countries with the highest number of threatened species and this for each of the groups that have been sufficiently studied: mammals, birds and plants. As habitat degradation is the most important cause of extinction it can be assumed that Tanzania is also losing many species which have not even been studied, the Kihansi toad being a prominent example.
- **Planning should preferably be basin wide:** as water is the resource that determines most of the productivity of the other resources, through the annual flood (groundwater recharge, agriculture, fisheries, wildlife, mangrove, forestry, etc.) it is vital to consider the issues at the level of the entire basin. Indeed, the lower Rufiji stakeholders can express all the water needs they can imagine and agree totally on the common objectives for the development of the floodplain and delta. Their development programme will still fail if land-use changes such as deforestation or increased abstraction upstream for irrigation do not allow the minimum required flows to reach the lower river at the right time of year. In some areas of the basin this is already the case: increased water use for dry-season irrigation has made the Great Ruaha river run dry. This negatively affects wildlife in Ruaha National Park, which means revenue from tourism is lost and wild animals move out of the park in search of better areas. This in turn exacerbates conflicts with adjacent communities. Luckily the Rufiji is a rather exceptional case as the whole catchment is in-country. Most rivers of this size cross several borders and international agreements have to be embarked upon to guarantee sufficient water quality and quantity for the downstream users. However, it is not because the whole catchment is within one country that the issue does not have to be addressed. REMP will therefore bring together water users and institutions from the entire basin in a workshop looking at upstream – downstream linkages.
- **International conventions may override:** Tanzania, as most countries, has signed many international conventions with regard to conservation and sustainable development. It has therefore engaged itself to protect wetlands of international importance, to conserve biodiversity,

to take measures against global warming, etc. Local stakeholders should be aware that they also have global responsibilities.

3.2.3 Planning Requirements

There are a number of successive steps that have to be gone through for successful planning:

- **Gathering economic, social and environmental data:** appropriate decisions can only be based on knowledge of the reality. Only when the data are available can one proceed to develop a comprehensive view of the functioning of the system and of the interactions between its components. Unfortunately data available for the lower Rufiji are scanty or at best incomplete, especially on rainfall, hydrology, vegetation, woody biomass, fisheries, traditional practices of agriculture and other resource use, income generation from natural resources, traditional conservation mechanisms and practices, present take-off levels, biodiversity, etc. Some good information is available from the RUBADA studies but so many changes have occurred since then that certain aspects will have to be re-investigated. Though REMP has been making a lot of effort over the last two years to fill in some of the most serious gaps it is clear that this should be an ongoing process, allowing the plans to be adapted as new information becomes available.
- **Analyse the information available to define critical factors:** data in themselves have no meaning, they have to be analysed to yield information which can then be compared with information from other river basins. The first stakeholder meeting has already supplied a wealth of information on perceptions at village level and many critical factors have been identified. From all sources it is clear that the annual flood is the heartbeat that makes the lower Rufiji floodplain and delta function. Quantitative information on the flood is however still lacking.
- **Define development options:** there are many possibilities for the improvement of present activities and there is also potential for new things. Stakeholders should discuss about what kind of direction they would like to take. For example, international markets for organically grown cotton, vegetables and fruits are rapidly expanding and Rufiji agricultural stakeholders could agree to strive together to obtain an internationally recognised label for their produce. All these options can then be integrated into a master plan which expresses the common vision, states the development objectives and defines the options for their achievement.
- **Assess compatibility and economic, social and environmental impact:** Some development options may be incompatible. The difficulty of combining hydropower and sustained floods has already been mentioned. Other practices may also be incompatible with the options, for example the use of DDT by rice farmers in the mangrove may destroy the efforts by other stakeholders to achieve the organic label for other produce. Equity and gender are often important issues when large-scale mechanised farming is introduced because the poorest of the poor tend to lose out. In general impact studies are best conducted under public scrutiny. A lot of conflict could have been avoided had the procedures for the impact assessment of the proposed Rufiji shrimp farm been more transparent. Only after this analysis can different alternatives be compared.
- **Select the best options for suitable integrated development:** once the choice has been made priorities for implementation can be set and action taken.

3.2.4 Principles

Chances for successful implementation are greatly enhanced by adhering to the following principles:

- **All stakeholders are to participate in decision making on cost-benefit sharing:** stakeholders should be aware of the costs and benefits that will ensue from the implementation of the management plan. The arrangements should be perceived as fair. Otherwise there will be evasion and policing costs may become prohibitive. Technicians should provide the users with optimal use scenarios. For example, some forests may have to be set aside for 25 years before any sustainable

exploitation can be envisaged. Mechanisms must be found to accommodate for the costs of their delimitation, policing, etc.

- **Multi-sectoral aspects are included in design of investment plans and policies:** technical departments at all levels have a habit of considering only their sector and therefore a major effort needs to be done to integrate across sectors, looking especially for mutual reinforcements and complementarity.
- **Interagency relationships are promoted:** no single agency can claim to do everything, each institution will have its role to play and many interactions can be synergetic. From the beginning interagency links should be promoted. The roles of each should be clearly defined and formal agreements on their relationships established.
- **Planning is gender sensitive:** all forces in society must be mobilised to achieve sustainable development. This can only be done if no group is economically or socially marginalised.
- **Market-based instruments are used:** implementation, monitoring, etc. will require means. Therefore all users/polluters will have to contribute, for example to maintain the water quality control monitoring system.

As one can see from the foregoing, the procedures are known and the principles have been established. Therefore, at least in theory it should not be too difficult to come up with a lower Rufiji environment management plan that covers the floodplain and delta and the woodland and forest remnants. However, between theory and reality there may be many gaps and judging from some preliminary investigations awareness, both of the need for integrated planning and of environmental issues in general, may prove to be a major stumbling block.

3.2.5 The Reality

When one travels through the Rufiji district the impression is not encouraging. Though some areas are still beautiful there are signs everywhere of change and of unsustainable practices.

The woodland is pockmarked with illegal sawpits and some areas in the forest reserves hold more stumps than trees. Everywhere pristine woodland is being cleared for dryland farming which is probably unsustainable because of the poverty of the soils. Woodland clearing is done in an extremely wasteful manner and sometimes on slopes of the vital lake watersheds. Exotic tree species of dubious quality are being planted while some of the finest national hardwood species are on the verge of extinction. At the same time the wood of these trees can be bought at ridiculously low prices in Dar es Salaam which means only a very small benefit from their exploitation, if any, can have remained in the district. There are no more large trees shading the edges of the lakes and evaporation therefore has increased. Suitable trees for the making of canoes have become hard to find.

Trucks loaded with charcoal, sometimes made of hardwood, continuously thunder away to Dar es Salaam. Around the boomtown of Ikwiriri there is virtually no firewood left.

Thousands of cashew trees are not cared for and tonnes of cashew cannot find buyers. Wild fruits from vines are often collected by cutting down the supporting tree. In the northern delta the mangrove is converted to rice farms that become unproductive after 5 to 7 years.

Very small mesh sizes are used in fisheries and undersized fish are marketed everywhere. Some of the lakes such as Uba are biologically dead because of overfishing. Very few wild animals are encountered, except vervet monkeys and baboons. Illegal harvesting of bushmeat is rampant and the present exploitation rate clearly exceeds optimal off-take levels. Moreover, the woodland is being continuously set on fire to attract antelopes thus preventing natural regeneration of some tree species.

In summary, most of the highly strategic resources are not used sustainably. The most worrying aspect of it all is that a lot of people do not seem to be aware of the impact of their own actions, nor do they feel empowered to stop unsustainable practices of others. One comes under the impression that the Rufiji district is having a party with its natural resources, as if there is no tomorrow. When we are using unsustainable practices we are in fact borrowing from the environment, but this loan will have to be repaid one day, by us or by our children. Otherwise the bank - the ecosystem will go bust.

The situation is worrying but a lot can still be done. By taking the right measures now decent livelihoods can still be had in the future. It is clear that most of the damage is being done by people, either from within the district or by outsiders. However, peoples' actions are not only the problem, they also carry the potential for solutions. Still, action is necessary and one should not be waiting for somebody else to sound the call. It is not for the government to wag its finger and say "Thou shalt not ...". Those days are over, the government has no means to police every tree and every buffalo. It is for the local communities to decide what practices are unacceptable, it is for each individual to take responsibility for his own actions and it is for all of us to mobilise means to stop the detrimental activities of others. It is in our own hands that the future lies.

3.3 Further Stakeholders Analysis

Facilitated by the Workshop Moderator in the plenary.

The first District Stakeholders Workshop had identified several stakeholders. The list of the stakeholders identified in the first workshop is provided as Annex 4. In that workshop, the following categories of stakeholder groups were identified: local natural resources user groups; government ministries/institutions; NGOs; other natural resources management projects in Rufiji; and business oriented firms.



To assist with the further analysis of the stakeholders, the moderator divided the participants into seven groups. The groups were requested to thoroughly study the list of the stakeholder groups identified in the first workshop and list any further stakeholders whom the workshop may have forgotten. Each group presented their list of stakeholders, which after plenary discussion can be summarised as follows:

3.3.1 A summary of further identified stakeholders that could contribute to the EMP process

- National Cashew nut Board
- National Lint and cotton Board
- Village water committees
- Salt miners
- Log transporters
- Carvers
- Villagers/Hunters/Companies dealing with bird hunting
- Fishermen using dynamite
- Village tour guides
- TaTEDO (NGO dealing with energy-saving technologies)
- Sokoine University of Agriculture (Morogoro)
- Vice President's Office (Poverty Alleviation section)
- First Energy Company (NGO conducting oil exploration in the Rufiji district)
- Ministry of trade and industry

- Institute of Resources Assessment (University of Dar es Salaam)
- REPOA (NGO dealing with poverty alleviation research)
- Tanzania Wildlife Corporation (TAWICO)
- Journalists Environment Association of Tanzania (JET)
- Lawyers Environmental Action Team (LEAT)
- Tanzania Electric Supply Company Limited (TANESCO)
- Tanzania Fisheries Research Institute (TAFIRI)
- IMS
- Tanzania Petroleum Development Corporation (TPDC)
- Tanzania Forestry Research Institute (TAFORI)

3.4 Identification of Further Management Issues

The management issues identified during the first workshop were circulated to all the 7 groups. These management issues are provided as Annex 5. Each group was requested to review them keenly and identify any gaps or any issues that the district stakeholders may have missed. For all the additional identified issues, the groups were requested to list each issue on a separate card. Each group made a presentation of their further management issues in the plenary. After the presentations by all the groups, the plenary agreed on the following additional management issues.

3.4.1 Further management issues identified

- i. Water resources in Rufiji district are a great natural resource that should be managed wisely for the benefit of the local inhabitants.
- ii. Management of water resources at village levels has not been effective due to poor managerial skills and low capacity of the elected committees. Villages should be assisted in building their capacity.
- iii. Discussions between the relevant authorities at the District, the Ministry of Agriculture and Cooperative, and Lint and Marketing Board should be initiated in view of reviving the cotton ginneries.
- iv. Villages should be encouraged to initiate village natural resource scouts to guard the natural resources within their village boundaries.
- v. Building of the Stiegler's Gorge dam should not be banned wholly, but should be viewed as a much-needed development that would improve the living conditions of the local inhabitants. However, all negative environmental impacts must be minimised.
- vi. Inadequate agricultural, forest, fisheries and wildlife extension services,
- vii. Improvement on ways and means of improving decision-making processes during policy/legislation implementation to ensure that all the relevant stakeholders who impact on the natural resource are involved.
- viii. Weakness in implementing environmental legislation at the district level.
- ix. District leadership should make studies and adequate follow-up on the DDT use in rice cultivation within the delta.
- x. Diversification of tree-crops and initiate efforts to introduce other such as oil palm.
- xi. Low levels of awareness on environmental issues.

Day 2 – 23rd November 2000

3.5 Clustering of the Management Options into Thematic Areas

In addition to identifying management issues which require to be addressed in the EMP process, the first District Stakeholders workshop had identified management options that could be employed in addressing them. However, these management options had been identified on a sectoral basis e.g. forestry and fisheries. It was recommended that there was The need to have these issues clustered into thematic areas which could then addressed in the management plan. To facilitate this process, all these management issues were numbered, as shown in Annex 5. and distributed to the 4 groups. Each group was requested to cluster the management options into 6-7 thematic areas. Each group was asked to name each of their thematic areas. The original clusters as presented by the 4 groups are provided as Annex 6.. The first group made its presentation in the plenary the other 3 groups were requested to discuss the clusters, and to compare them with their own were requested to see if there was any new



cluster that they had in their group that was not in that. The clusters were amalgamated by plenary agreement end result of this was the derivation of 7 clusters with several sub-headings. Due to time constraints it was not possible to finish discussions on the clusters. Thus, the workshop selected 3 representatives and the workshop conveners were requested to review the sub-headings and come up with a concise heading for each cluster, which was presented to the workshop the following morning.

The following were seven clusters discussed and accepted as the proposed themes/clusters areas that need to be addressed in the developing of the management plan

1. Conservation and sustainable utilisation of natural resources.
2. Economic efficiency and control of benefits by the local communities.
3. Sustainable development opportunities/activities.
4. Policy, institutional structures, and legislative aspects.
5. Capacity enhancement in environmental management.
6. Natural hazards management/preparedness.
7. Environmental education, awareness, and integration of environmental issues in public services.

Day 3 – 24th November 2000

3.6 Possible Interventions under the Various Thematic Areas

The third day of the workshop began by identifying 3 potential interventions that could be made under each of the thematic areas. Again this was carried out in group discussions, by the 4 groups. Afterwards, each group made presentations. The table below shows the interventions identified under each thematic area. Instead of presenting the proposed interventions by groups, we have summarised them under each thematic area to avoid repetitions.

Table 1: Possible interventions under each of the thematic areas

THEMATIC AREA	POSSIBLE INTERVENTIONS
<p>1. Conservation and sustainable utilisation of natural resources</p>	<ul style="list-style-type: none"> • Inventorise the current status of the natural resources in the Rufiji district, • Enhance community ownership of resources within their areas • Facilitate community to have legal power of controlling income generated from the natural resources within their areas. • Develop land use zonation for the whole district with specific zones set aside for certain uses • Pilot, encourage, and initiate appropriate technologies that save energy, • After the inventory of the natural resources has been completed, a management plan should be designed and implemented • Afforestation/Agroforestry • Promote alternative income generating activities <p>Implement well defined land use planning, zonation, Buffer zones.</p>
<p>2. Economic efficiency and control of benefits by the local communities</p>	<ul style="list-style-type: none"> • Establish/improve farmers cooperatives • Improve the infrastructure • Complete community participatory in controlling of income generated from their natural resources • Improve infrastructure to make easier way for transport and transportation. • Facilitate realisation of agriculture inputs, protection of crops from the natural resources and canning industries. • Support establishment of primary cooperative societies. • Involve community in planning implementation and evaluation of all available resources within their areas • Persuade and motivate the community in the community activities • Have economic services which includes availability of markets and infrastructure e.g. roads.
<p>3. Sustainable development opportunities/activities,</p>	<ul style="list-style-type: none"> • Identify opportunity areas of implementation • Emphasise and advertise for external and internal concerning opportunities of investment like tourism, modern agriculture and fishing. • Prohibit excessive harvest of our resources like fishing using big ships. • Improve agriculture and livestock • Availability of inputs, modern machinery and availability of good seeds and livestock • Enhanced availability of markets • Promote modern livestock keeping and agriculture • Publicize/advertise tourist attractive areas and improve infrastructure • Improve bee-keeping. • Have an inventory survey of resources to enable publicise them and use them to bring development to the people without bringing harm to it's Quantity and Quality of environment e.g. ecotourism, beekeeping.....Palm plantation cotton and horticulture. • Establishment of irrigation farming • Establishment of transport business through the river using boats • The district should have sustainable development programmes which will entice the investors to invest • Sustainable opportunities should be analysed for future utilization to bring development to the district • Deliberate efforts should be taken by the district to find other investors/stakeholders from outside the district to contribute in the sustainable development of environmental management.

THEMATIC AREA	POSSIBLE INTERVENTIONS
<p>4. Policy, institutional structures, and legislative aspects</p>	<ul style="list-style-type: none"> • Review of existing policy to reflect the current situation. All policies concerning environment should be analysed • Bottom up approach • District facilitation team • Review/agree on different laws programme coordination • Train people to understand laws. • Both policies and laws should be translated and then educate stakeholders on all present policies and laws. • Review laws/policies to make them updated • Monitoring and evaluation on implementation of available laws and policies • Important institutions within the project's area should be analysed, co-ordinated and make them participate fully in the project's area. • Coordination of policies by all stakeholders • District council to enact by laws of stabilizing of wise/sustainable use of resources and fines should be specified accordingly. • Establishment of national organization to deal with environment and have legal status. • Enacting and improvement of bylaws from villages concerning environmental management and should be adhered to the letter • Amendment of laws/policy which are obsolete or out of date • Due to the lack of magistrates ward court should be used. • There should be a communication system, which will simplify implementation and coordination between community level up to national.
<p>5. Capacity enhancement in environmental management</p>	<ul style="list-style-type: none"> • Create/strengthen awareness (community/district level) training formal/informal. • Involvement/empowerment of key stakeholders • Decision making, implementation, monitoring • Increase human resources and inputs employment –motivation e.g. salaries, housing, transport and social activity etc. • Training of environment management of the village environment committees and extension workers • Facilitation extension workers being given facilities • Facilitation of the community to enable it plan sustainable action plan • District council must ensure all facilities are being issued to the extension workers and establish nurseries at each division • The district council should issue responsibility guideline right from the village up to the district level which concerning environmental management • District council should have good ties between itself and NGO'S CBO'S on environmental management • Environmental education to be given to staff of all levels • There should be enough facilities • Development projects should not take off until environmental impact assessment has been taken. • Establish and improve environmental committees at all level i.e. village, ward and district • There should be an environmental fund • Establishment and improvement of patrol programme and communications at villagers, wards and district • There should be enough experts at the district • Facilitate the community capability in implementation of their plans • Involvement of NGO's CBO's and private sector in development of resources.

THEMATIC AREA	POSSIBLE INTERVENTIONS
<p>6. Natural hazards management/preparedness</p>	<ul style="list-style-type: none"> • Early issuing of expected hazards information • There should be enough measuring facilities for weather, case of flow and depth of water expected hazards • Have enough capacity to curb different hazards • Research: to know the drought or flood circle etc • Establishment Hazards fund at all level, ward and district • Establishment of water reservoir curbing floods and drought (Irrigation farming) • Establishment of infrastructure on means of evaluating weather thereafter early issue of information on expected hazards • Creation of strategies of decreasing effects of natural hazards • Inform people on precaution to be taken before and after the hazards has taken place. • Plant trees along Rufiji /river with other areas of the district • District leadership as well at lower level i.e. ward and village level must disseminate education of tree-planting, floods, agriculture and means of protection against vermin's and importance of enacting laws and policies. • There must be early warning of floods. The district should build a capacity of having information between itself and other departments concerning weather and TANESCO. • District should collaborate with the village and ward leaders to enacted by laws and their management to stop the available natural resources from being destructed or continue being plundered. • To have warning programmes e.g. food security for each household • Application of laws to control actions which will cause environmental restriction e.g. excessive cutting of trees and fire burning in the bush. • Environmental impact assessment should be done on all big projects to determine it from natural hazards.
<p>7. Environmental education, awareness, and integration of environmental issues in public services</p>	<ul style="list-style-type: none"> • There must be national environmental law • There should be a system of dissemination of environmental awareness all over the country • there should be program of education environmental education to the community at village, ward and district level plus education institutions • Establishment a program of distribution of flyers, Brochure, books and video cassettes concerning environmental conservation • Establishment of study tours programme • Environmental impact assessment education should be issued at all level of education system • Environmental impact assessment should be held before starting or any project • There should be a proper land use programme. • Environmental education should be introduced starting from primary education, secondary, secondary and adult education. • District council will use village government in giving environmental education • Prepare village land use plans • District council should not only enact by laws which forbids shift farming but also ensure its implementation • There should be seminars on env. education the community • Campaigns on mobilisation/sensitisation on sustainable env. conservation should be held through mass media e.g. Radio Flyers, Posters. Participatory of different public institutions in env. management. There should be seminars on env. education the community.

3.7 Developing the Potential Long-term And Operational Objective for the EMP

The facilitator prepared the participants for work on developing the main objective explaining that:-

“In every journey a person usually has expectations of accomplishing the journey. For instance, in the erection of a building, people usually start by having building plan, and then acquire relevant building materials like poles, thatching materials etc., and then embark on building the house until its completion. Thus, our main objective is to have a house built, and the final outcome is a house. In this environmental management planning, we have been looking at the stakeholder groups, the main theme areas, management options, that will somehow contribute to the EMP. Therefore it is obvious that our main aim is an EMP, but an EMP alone is not sufficient unless it is implemented. To achieve all these we require to develop a goal for the EMP, and operational objectives that will contribute to the achievement of the goal. A goal is defined as the desired end that one contributes to in order to achieve something”.

Tasks given

Developing the goal: Each group is requested to set the main goal in a logic of future vision (pictorial form) to show what you would like to see/have in the Rufiji district in 10-20 years from now.

Developing specific objectives: In the daily work routine, even if you have set a major goal you must also have specific objectives which will simplify your day to day work for the whole programme. The specific objectives must be SMART that is, Specific, Measurable, Achievable, Realistic, and Time-specific.

Again this was done in group work and the following is the main goal as proposed by the different groups.

3.7.1 Proposed main goal for the EMP

Each of the seven working groups proposed for the EMP goal. The goals are presented in the following table

GROUP	PROPOSED GOAL
1	The valley be conserved and developed to alleviate poverty to the community
2	The valley be conserved and developed to alleviate poverty to the community
3	Promotion of natural resources and improved farming systems towards enhancing social welfare of the project area
4	To promote sustainable management of natural resources of the environment and biodiversity therein through the involvement of stakeholders thus improving standards of Rufiji basin inhabitants.
5	To improve the livelihood of the inhabitants of Rufiji river valley, delta and environment through sustainable means.
6	Have good livelihood
7	To improve the livelihood of the inhabitants of Rufiji river valley, wetlands and delta through conservation and wise use of existing resources.

3.7.2 Operational objectives as proposed by the different groups.

Group 1’s Operational objectives

1. To ensure sustainable use of resources
2. To have economic efficiency which enables the community own income to remove poverty.
3. To use effectively sustainable opportunities for the development and benefits of the community and the nation
4. Have policy, laws and institutional structure which will facilitate management and promotion of resources use within the valley
5. To build enough capacity of management of al issues of environment

6. Have proper programme to alleviate and mitigate natural hazards
7. To increase dissemination of education and environmental awareness while giving services to the public.

GROUP 2's Operational objectives

1. Zonation of people of Rufiji in using of the known resources effectively in order to build sustainable economy which will enable conserve the environment and decrease hazards.
2. Quantity, quality and availability of the existing resources and recommend alternative technology of sustainable use of resources in order to have a good integration of availability and the use
3. To build sustainable chain of infrastructure to simplify distribution of inputs and its technology of crops collection and sending them to the market
4. To analyse and publicize new areas of investment to the local and external investors of Rufiji.
5. To analyse and coordinate all policies and laws which aims at the better use of resources and translate them in the simple language and translate them in the simple language for the target groups (community people).
6. To prepare programme of training of environment and their facilities to key actors.
7. To build infrastructure of evaluating development of weather change at the Rufiji valley and giving of information and periodical recommendations and results of the evaluations.
8. To give awareness education and evaluation the effects of environment before and after the project's started.

GROUP 3's Operational objectives

1. Community controls economic benefits
2. Resources conserved and used sustainably
3. Policy, institutional structures and legislative aspects in place
4. Natural hazards managed
5. Environmental management capacity built
6. Environmental education and awareness promoted
7. Environmental issues integrated in public services.

GROUP 4's Operational objectives

1. To promote conservation and sustainable use of resources through Agroforestry practices by 2002.
2. To improve economic efficiency and benefits control by committees by 2005 through establishment of farmers associations and infrastructure development and on-farm seed production.
3. Identify the existing sustainable development opportunities in rural communities.
4. To review and update the existing policies and legislations and communicate them to the target community.
5. To enhance the capacity of the community and key implementers to manage the environment
6. To create awareness on environmental issues through seminars, existing public facilities media and awareness campaign

GROUP 5's Operational objectives

1. Sustainable use of resources
2. Put economic concrete system and ownership of the income by the community
3. Put sustainable development opportunities
4. Make policies and institutional structures and law aspects issues
5. Facilitate environmental management
6. Identify natural hazards
7. Give environment and awareness education during public services.

GROUP 6's Operational objectives

1. Good management of wise use of resources from village level up to the district
2. Have good land use plans at every village
3. To educate the community to produce more to increase their income
4. Implementation of sustainable environmental programme should be concrete
5. To enact bylaws and supervise their implementation and development use of resources
6. The district should educate the communities about early warning of natural hazards and supervise on planting of trees in all areas of Rufiji
7. District council should enact bylaws and forbids shifting. Cultivation and ensure it's implementation.

GROUP 7's Operational objectives

1. Resources have been used sustainably
2. The community owns both economy and income effectively
3. Development opportunities promoted
4. Policies, laws and institutional structures formed and adhered
5. The community has the capacity to manage their environment
6. Steps taken on warning of natural hazards
7. The community has prospered through environment education and integrated issues of environment

4 Concluding Remarks

Mr. Issa Lembuya, District Commissioner – Rufiji District

In his closing speech the DC thanked the workshop participants for their perseverance up to the end of the 3-day workshop, and for their active participation during the workshop. He commended the process being used to design the environmental management plan for the district, but reiterated that this should go hand in hand with analysing the current legislative framework, to identify existing legislation and by-laws that could be useful during the implementation of the EMP. He suggested formulation of by-laws where they do not exist. Designing the overall environment management plan should not overshadow the work being carried out at the pilot villages, which is showing some very good signs of success. Rather the work that has been initiated at the pilot village levels should be strengthened, as this is the only that we can test whatever interventions are recommended at a local level.

The need to integrate conservation and development is of paramount importance, and very delicate and should be handled with great caution. Natural resources should be used sustainably to enhance the livelihoods of the inhabitants. Any unsustainable forms of utilisation should be discouraged as we would lose the natural resources base from which we obtain our requirements. Neither should conservation advocate for blanket protection of the resources, but should balance the needs for the local inhabitants and those ones of the ecosystems.

Rufiji with its rich natural resources base is a target for many development activities. However, precautions should be taken against destroying the environment by ensuring that Environment Impact Assessment (EIAs) are conducted before commissioning such projects.

5 Workshop Evaluation

For evaluation the workshop facilitator set the following question: Pick two cards of different colours: use the brown card to depict all the things that pleased you during the workshop; and green card to highlight all the unfulfilled expectations or recommendations for improvement in future. The tables below summarise the evaluation of the workshop by the participants.

5.1 What the Workshop Participants enjoyed most.

Aspect	%
Level of participatory interaction; involvement of participants at all levels; sufficient participation and involvement of local stakeholders, and good number of workshop attendees.	39
Good workshop facilitation	14
Process/methodology used in conducting the workshop; materials presentation	26
General logistics	10
Content on environmental issues – learning about conservation in Rufiji area	11
Total	100

5.2 Weaknesses/Gaps/Areas Requiring Improvement

Aspect	%
General logistics (accommodation, allowances etc.)	26
Short duration/overoptimistic workshop programme	39
Representation deficiencies especially women, local communities	9
Workshop process/methodology	6
Workshop facilitation	17
Environmental content	3
Total	100

6 Annexes

6.1 Annex 1: Workshop Participant List

Designing an Environmental Management Plan for the Rufiji District's Floodplain and the Delta: The Second Stakeholders Planning Workshop (22-24 November 2000)				
No	Name	Post/Institution	Address	Email
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65	Shaban Y. Msumi	Councillori Mwaseni	Diwani Mwaseni	
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6.2 Annex 2: The Workshop Participant's Expectations

The workshop participants' expectations can be broadly categorised into 6 broad areas as follows.

Area of expectation	% of workshop participants
General environment conservation and destruction	24
Socio-economics aspects of conservation	19
Institutional – the role of REMP and how it is being implemented	11
Strategies and planning for the natural resources in Rufiji	30
Environment and development linkages	13
Environmental awareness and education	3
Total	100

6.3 Workshop Programme

SESSION: DATE & TIME	EVENT/TOPIC	WHO BY
<i>Day 1: Tuesday 21st August 2001</i>		
4.00 - 4.30 p.m.	Tea/coffee break	ALL
10.00 – 10.30 a.m.	Tea/coffee break	ALL
1.00 – 2.00 p.m.	Lunch	ALL
4.00 – 4.30 p.m.	Tea/coffee break	ALL
		Plenary
<i>Day 3:</i>		
8.00 – 8.30 a.m.	Recap of previous day	Workshop Facilitator
8.30 – 10.30 a.m.	Development of the draft long-term and operational objectives, and assumptions	Plenary
10.30 – 11.00 a.m.	Tea/coffee break	ALL
11.00 – 1.00 p.m.	Discussions on the objectives continues	Plenary
1.00 – 2.00 p.m.	Lunch	
2.00 – 4.00 p.m.	Listing and discussions of the draft principles/guidelines for the EMP	Workshop facilitator
4.00 – 4.30 p.m.	Workshop closing	Mr. Issa Lembuya – DC, Rufiji
4.30 – 5.00 p.m.	TEA	

END OF THE WORKSHOP

6.4 Annex 4: The Stakeholder Groups Identified During the District Stakeholders Workshop Held in Utete on June 28-30

The following stakeholder groups were identified in the plenary, and recommended to be involved in the development of the development of an environmental management plan for the Rufiji district.

Local natural resources user groups

Natural resources user group	Natural resources type	Location
Fisher-folk	Fish – both shell and fin, hippopotamus, prawns, etc	Oceans, rivers, ponds and lakes
Ukindu (<i>Phoenix reclinata</i>) dealers	Leaves of <i>Phoenix reclinata</i>	Mainly in the Delta
Hunters (Hunting Association)	Wild Animals, Birds,	Delta, Floodplain, Uplands,
Timber harvesters/loggers	Trees, poles	Delta, Floodplain, Upland forests such as Kichi Hills, Ngulakula etc.
Mangrove cutters/harvesters	Mangrove poles	Delta
Carpenters	Timber	In town centres
Mining corporations	Oil and gas	Delta, and uplands at Kisangire, Songo Songo Island
Prawns dealers/buyers	Prawns	Delta
Tour operators	Tourism - wildlife	Camps/lodges located within the Selous Game Reserve
Honey harvesters	Trees for making hives,	Delta, Floodplain, Uplands
Charcoal makers/dealers	Trees – making charcoal	Widespread in the whole district
Mining workers	Stones, sand,	River Rufiji, Uplands
Farmers and cattle herders	Land, forests, water, fodder,	Delta, Floodplain, Uplands
Witch Doctors	Trees, grasses, water, honey, wild animals, birds	Delta, Floodplain, Uplands
Builders	Land soil, tree, water, stones	Delta, Floodplain, Uplands

Government Departments and institutions mandated with natural resources management responsibilities and at District, Regional and National levels

- Natural resources management departments: Agriculture and livestock, Lands, Water, Fisheries, Forestry, Game at both District and Regional levels,
- Rufiji District Council's Environment and Construction Committee (consisting of elected councillors)
- Ministry of natural resources and tourism at national level
- Ministry of Agriculture,
- Ministry of Energy (Minerals section)
- National Environmental Management Council (NEMC)
- National Land Use Planning Commission (NLUPC)
- Rufiji Basin Development Authority (RUBADA)
- River Basin Water Office (RBWO)
- Rufiji Basin Management and Smallholder Irrigation Improvement Project (RBMSIIP)
- Ministry of Finance - Planning Commission
- Tanzania Petroleum Development Corporation
- District Civil Engineering Department (Roads and bridge construction) and road improvement projects both at village and district levels.
- Ministry of Local Government and Regional Administration

Non – Governmental Organisations

- Rufidelta
- Mloka Mkongo Development Agency
- Wildlife Conservation Society of Tanzania (WCST)

Other Natural Resources Management Projects within Rufiji district and environs

- Rufiji Bee-keeping project (RUBEP)
- Mangrove Management Project (MMP)
- WWF's Coastal Forests Conservation and Wildlife Management Projects
- GTZ Selous Conservation Programme – Community Based Conservation project in Tapika and Ngarambe
- Mafia Island Marine National Park
- Tanzania Coastal Management Project (TCMP)

Business-oriented firms (from outside Rufiji district)

- African Fishing Company (AFC) – Prawn Farming in the Delta
- SONGAS (Gas mining at Songo Songo Island)
- Hotel and Tour operators
- Hunting Association
- Trawler operators and fisheries resources dealers (e.g. TANPESCA)

It was recommended that the above stakeholder groups should be involved in the management planning process. Involvement of such groups should be seen as an added advantage for they would be able to provide their expertise such as on legal and policy issues which might be lacking in the district.

6.5 Annex 5. Management Issues Identified During the District Stakeholders Workshop of June 28-30, in Utete

GROUP ONE: AGRICULTURE

Activity	AREA	MANAGEMENT ISSUES
Farming of cashew nuts trees, simsim, fruits, pumpkins, sweet potatoes, millet, rice, cassava, and banana.	Practised mainly in the floodplain (north and south of Rufiji river between Mloka to Ikwiriri). Within the Delta it is practised in Chumbi and Mbwarra.	i. Destruction of the crops by wildlife such as elephants, hippos, wild pigs, monkeys, ii. Droughts iii. Poor prices for the crop yields iv. Poor agricultural implements v. Poor market for their produce such as fruits, and vi. Floods, vii. Poor extension services, viii. Lack of modern farming implements
Coconuts, rice	Coastal Strip, Rufiji floodplain (for rice)	ix. Poor transport system (water and land) and hence limited access to markets, x. Poor commodity prices xi. Conflicts between the farmers and the mangrove resources managers over growing rice in the delta xii. Problems of village boundaries, xiii. Destruction of wetlands through clearance for rice cultivation, xiv. Environmental pollution as a result of using chemicals to kill the rice-eating crabs – use of DDT has been witnessed in the Delta, xv. Poor extension services, xvi. Lack of high yielding rice varieties encouraging opening up of virgin areas for improved production
Livestock rearing	Kilimani, Mkongo, Ikwiriri, Mohoro, Utete, Mbwera and South of Delta	xvii. Poor livestock husbandry, xviii. Poor income from livestock,
Water for domestic use, irrigation, transport	Mbunju (Segeni), Mkongo Rufiji flood plain and the delta	xix. Attacks by crocodiles (human wildlife conflicts) xx. Salt water intrusion into clean water wells xxi. Unreliable transport facilities e.g. canoes, xxii. Regular floods, xxiii. Lack of safe drinking water
Oil exploration	Rufiji River basin from Kisangire to Mtunda	xxiv. Clearing vegetation (natural and agricultural) for seismic lines, xxv. The seismic lines and the improved roads being used by poachers and loggers to transport their cargos out of the district,
Gas pipeline	Area for gas pipeline from Somanga, Mohoro, to Ndundu.	xxvi. Clearing vegetation, xxvii. Likely pipe bursts that could destroy ecosystems from gas leakages,
Salt extraction	Rufiji Delta	xxviii. Cutting down mangrove to evaporate the brine, xxix. Poor economic returns

GROUP TWO: WILDLIFE

Poaching of wildlife in the Selous Game Reserve and other open game areas	All villages around Selous Game Reserve and open areas at Mohoro Ngulakula, and Mkongo	<ul style="list-style-type: none"> i. Poaching of wildlife, ii. Widespread forest fires,
Human-wildlife conflicts	Widespread in the project area	<ul style="list-style-type: none"> iii. Insufficient game officers from the Rufiji District Council to monitor and extinguish problematic animals iv. Insufficient equipment both for the district staff and the local village inhabitants to contain the situation, v. The existing district are unmotivated to discharge their duties, vi. Extension of agricultural activities into wildlife open areas vii. Extension of wildlife reserve into farming areas viii. Traditional community systems for managing problem wildlife are broken down
Hunting	Open areas mainly in Tapika, Ngarambe, and Mloka villages	<ul style="list-style-type: none"> ix. Quotas are not based on sound wildlife population figures as there wildlife censuses conducted beforehand, x. Lack of summarised information regarding offtake each season xi. Majority of the hunters are from outside Rufiji district, and therefore majority of the local people do not benefit from the hunting activities, xii. Villagers who hunt get very low returns compared to what they might get if they could trade their quarry legally xiii. Illegal hunting for bush meat xiv. The District Game Office is under-staffed making monitoring of hunting operations difficult xv. Hunting by using illegal methods such as traps and axing animals to death, xvi. Low awareness and lack of information on natural resources management policies and legislation, xvii. The game officers sometimes do not adhere to the laid down regulations on hunting
Tourism	Mainly within Selous Game Reserve, but also limited tourism activities in villages surrounding it such as Mloka, Tapika, and also in the Delta.	<ul style="list-style-type: none"> xviii. Tourism potential in Rufiji district has not been fully exploited, xix. Limited knowledge and awareness on community-based tourism, at any level in the district. xx. Investors not willing to develop tourism activities in Rufiji district xxi. Disputes likely regarding Concessions at Lake Utunge north area. xxii. Increased pressure on areas adjacent to SGR are expected as the reserve restricts further tourism development in the park. xxiii. Oil exploration in north delta and north west corner of Rufiji District could threaten tourism/ reduce value for tourism

GROUP THREE: FORESTRY RESOURCES

Logging	Widespread in the whole Rufiji district	<ul style="list-style-type: none"> i. Destruction of wildlife habitat such as the white colobus monkeys found in the forests in the MtanzaMsona area (Zilizili forest), ii. Depletion of important timber tree species such as Pterocarpus angolensis, Milicia excelsa, Dalbergia melanoxylon etc. iii. Lack of clear boundaries of the existing forest reserves, especially the present extent of the Selous Game Reserve and neighbouring villages such as MtanzaMsona iv. The government control system is only operating at the post-harvest stage, checking licences to transport timber, when the tree is already dead. v. The majority of the village community may not know the extent or contents of the communities' lands and forests or have a sense of its value. vi. Communities feel powerless to control logging vii. Communities collaborate with pole cutters and loggers, sometimes because they are relatives. viii. Some community leaders accept emoluments from illegal loggers. ix. Communities are not aware that new forest policy allows them to enter joint management agreements with government and to have their own forest reserves. x. Opening up roads for wild animal poachers xi. Licence giving occurs at district or national level distant from the resource and without information regarding the status of the resource. xii. No community- based timber-marketing systems, which could raise local profitability from the locally harvested resource. xiii. Most of the timber is "exported" from Rufiji in a raw state (logs, planks) so little value is added or profit gained within the district. xiv. The quality of the timber products (e.g. furniture) produced is low and not achieving high prices or exclusive markets.
Wildlife and bird hunting	Mtanza Msona, Ndundunyikanza, Ngorongo	<ul style="list-style-type: none"> xv. Hunting activities have been identified as one of the root causes of the forest fires menace xvi. Hunting traps cause human injury xvii. Communities generally do not think that any bird species are under threat from their own hunting activities or from bird trapping for sale.

Honey harvesting	Ruhoi Forest reserve	xviii. xix.	Honey harvesting being carried out by non-residents of Rufiji district Legal status of bee product trading is confused.
Charcoal Burning	Ruhoi Forest reserve	xx. xxi. xxii.	Forest fires, Destruction of vegetation cover, Inefficient charcoal making processes
Expansion of agriculture activities	Utete	xxiii. xxiv. xxv.	Shifting cultivation leading to opening up of new areas, Spread of forest fires when fire is used to clear vegetation to pave way for agricultural farms, Increasing riverbank erosion
Mangrove harvesting for construction and export poles, furniture, firewood for salt-processing	Rufiji delta	xxvi. xxvii. xxviii.	Destabilisation of the river banks and shorelines, Negative impacts on the fisheries nursery grounds, Colonisation of mangrove species in degraded areas difficult due to changes in biophysical factors
Road construction by Village Transport and Transportation Project, District Roads Development Project, Selous Game Reserve, National Roads Authority (bridge over Rufiji River)	Nyamwage, Mbwara, Tawi, Mohoro, Delta, Kingupira to Utete via Kichi, Mtanza –Kisarawe	xxix. xxx. xxxi.	Clearing woodland and forest areas to pave way for the roads, for instance the Utete-Kingupira road that cuts through the Kichi Hills forests, through mangroves in the south delta. Rock quarrying danger to water source and forest cover at Nambunju/Mbwara Opening up the Rufiji district, making transport of natural resources from the woodlands/forests easier, adding to the already existing pressures on these resources,

GROUP FOUR: FISHERIES RESOURCES

ACTIVITY	AREA	PROBLEMS
Trawling	The Indian ocean shores especially at Jaja, Pombwe, and Mbwera etc.	i. Impacting negatively on the artisanal fisheries, ii. Destruction of fisheries, iii. Destruction of fisheries nursery grounds, iv. High by-catches levels v. Trawlers fish inside the limits of closeness to the coastline vi. Trawlers operate outside legal hours. vii. Trawling licences are given from the national level without consultation to lower levels regarding sites and stocks. viii. No returns to communities who should be in control of the coastal zone up to 12km offshore. ix. Communities feel powerless and get little response to their complaints to higher levels. x. District centre is distant from the coast; therefore officers seldom access the coast.
Dynamite and fish poisoning	The Indian ocean shores especially at Jaja, Pombwe, and Mbwera etc. especially in the border with Lindi region.	xi. Destruction of fisheries, xii. Environmental side-effects, xiii. Destruction of corals and non-fished species of fish, crustaceans and other species. xiv. Fisheries breeding grounds destruction xv. Risk of human injury by bombs xvi. Risk of human poisoning by chemicals.
Use of cast nets and seine nets	The Indian ocean shores especially at Jaja, Pombwe, and Mbwera etc.	xvii. Fisheries nurseries destruction
Fish poisoning (Mtuka)	Rivers (floodplain and the delta), Lakes Ruwe, Zumbi, and Lungonyi	xviii. Destruction of fisheries nurseries grounds
Use of small meshed nets, traps, and seine nets, and tanda (cloth or mosquito netting)	Rivers (floodplain and the delta), Lakes Ruwe, Zumbi, and Lungonyi	xix. Removal and killing of small juvenile fish species
Use of lead weights for fishing	Lakes and rivers	xx. Risk of poisoning fish, other fauna and humans.
Blocking river fishing method	Rivers (floodplain and the delta)	xxi. Removal and killing of small juvenile fish species
Luring of fish by noise and disturbance of the water	Rivers (floodplain and the delta)	xxii. Destruction of fisheries nurseries xxiii. Environmental destruction.

Additional Issue Identified In the Plenary

- Most of the problems affecting the natural resources management in the Rufiji district are as a result of poor communication between the various stakeholders ranging from decision-makers to resource-users, to institutions mandated with natural resources management at all levels.
- Poor environmental awareness: despite majority of the inhabitants and the Rufiji district council relying heavily on the natural resources appreciation of the many benefits and services from these

resources is quite low. This partly is to blame for the present unsustainable utilisation of the natural resources in the District.

- Poor implementation/effecting of the existing legislation and policies and formulation of new by-laws.
- Lack of information on the current status of natural resources in Rufiji district making elaboration of management systems difficult.
- The ever-changing river characteristics and flooding dynamics.
- Lack of by-laws at village level – the implication is that the licenses are bought from the district headquarters and the licensees harvest resources from some of the villages without paying any concessions to the village governments.
- Destruction of coconuts by diseases.
- The burgeoning bird collection without prior information on the present status of birds in Rufiji district.
- Increasing harvesting of *Phoenix reclinata* (Ukindu) for weaving.

6.6 Annex 6: Clustering of the Management Issues into Broad Thematic Areas

Group I

Cluster 1	Infrastructure and community services	1.21, 1.23, 1.9
Cluster 2	Natural disaster caused by weather changes	1.6, 1.20, 1.2, 1.22
Cluster 3	Agriculture equipments and inputs	1.16, 1.4, 1.8
Cluster 4	Technical experts and working facilities	1.7, 1.17, 2.3, 2.4, 3.5, 3.17, 1.15, 2.14, 4.8, 2.5, 2.17
Cluster 5	Economic and financial services	2.12, 3.12, 1.13, 2.12, 1.5, 1.10, 1.29, 1.18, 3.14, 3.18, 4.6
Cluster 6	Environmental damage and degradation	2.6, 2.13, 1.28, 2.1, 1.14, 1.13, 1.24, 3.2, 1.25, 2.15, 2.2, 3.1, 3.24, 3.21, 3.20, 3.22, 3.23, 1.27, 3.10, 3.15, 3.16, 3.31, 3.8, 1.26, 4.1, 3.7, 3.25, 3.26, 3.29, 1.1, 4.2, 3.27, 4.3, 4.4, 4.9, 4.10, 3.30, 3.28, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.18, 4.17, 4.19, 4.20, 4.21
Cluster 7	Policies, legislations and conflicts	3.4, 3.6, 3.9, 4.5, 4.7, 3.11, 3.19, 3.3, 2.23, 2.19, 2.20, 1.11, 1.12, 2.21, 1.19, 2.7, 2.8, 2.9, 2.10, 2.11, 2.16, 2.18

Group II

Cluster 1	Issues related to water resources	1.20, 1.21, 1.23, 4.8
Cluster 2	Natural disaster	1.22, 1.6, 1.2, 3.2
Cluster 3	Weakness in economic activities	1.5, 1.18, 1.17, 1.29, 2.4, 3.4, 3.7, 2.11, 3.8, 3.13, 3.14, 2.12, 4.6, 3.12, 2.20, 2.18, 1.3, 1.4, 1.5, 1.8, 1.9, 1.10, 1.7
Cluster 4	lack of awareness in natural resource ownership	2.16, 4.5, 3.11, 3.17, 2.5, 2.8, 2.19, 3.5, 4.7, 3.9, 3.6
Cluster 5	Weakness in enforcement of beekeeping and hunting laws	2.10, 3.10, 1.25, 3.31, 2.3, 2.14, 2.17, 2.9, 3.19, 3.18, 2.15, 2.13
Cluster 6	Conflict and competition between other uses of land and natural resource	1.19, 1.1, 1.11, 2.22, 1.12, 2.6, 2.7, 2.21, 3.3
Cluster 7	Environmental and its resource damage	4.20, 4.19, 4.3, 3.28, 3.30, 3.2, 1.13, 4.13, 4.12, 3.27, 1.14, 3.26, 3.24, 2.2, 4.14, 4.18, 4.17, 4.10, 4.21, 3.1, 3.25, 2.1, 4.11, 4.9, 4.4, 4.1, 4.2, 4.15, 4.16, 3.15, 1.16, 3.16, 3.22, 3.23, 2.23, 1.28, 1.27, 1.26, 1.24, 3.20

Group III

Cluster 1	Natural resources	2.7, 2.9, 2.13, 2.10, 4.1, 2.17, 2.21, 3.1, 3.2, 2.15, 4.4, 4.5, 4.9, 4.11, 4.12, 3.3, 3.4, 4.20, 4.21, 3.28, 3.27, 4.3, 4.15, 4.16, 4.17, 4.19, 3.17, 1.12, 1.19, 1.28, 2.1, 2.2, 3.11, 3.13, 3.15, 3.16, 3.18, 3.19, 3.20, 3.21, 3.26
Cluster 2	Human resources	Lack of mineral expertise in the district Lack of agriculture and livestock expertise in the district Lack natural resource expertise
Cluster 3	Community services	1.23, 1.29, 4.14, 4.18, 1.9, 3.30, 3.31, 4.6, 1.15, 1.20, 1.21, 4.7, 4.8, 4.10, 4.23, 2.4, 2.5, 2.8, 2.12, 2.16, 2.19, 3.5, 3.6, 3.7, 3.8, 3.9, 3.29
Cluster 4	Tourism	2.18, 2.20, 2.22
Cluster 5	Minerals and Energy	1.27, 1.25, 1.24, 1.26, 2.23, 3.10, 3.22,
Cluster 6	Agriculture and cooperatives	2.11, 1.8, 1.1, 1.2, 1.5, 1.6, 1.14, 1.11, 1.16, 1.3, 1.17, 1.18, 1.22, 2.6, 1.13, 3.12, 3.14, 3.25, 3.23, 3.24 Existence of agriculture diseases and pests Lack of agriculture inputs

Group IV

Cluster 1	Issues concerned with education, awareness and community services	1.23,3.5,3.9,4.18,3.6,3.17,4.14,4.13
Cluster 2	Disaster mitigation	1.22,1.6,1.2
		Problems concerned with fresh and ocean water
		Disaster mitigation plan formulation
Cluster 3	Strategies to improve small scale economic activities in the society	1.17,1.3,1.18,1.10,1.29,3.14,3.12,2.12
Cluster 4	Infrastructure and development of existing economic activities	2.20,2.18,1.21,1.9,1.5
		Non existence of sustainable timber marketing
Cluster 5	Management of sectoral integration	3.18,4.7,4.6,3.29,4.5,3.11,3.3,2.23,2.22,2.21,1.12,1.11,3.19
		Involvement of local people in decision making
		Management of balanced use of water resources
		Existence of procedure in approval of projects at the district level
Cluster 6	Ability to manage, and distribute information	2.10,2.3,2.14,3.4,4.8,3.31,2.19,2.17,2.16,2.9,1.16,1.15,1.7,1.8,1.4
		Weakness in law enforcement
		Environmental development fund
		Poor/ lack of proper technology
Cluster 7	Conservation and sustainable use of resources	1.1,1.13,1.19,1.14,1.20,2.8,1.26,1.25,1.24,1.28,2.2,1.27,2.7,2.5,2.1,2.13,2.11,3.1,2.15,3.8,3.7,3.2,3.26,4.2,4.3,4.1,4.4,3.28,3.27,3.27,3.25,3.24,3.23,4.20,4.21,4.19,3.30,4.17,4.26,4.15,4.12,3.22,4.11,3.21,4.10,4.9,3.20,3.16,3.25,3.10
		Damage done to livestock caused by wildlife and other animal diseases
		Agricultural diseases
		Environmental damage done by oil /mineral exploration
		Legislations should consider local benefits from resources.