

IUCN - The World Conservation Union

Eastern Africa Regional Programme

**LAKE JIPE
CROSS-BORDER PLANNING WORKSHOP**

*13th to 15th October, 1999
Moshi (Tanzania) and Taveta (Kenya)*

ON

**PROPOSAL FOR THE DEVELOPMENT OF MECHANISMS FOR TRANS-
BOUNDARY MANAGEMENT OF A SHARED ECOSYSTEM**

WORKSHOP REPORT

December, 1999

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SUMMARY

IUCN's Regional Programme in Eastern Africa initiated a process to address the deteriorating ecological status of Lake Jipe, its watershed and wetlands in the early 1990s. In September 1994, IUCN convened a joint workshop in Mombasa, at which the Coast Development Authority (CDA) and the Pangani Basin Water Office (PBWO) met and agreed on joint activities to manage the cross-border ecosystem of Lake Jipe. They were then commissioned (by IUCN with GEF/UNDP support) to compile assessment reports and identify management issues affecting Lake Jipe from either side of the Kenya-Tanzania border. These reports were completed in 1996.

The purpose of the Lake Jipe Cross-Border Planning Workshop on *Developing Mechanisms for a Trans-Boundary Management of a Shared Ecosystem* was to follow-up on the recommendations of the two assessment reports by CDA and PBWO. The three-day workshop, which was held between October 13th -16th in Moshi (Tanzania) and Taveta (Kenya) was attended by 22 stakeholders from different professional backgrounds and institutional affiliations from both Kenya and Tanzania - at national, district and local levels.

The objectives of the workshop were:

- to bring together various stakeholders to exchange views on management needs and priority actions,
- to acquaint the participants with the conditions of the Lake Jipe ecosystem,
- to develop a project concept and management strategy outlining the roles and responsibilities of different stakeholders,
- to develop an initial basis for a logical framework for intervention.

The assessment reports by CDA and PBWO were presented and discussed on the first day of the workshop, while the second day was dedicated to a field visit to both the Tanzanian and Kenyan sides of the Lake Jipe ecosystem. On the third day, participants reviewed the information gathered and deliberated on the best way forward in formulating a joint management plan.

The workshop formulated a vision for the Lake Jipe ecosystem which was: *“A Lake Jipe ecosystem that meets ecological and socio-economic needs in perpetuity”*.

To fulfill this vision, it was suggested that a Management Plan for the lake and its associated ecosystems should be developed and that this would be guided by the following goal: *“to jointly manage the Lake Jipe ecosystem for conservation and sustainable use”*. This became the overall goal to which a project would contribute.

The workshop participants agreed that to achieve the desired goal and vision, this cross-border management plan initiative must define its common purpose to incorporate: *“developing an integrated cross-border management system that will ensure conservation and sustainable utilisation of the Lake Jipe ecosystem”*.

Several options and objectives were envisaged within a management planning framework. These included community-focused joint programmes on conservation and sustainable utilisation of natural resources. Programmes identified included, but were not necessarily limited to: awareness creation; information generation; capacity building; action oriented research;

improving standards of living for peoples of the ecosystem and integration of interested institutions.

The workshop agreed on a joint management and implementation strategy and that should incorporate cross-border policy and management structures.

This report summarises the narrative presentations during the three-day planning workshop. The introduction gives a general overview and the rationale for holding the workshop. The report is divided according to the workshop days and sessions. There were seven sessions in total. The last section of the report presents summaries of roles and responsibilities of different organisations which were represented at the workshop.

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G.W.Howard, Report Editor

INTRODUCTION

Lake Jipe straddles the border of Kenya and Tanzania and has a complex drainage basin in both countries involving Mt Kilimanjaro and the Pare Mountains. The lake and its wetlands are of international importance as a home to a diverse fauna (including many palaeartic migrant birds, intra-African migrants and large mammals) and flora as well as providing support to many people on both sides of the international border. The Jipe catchment and lake are beset with management problems that include reduced runoff, increasing siltation, decreasing water quality, a shrinking fishery and advancing wetland plants that threaten the existence of the open waters. At the same time, the lake and its surrounds are seen as areas of potential agricultural development while the waters of the drainage basin are being investigated as sources urban supply and expansion of irrigation. The lake and its wetlands are also a major source and storage for the waters of the Pangani River - the second-most important river in Tanzania for hydropower generation, water supply and irrigation. Both Tanzania and Kenya have expressed the need for watershed management in their own countries as well as a coordinated approach to wise use of the catchment, wetlands and waters of this shared resource. This proposal outlines the characteristics of the Jipe system, describes the needs for management and suggests a programme to develop a management strategy that involves both countries.

Lake Jipe and its Wetlands

Lake Jipe is situated south-east of Mt Kilimanjaro in the Coast Province of Kenya and in the Kilimanjaro Region of Tanzania at about 3°35' South and 37°45' East. The open water area of the lake is approximately 10 km long and 3 km wide and is surrounded by varying widths of lake-edge swamps: from 2 or 3 m on some parts of the Kenyan shore to 1 or 2 km on the eastern (TZ) side. The northern end of the lake is now a vast area of swamp which extends up the incoming Lumi River and down the outflowing Ruvu River. The lake is just above 700 m a.m.s.l. and is shallow, with a depth of around 2 m. It is slightly sodic as some of its water runs off the ancient volcano of Mt Kilimanjaro; it currently has a conductivity of around 800 µS/cm. Lake Jipe is one of the few shallow freshwater lakes in the region and is second only to Lake Naivasha in animal and plant diversity in Kenya.

The vegetation of the lake and fringing swamps is dominated by bulrush (*Typha domingensis*) which grows out from the lakeshore and forms floating "islands" as well as lining the lake edges. This plant evidently thrives in the Jipe waters, despite their sodic content, as it grows to over 5 m high and is very dense. The swards of *Cyperus laevigatus* (the soda-tolerant sedge) on the landward side of the rushes and the abundance of the soda-tolerant grasses *Sporobolus spicatus* and *S. macranthus* further attest to the presence of sodium carbonate in the water and soil. While *Typha* predominates, many other wetland plants are present, especially at the northern end where the Ruvu River exits through extensive papyrus swamps.

Lake Jipe is well known for its waterbirds and is one of the few places in this part of Eastern Africa where the Lesser Jacana and the Purple Gallinule are common and where the Madagascar Squacco Heron, Black Heron, African Darter and African Skimmers are often seen. Many Palaeartic migrant waders visit these wetlands as do inter-African migrant waterbirds. The lake shares the endemic tilapia *Oreochromis jipe* with the Pangani River system and has a significant fishery based upon this species as well as a barbel fish and the sardine *Rastrineobola argentea*.

Hippopotamus are present in Lake Jipe and waterbuck occur on its margins. The southern half of the lake in Kenya is in Tsavo West National Park where it is both a watering and feeding resource for elephants, buffalos and other ungulates from the adjacent dry plains - such as zebra, giraffe, oryx and smaller antelopes and gazelles. Otters are known from the lake as are crocodiles and water monitors. The lake is important to the (wild and domestic) fauna of a wide area around it because it is a permanent source of water and green vegetation throughout the long dry seasons. There are around 50 species of submerged, emergent and floating plants in the lake and wetlands and an abundance of climbers that use the bulrushes and papyrus for support.

The Jipe Drainage Basin

Mt Kilimanjaro (5895 m) is the largest and tallest single-standing mountain in Africa with a very large volcanic cone which retains snow all year round, despite its position so near the equator (at around 3° South). There is rainfall and snow melt on the mountain in every month of the year with resultant runoff and subsurface drainage. Mt Kilimanjaro is in a generally arid area of Eastern Africa so that much of the runoff does not extend far from its slopes, especially to the north and east. Nevertheless there is surface runoff from the eastern slopes of the mountain which feeds into the Lumi River and flows to Lake Jipe in those seasons when there is sufficient local rainfall to maintain this river. The slopes of Mt Kilimanjaro are all in Tanzania while the Lumi River runs through Kenyan territory, past the town of Taveta to the lake. The Lumi is also fed by subsurface waters from Mt Kilimanjaro, some of which reach the river through springs. The quality of water from these springs is sufficiently high to provide both urban and irrigation supplies within Kenya and Tanzania and there are many irrigation canals in the area to the north of Lake Jipe. The Lumi enters Jipe through a large Typha swamp which may exceed 20 km² in area and which blends into the swamps of the Ruvu River, the exit for the lake waters.

The other main source of water for Lake Jipe is the Pare Mountains in Tanzania. These are primarily metamorphic in origin (i.e. not volcanic) and are high enough (highest point 2113 m) to have permanent streams flowing to their bases. Several such streams from the eastern side of the North Pare mountains reach Lake Jipe, either above or below ground, while others flow only during the wet seasons. Some flows probably enter the lake from the southern end of these and the South Pare Mountains, when the Kirurumo River flows to the lake through its southern swamps.

There is virtually no inflow from the western side of the lake where the Serengeti Plains (not the plains of Serengeti National Park) in Kenya's Tsavo West National Park, are arid and very flat. Several small hills near the northern part of the Kenyan shore produce occasional runoff to the lake via stream beds that are dry, red, sandy channels for most of the year.

The subsurface waters make a large, but unknown, contribution to the water balance of Lake Jipe. The lake maintains a fairly constant level throughout the year, despite the existence of a marked bimodal rainfall. This level is partly regulated by the outflow from the Ruvu River, which passes through a very extensive swampy area with almost no slope before becoming a true river near Kifaru. This swamp, which is dominated by papyrus, covers at least 35 km² and is in both Kenya and Tanzania as the river "channel" is the international border. The Ruvu then flows westwards to Nyumba ya Mungu reservoir where it joins with waters from the southern and western sides of Mt Kilimanjaro and from Mt Meru to become the Pangani River. Lake Jipe thus acts as a natural storage for the Pangani River via the Ruvu which flows all year. The Pangani is a very important river in Tanzania, both for irrigation, water supply and hydropower generation as well as for its

contribution to the productivity of the coastal area in Tanga Region - through nutrients, sediments and water to the mangroves and other marine ecosystems.

Values and Uses of the Jipe Wetlands

Hydrologically, Lake Jipe acts as a water storage organ for the Ruvu River (and so for the Pangani River as well). The swamps of the lower Lumi River act as sediment traps for the floodwaters so that some suspended material is deposited before the water reaches the lake. The (mainly papyrus) swamps of the upper Ruvu River serve another function of water "purification" in the sense that they extract salts from the Jipe outflow so that by the time the water reaches the open channel of the Ruvu near Kifaru, its conductivity has fallen to around 200 $\mu\text{S}/\text{cm}$. This "freshening" of the Ruvu water is especially important as it then mixes with the sodic waters of the Kikuletwa River in Nyumba ya Mungu dam and counteracts the alkalinity of that water for the Pangani downstream. Thus the storage in Lake Jipe, its slow release throughout the year and the removal of salts in the papyrus swamps all combine to ensure a constant supply and good quality of water for the Pangani River.

There are many uses made of the waters and wetlands of Lake Jipe - that are of both direct and indirect benefit to the people of the region. The main uses are:

- § commercial and subsistence fisheries in the lake and swamps (there were several large fishponds on the lake edge in the past),
- § transport on the lake by boat,
- § tourism on the lake and the attraction of wildlife to the lake which enhances tourism and is the reason for siting several tourist facilities nearby,
- § water supply to homesteads either directly or from wells fed by the lake water system,
- § irrigation from the lake and from the rivers and channels leading to the lake,
- § water supply for livestock (goats, sheep, cattle),
- § harvesting of both papyrus and Typha reeds for thatching, roof, fence and screen building and mat and basket making; harvesting of lake and swamp-edge palm fronds for fish traps, fences and other building materials,
- § honey production from wetland trees and riparian plants.

Tsavo West National Park has its border within the waters of Lake Jipe. This allows access for many terrestrial wildlife species to the wetlands and waters of the lake edge while providing protection for the large mammals and crocodiles that inhabit the open waters of the lake. The lake and swamps are important refuges as well as feeding and breeding grounds for local and migrant birds while providing habitats for many species of wetland plants (phytoplankton, herbs, shrubs and trees), fish, amphibians, reptiles and invertebrate animals. The lake and wetlands probably provide refuges for the wildlife of Mkomazi Game Reserve in Tanzania, which is 20 km

away to the south-east. In dry years and in dry seasons the wetlands provide not only water but also green grazing for both wildlife and domestic livestock from a wide area around the lake.

Current Problems and Management Needs

The main change in the nature of Lake Jipe and its wetlands over the last forty years has been the increase in silt loads that enter the system. This caused the lake level to rise slightly while the depth of the lake has decreased (at least at the northern end) and the edge swamps have spread into the open waters of the lake. There has probably been a slow increase in alkalinity or sodic content of the waters as evidenced by the virtual disappearance of water lilies from the lake. Lake Jipe was renowned in East Africa for being the best place to see Pygmy Geese, a species of wetland bird that favours areas with water lilies. Photos of the lake surface and swamps from the late 1970s show water lilies among the Typha swamps - but these seem to have disappeared, together with the Pygmy Geese - probably due to increasing conductivity of the Jipe waters.

District and development authorities and residents on both sides of the international border are worried about these trends and attribute them to increasing erosion in the watershed of the Lake and consequent siltation of the wetlands. There is no doubt that the open waters have decreased in area by almost half over the last forty years as the Typha swamps move with the rising silt deposits towards the centre of the lake. The proliferation of reeds all around the lake edges may also be caused by the rise in conductivity as other wetland plants (such as water lilies) are forced out and Typha predominates. This spread of reeds into the lake is now regarded as a serious problem of weed infestation as it not only reduces the amount of open water but prevents access to the waters for fishing and transport and reduces the options for fishing.

The high levels of erosion and silt transport are partly due to the steep nature of most of the drainage basin of Jipe as well as to the preponderance of heavy rain showers on the upper slopes. Deforestation is probably affecting this process on the upper parts of both Mt Kilimanjaro and the Pare Mountains. Increased grazing pressure may also contribute to this siltation, especially on the lower and sandier slopes. There is also a suggestion that road and railway construction and the harvesting of stone and soil in the catchment has affected the surface flows so that they now carry more silt. Thus while the erosion of soils in the Jipe drainage basin and the siltation and shallowing of the lake are natural processes, they are being hastened by human activity. The flow of water from the upper catchment on Mt Kilimanjaro and the Pare Mountains has also been decreased in the last decades as more and more water is diverted from the permanent streams - for homestead and village water supply and irrigation.

There is therefore need to modify this human activity by integrated management of both the watershed and the wetlands of Lake Jipe. Several management options exist for reducing deforestation, grazing pressure, erosion and siltation as well as for monitoring and managing water quality and quantity. But at present the problems stretch from one side of the international boundary to the other (and back again!) and so will need cross-border coordination and joint planning.

Prospects and Progress for Cross-border Management

In Kenya the Coast Development Authority (CDA) has the mandate to coordinate and plan developments in Coast Province which includes the drainage basin and waters of Lake Jipe. Together with the District of Taita Taveta, CDA held a workshop in April, 1993, to discuss the issues of Lake Jipe and the needs for management of the watershed and the wetlands. Many of the issues above were mentioned and it was resolved that CDA should work towards a comprehensive management and development plan for the watershed on the Kenyan side of the border as well as looking into ways of managing the specific problems of the lake. CDA felt that there should be cooperation with authorities with similar mandates for management of the Jipe watershed and wetlands in Tanzania.

In Tanzania the Pangani Basin Water Board (PBWB) has the mandate to manage the waters of the Pangani River Basin from the uppermost parts of the watershed to the ocean. The Water Board works through its Pangani Basin Water Office (located in Hale, Tanga Region) to control and manage the waters of the basin and to regulate their uses. PBWB has recently been concerned about the watershed and water balance of Lake Jipe and its contributions to the greater Pangani system.

In September, 1994, CDA and PBWB met at CDA's headquarters in Mombasa, Kenya to discuss common interests and possible ways of working together to develop a coordinated management system for the watershed, wetlands and open waters of Lake Jipe. During 1996 both CDA and PBWB finalised summary assessments of management needs for the Jipe catchment and wetlands and are preparing reports on the information needed for a future water budget. This exercise was coordinated by the IUCN Wetlands Programme in Eastern Africa and funded by the GEF project on Biodiversity Conservation in East Africa. The intention is to bring the two agencies together soon to discuss their findings and then to make plans for national and joint activities for the better management of the Jipe system. Thus the present workshop was planned to accommodate stakeholders and their views from both sides of the border. It was prepared by IUCN with assistance from the East African Wild Life Society and funded by the Netherlands Government through the Ministry of Agriculture, Fisheries and Nature management in Nairobi, Kenya and through IUCN's Wetlands Programme.

THE LAKE JIPE ECOSYSTEM WORKSHOP

Aim of the Workshop

- To formulate a proposal for the development of mechanisms for trans-boundary management of the shared Lake Jipe ecosystem.

Objectives of the Workshop

1. Bring together the two countries of the Lake Jipe ecosystem.
2. Consult with major stakeholders, including farmers and fisherfolk.
3. Share experiences and develop a mutual understanding of the benefits and opportunities.
4. Underscore the importance of Lake Jipe to the surrounding human population.
5. Discuss findings of assessment reports on management needs.
6. Design a plan for national and joint management activities.

Outcome of the Workshop

The workshop process brought together people from both countries to participate in building mutual trust, understanding and consensus to recognise issues that are of common interest. Through workshop deliberations, an **agreement** was reached to develop comprehensive strategies for the management of Lake Jipe as a shared ecosystem. The workshop identified a set of activities and priorities for a trans-boundary management.

WORKSHOP PROCEEDINGS

DAY 1: EXCHANGE OF VIEWS ON MANAGEMENT NEEDS AND PRIORITY ACTIONS

The first day of the workshop was for exchange of views on management needs and priority actions between the regional management authorities, district officers and relevant NGOs.

Most participants who had arrived the day before at the Lutheran Hostel in Moshi, the venue of the first day of the workshop, began registration at 8:30 a.m. This process was guided by Edith Mbigi of IUCN. (see **Appendix 2**)

1. INTRODUCTIONS

1.1. Self-Introductions

Registration was followed by self-introductions during which participants gave their name, institutional affiliation and position held in their respective institutions.

1.2. Opening Speech

The Regional Administrative Secretary of Kilimanjaro Region (or his deputy) was expected to make an official opening speech on behalf of the Government of Tanzania. Since the appropriate official was not present at the start of the meeting, the workshop programme continued in the hope there would be a 'later official opening'.

Next, it was an opportunity for the NGO partners, IUCN and EAWLS, who were the workshop co-organisers, to give the background of the workshop.

1.2.1. The World Conservation Union - IUCN:

Geoffrey Howard, the Wetlands Programme Coordinator for the IUCN Eastern Africa Regional Programme gave the background of the workshop. He said that it is IUCN's unique way of working across borders and bringing together various stakeholders in forums such as this that demonstrates the organisation's strength as a Conservation Union. Because of its regional spread, IUCN found itself best placed to marshal support of both Tanzania and Kenya to address the environmental challenges facing Lake Jipe.

According to Dr. Howard, in 1992, IUCN recognised the value of Lake Jipe, (including its wetlands and the watershed) as an ecosystem of international importance. Lake Jipe was unique because of its geographical location, biodiversity, endemism, catchment drainage characteristics, agricultural potential, importance to livestock and wildlife, and as a reservoir of the Pangani River through the River Ruvu. In spite of this importance, the entire ecosystem had been changing and deteriorating, posing a significant threat to sustainable exploitation of its values and products. And Lake Jipe being an ecosystem straddling two countries, Kenya and Tanzania, the major challenge became: "How do we formulate a plan to manage a cross-border resource?"

In 1994, IUCN organised a cross-border forum for the two principal management authorities - each on either side of the border - concerned with Lake Jipe ecosystem. Coast Development Authority (CDA) and the Pangani Basin Water Office (PBWO) were statutory institutions involved with Lake Jipe and its catchment on behalf of their respective governments. Here in Mombasa in September 1994, it was agreed that each institution should carry out an assessment study of the values and functions of Lake Jipe, its watershed and wetlands. These studies were completed in 1996.

In an attempt to answer the cardinal question: "How do we manage a cross-border resource?", IUCN secured part funding from the Royal Netherlands Embassy, Nairobi, to conduct a cross-border workshop in Moshi and Taveta (the remainder of the funding came from IUCN's resources). This present workshop was to deliberate and formulate a

project outline for developing a more comprehensive Project Proposal for a possible management plan for Lake Jipe, including its watershed and wetlands.

Participants to this workshop have been drawn from government and wetlands institutions operating within the two countries. Government and institutional representatives at the workshop have come from PBWO, CDA, district administration authorities of Mwanga and Taveta districts, fisheries departments, Community Development Trust Fund (CDTF), East African Wild Life Society (EAWLS), UNDP/GEF East African Cross-border Biodiversity Project, Kenya Wildlife Service (KWS), Kenyan National Environment Secretariat (NES), Tanzanian National Environment Management Council (NEMC), and IUCN.

1.2.2. East African Wild Life Society - EAWLS

Hadley Becha, the Acting Executive Director, gave a general overview of the structure of the EAWLS, spelling out its regional framework for the three East African Countries, whose three presidents of Kenya, Tanzania and Uganda are co-patrons of the Society.

The EAWLS's mission includes species conservation, forestry initiatives, wetlands and marine programmes, and conservation education. The Society has field offices in Wundanyi (Taita Hills) covering forest conservation activities of the Eastern Arc Mountains forests, of which North Pare and South Pare mountains are the southern watersheds of Lake Jipe. Lake Jipe too falls within this area and description.

The Society has interests in Lake Jipe because of its regional constituency, and the need to work on community conservation through mediation and advocacy. The Society's prime example of working with communities was its consultative process on the Tana Delta controversy in Kenya. Becha said that the Society's Tana Delta conservation education, awareness and community mobilisation programmes will be unique experiences to draw from for the Lake Jipe management planning process.

Though the Society became involved in the Lake Jipe initiative because of its various programmes, it would also like to see an ecosystem management approach, which will take into account the human dimension. In order to achieve this goal, the Society would undertake to encourage consultation with identified target groups and stakeholders, initiate dialogue and promote mediation towards developing a bankable management process. It is the hope of the Society that through this workshop, the partners in the entire process will build capacities for formulating an integrated Management Plan of the Lake Jipe Ecosystem.

2. PRESENTATION OF ASSESSMENT REPORTS

2.1 Coast Development Authority

by Dr. B. J. Mwandotto & Musyoki Muthuka.

Lake Jipe, which is in Taveta Sub-district of Voi District is within Coast Province. It falls under the jurisdiction of Coast Development Authority. CDA compiled an assessment report on management needs of Lake Jipe, which was presented at the workshop.

The Management Needs Assessment Report described the topography, drainage and catchment characteristics of the watershed, wetlands and open waters of Lake Jipe on the Kenyan side. In addition, it highlighted water balance issues which include abstraction for irrigation, water in-flow, the system's storage capacity and out-flow from the system. Other highlights in the report include socio-economic issues, land-use patterns and threats, biodiversity and water abstraction.

The Report described Lake Jipe catchment basin on the Kenyan side as facing innumerable challenges from continuous development of irrigation schemes, and mining of sand and stone. Some of the factors threatening the ecological integrity of Lake Jipe, according to the Report, include establishment of new settlement schemes, upstream water abstraction for irrigation and domestic use. Already there were 21 water supply schemes, and agriculture is expanding at a very fast rate. Additional human needs had stimulated deforestation, which together with over-grazing, were causing soil erosion, eutrophication and poisoning of the Lake Jipe ecosystem.

The immediate impact of these activities on the ecosystem included the depletion of a once flourishing fishing industry in the 1970s. Several management needs for Jipe catchment were described in the CDA report in response to problems and challenges identified above, which included resource use conflicts and human-wildlife conflicts. However, to address these problems, a *cause-effect analysis* needed to be carried out for the entire catchment basin on both sides of the international border.

The Report also recognised that there would be problems resolving issues raised above where there were inter-sectoral policy conflicts, especially with regard to the land tenure system. However, it was hoped that the newly founded East African Cooperation would become facilitative and supportive on cross-border issues, such as the conservation and development of Lake Jipe.

2.2 Pangani Basin Water Office

by S. M. Kamugisha

The set-up of PBWO, in terms of mandate and focus, is different from that of CDA. Whereas CDA is an authority concerned with development issues, PBWO, which was established in 1991, is mainly concerned with water resources allocation and management for the entire Pangani Basin in Tanzania.

PBWO's preparation of the assessment report on the *Management Needs for the Watershed, Wetlands and Open Waters of Lake Jipe in Tanzania* followed a resolution made in Mombasa on September 7, 1994, which said in part:

“... Pangani Basin Water Office and Coast Development Authority have resolved to compile existing information on hydrology, biodiversity, and human use of Lake Jipe wetlands and watersheds, and to jointly develop a programme of action for future management of the area”.

It was in response to this resolution that PBWO made its assessment report. The report described the Lake Jipe catchment, its water resources, land-use patterns, conflicts, wetland biodiversity and existing development projects. It proposed new programmes and provided a basis for cross-border collaboration and cooperation. The report recommended the following elements for the cross-border collaboration and cooperation: establishing frameworks for cooperation; exchanging information; building a data-base for catchment conditions on hydrology, hydrogeology, water quality, meteorology, and ecology; formulating and implementing an international legal framework on management of a shared ecosystem. However, to do this, Tanzania and Kenya must first draw-up an agreement or a Memorandum of Understanding on how to manage the shared ecosystem.

During the writing of its report, PBWO carried out a stakeholder analysis to complement the management needs assessment regarding development programmes in the Pangani catchment. The analysis concluded that human activities, especially agriculture, had more negative impact on the Lake Jipe's ecosystem.

2.3 Discussion on Presentations

Discussions were held after each presentation, where several issues were raised, some of which were responded to by the presenters. During the discussions, cards and felt-pens were distributed to participants to write their reactions, which were then posted on the flip-chart board for classification.

Issues raised on the cards included institutional arrangements and need to strengthen capacities of the local resource users. They suggested development of alternative resource uses (such as promotion of eco-tourism) and identification of alternative sources of income, building of a research base for the Lake Jipe natural resource inventory.

Common problems affecting both sides of the border in terms of resource utilisation due to policy conflict were recognised. An example of such conflicting policy, which needed harmonisation across the border, was fishing regulations.

Generally, identification of conservation and management issues revealed specific management gaps which needed to be addressed if the Lake Jipe ecosystem were to maintain its desired ecological integrity. Filling these gaps would entail:

- Evolving possible mechanisms for cross-border co-ordination and joint management;
- Identifying management and development needs for Lake Jipe's watershed, wetlands and open water;
- Identifying a set of acceptable activities and priorities for future actions and plans.

It was emphasised that the roles and responsibilities of specific management authorities from either side of the border needed to be identified. This could be accomplished through a stakeholder consultation process initiated by IUCN and its NGO collaborating partners.

After this plenary session, every effort was made to address these concerns - in Moshi, during the excursion, and on the third day in Taveta. All these concerns were explored in more detail through small group discussions and plenary sessions. In the end, the basis for a Project Proposal was firmly established as this report has shown.

2.4 Categorisation of Issues

Management issues identified during the plenary session were pooled into five categories. These included:

1. Research
2. Management
3. Policy
4. Coordination
5. Socio-economics.

2.5 Presentation of Group Reports

In the third session, participants were divided into syndicate groups to define and refine elements in each category of the management issues listed above. The reports were presented by group rapporteurs:

1. Research:

The 'Research Group' made the following observations:

- a) that because of little, sporadic and uncoordinated research efforts on Lake Jipe, a serious information gap has emerged. As a result, different people hold different views on almost all issues, which science could easily verify;

- b) that efforts of CDA and the PBWO (through IUCN's support) in compiling background information about Lake Jipe on various aspects, was the first major step towards bridging the existing information gap;
- c) that lack of adequate baseline data was a major constraint in any management decision-making processes.

Therefore, essential research areas for baseline information were identified as **hydrology** and **biodiversity** of the Lake Jipe ecosystem.

A. Hydrology of Lake Jipe

Because of the inadequate hydrological information on Lake Jipe, the group recommended that it was necessary to:

- initiate water-balance studies to determine the water quantity (inflows, outflows and retention) and hence build a water-use budget;
- carry out a physico-chemical analysis of water quality to determine its suitability for domestic, livestock, wildlife, agricultural, and/or industrial use;
- estimate rates of sedimentation in the lake and inlet rivers;
- build up data on rainfall, evaporation and evapo-transpiration rates.

B. Biodiversity of Lake Jipe

In terms of Biodiversity, it became evident that lack of sufficient information on Lake Jipe was responsible for the poor understanding of:

- its ecosystem diversity and dynamics, including the surrounding aquatic environment, its wetlands, drylands and forests;
- species diversity and dynamics of the associated flora and fauna, especially wildlife;
- the impact of all invasive and/or introduced species into the ecosystem.

Therefore, it was resolved that biodiversity research initiatives needed to be carried out to fill-in information gaps and create data-bases.

2. Management Issues

The group discussing management issues suggested that:

- a) the initial management area for Lake Jipe and its wetlands must first be delineated and defined within physical boundaries such as perimeter roads. Ideally, delineation may start with a small manageable area around the lake itself. However, in future, and as more resources become available, delineation could be expanded to include upstream ecosystems along the inlet rivers of the watershed.
- b) the capacity-building efforts for the local people living within and outside the catchment area should be strengthened in order to achieve a high and quick turn-over of response within the implementation of the management plan. Such capacities could be built through:
 - formal training such as seminars and workshops for leaders;

- informal training forums such as public meetings, barazas and newsmidia. Functional literacy approach could be employed to enhance communication.
- c) target communities and stakeholders must be involved in the entire management planning process to ensure a participatory approach.
- d) a masterplan for an integrated natural resource and environmental management process should be developed.
- e) management plans of all the different stakeholders should be integrated and harmonised to ensure sustainable use of resources by the different communities. Implementation of such an integrated management plan would take into account cultural and traditional practices of host communities.
- f) adequate control, monitoring and regulatory mechanisms for upstream abstractions from surface springs and groundwater must be put in place to ensure a sustainable flow of water into the lake.
- g) alternatives to total dependence on wetland products should be considered, especially where the project's activities would affect the livelihood or income-generation capacities of community members.

3. Policy

The group deliberating on policy issues said there was an urgent need to develop a Regional Policy on Shared Natural Resources. Perhaps this could be effected through the East African Co-operation agreements. Initiation of such a Regional Policy might call for formation of a co-ordination body to oversee sustainable utilisation of shared resources.

A three-tier structure was proposed for such a coordination mechanism:

- a) The first tier, at the top of the hierarchy, would be the umbrella Regional Co-ordination Body with representation from IUCN, EAWLS, and representatives of national conservation bodies, such as Kenya Wildlife Service (in the case of Kenya). Any other members, including funding agencies, would be co-opted as observers or advisers, and such members would hold no voting rights.
- b) The second tier of the hierarchy would constitute individual National Co-ordination bodies, one for Kenya and the other for Tanzania, perhaps under the aegis of NES and NEMC respectively. These national co-ordination bodies would be concerned with specific individual national policies in their individual advisory and coordination capacities. However, liaison between the two national coordinating bodies would be advisable, especially if certain elements in their policies need consultation and harmonisation. Very important, though, for this particular tier, was the recommendation that each national co-ordinating body should develop and institutionalise a monitoring and evaluation mechanism, to assist in their co-ordination and advisory roles.
- c) The third tier would involve establishment of separate district-based implementation mechanisms for Taita-Tavetta District in Kenya, Rombo and Mwanga districts in Tanzania. These mechanisms would manage and supervise management programmes

during project implementation and, therefore, should incorporate participation of relevant government departments. It would be useful if these mechanisms incorporated NGOs implementing project activities in the catchment within individual districts.

Other candidates for consideration to be incorporated into the third tier would include community-based organisations, representation through business associations and researchers. Provision should also be made for participation of co-opted members whose expertise was deemed necessary.

It might also be important to ensure that NGOs represented at the regional co-ordination bodies were also represented in the district implementation mechanisms as co-opted members. Such a provision would facilitate vertical and horizontal feedback processes for the entire Ecosystem Management at both the regional and grassroots levels.

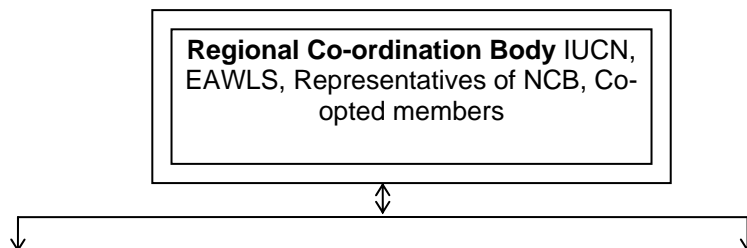
4. Coordination

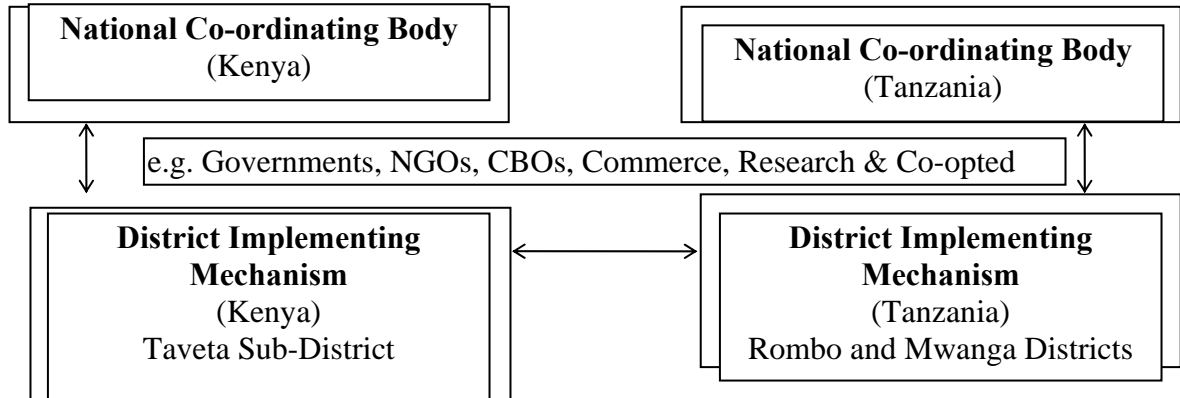
Coordination of management activities would largely depend on the institution of harmonised cross-border policies. Therefore, all planning processes must ensure proper co-ordination and implementation of a Management Plan for a shared ecosystem. However, in fulfilling this, several assumptions must be made:

- that the East African Co-operation Secretariat focal point on environment can be used;
- that goodwill meetings at district level in the two countries would continue with what has already started at this workshop;
- that the instituted policies would allow co-ordination;
- that resources to support co-ordination initiatives would become available.

Below is a proposed structure of cross-border mechanisms for ecosystem management process across the international border for Lake Jipe.

PROPOSED STRUCTURE





These coordinating bodies should review and harmonise national sectoral policies to minimise potential resource management conflicts within the Lake Jipe basin. Such co-ordination mechanisms would help establish data collection and exchange of information.

5. Socio-Economics

Issues on Lake Jipe basin that could constitute socio-economic studies included:

- collection and analysis of demographic data;
- determination of resource uses and users (ownership, access and benefits);
- differentiation of commercial activities from subsistence activities;
- evaluation of living standards, especially poverty levels as determined by income, education or health;
- an assessment of attitudes, perceptions and awareness on environmental issues;
- evaluation of existing national and cross-border resource uses and conflict resolution mechanisms.

3. AN OVERVIEW OF VEGETATION TYPES IN LAKE JIPE

For the benefit of participants who were not familiar with vegetation characteristics of shallow tropical freshwater systems, Dr. Howard presented a general overview of vegetation types and plant dynamics within such ecosystems. Shallow tropical freshwater ecosystems are often characterised by aquatic plants, some of which are floating while others are submerged and some emergent.

Floating plants included Kariba Weed (*Salvinia molesta*), Water Hyacinth (*Eichhornia crassipes*), Nile cabbage or water lettuce (*Pistia stratiotes*), Water Lily (*Nymphaea spp.*) and Duck Weed (e.g. *Lemna*, *Wolffia* and *Spirodela*). Reeds and bulrushes are usually anchored in the soil or substrate beneath the water surface with their stems and leaves emergent. Papyrus reeds (*Cyperus papyrus*), though anchored on the shore, often extends rhizomatous roots into the open water upon which new shoots (culms) and mature inflorescence grow. In shallow edges, Water Hyacinth and Water Lily roots may anchor in the substrate, while their leaves float on the water surface.

Dr. Howard recalled that Lake Jipe was once renowned for its floating water plants, especially the Water Lily (*Nymphaea caerulea*), which has since disappeared, perhaps due to the changing water

chemistry and lake ecology. The current dominant vegetation type is the Bulrush - *Typha domingensis*. The *T. domingensis* predominates on the lake edges and floating islands in the open waters, including the swamp in the upper reaches of the Ruvu River. However, as one goes downstream the Ruvu towards Kifaru bridge, domination of *Typha* diminishes as papyrus becomes predominant.

Sampling the open water of Lake Jipe has shown conductivity at above 800 $\mu\text{S}/\text{cm}$. Conductivity downstream in the Ruvu River has been determined at 200 $\mu\text{S}/\text{cm}$ towards Kifaru. This decreasing conductivity gradient downstream from the lake corresponds closely to the vegetation transition where the predominance of the *Typha* reeds diminishes as the papyrus takes over.

It could therefore be inferred that *Typha* is more tolerant to high conductivity (dissolved salts), compared to papyrus and, therefore, these wetland plants are important for water purification, which reduces the conductivity of the water by taking up the dissolved sodium chloride, sodium carbonate and other dissolved salts. Research is yet to determine the exact reasons for the disappearance of the Water Lily but this is likely to be related to increasing conductivity or salinisation of the lake waters.

A distinction needs to be made between "weeds" and "water plants". Weeds are those plants that have become a nuisance to man or the environment. Sometimes they are introduced, sometimes they are natives. In the case of Lake Jipe the most weedy species is *Typha domingensis* which is a native species that has become a problem due to changing conditions in the lake. The introduced water lettuce or Nile cabbage is present in small quantities but has not become a weed. Water hyacinth, the famous water weed of Lake Victoria, present in the lower reaches of the Pangani River, has not been recorded in Lake Jipe.

4. BRIEFING ON THE FIELD TRIP PROGRAMME FOR DAY 2

After giving the general overview of the wetland vegetation types and characteristics, Dr. Howard gave a briefing on the all-day excursion for the next day. He said, several stops would be made to expose the group to the different aspects of the Lake Jipe ecosystem. Participants would:

- visit the Ruvu River hydromet station at the Kifaru bridge (outflow of Lake Jipe);
- be shown the extent of the Ruvu River swamp from a vantage point;
- see some of the inflowing streams from the Pare catchment to the lake;
- visit the lake edge to observe wetland animals and plants - inside and outside of protected areas
- meet local communities living by and around the lake;
- where possible, meet NGO stakeholders operating within the Lake Jipe catchment;
- discuss wetland attributes, values, functions and products.

Summary of the Day's Deliberations

The facilitator summarised the day's deliberations by first thanking the participants for their active participation and endurance in giving the joint planning process a kick-start. By mixing individual contributions through small group and plenary discussions, every participant had an opportunity in one way or the other to contribute to the workshop deliberations.

Constitution and composition of syndicate groups was deliberate to create a mix for good and balanced synergy. At least in every group there was a Kenyan, a Tanzanian, an administrator, a hydrologist, and a social scientist or generalist. Such mix created good dynamics for joint activities, which was the essence of this planning workshop process.

Day One's sessions ended well after the scheduled time of 1700 hours.

DAY 2: VISIT TO THE LAKE JIPE ECOSYSTEM

The second day of the workshop was scheduled to acquaint the participants with the conditions of the catchment, wetlands and the lake ecosystem on either side of the border.

The journey began at 8:30 a.m. in a convoy of six vehicles. The **first** stop was at Kifaru hydromet station, where the Moshi-Tanga road crosses the Ruvu River. Here, participants saw evidence that Ruvu River could flood and overflow the bridge (4 meters above regular flow) and noted the hydro-station and the clarity of the outflowing water - probably "purified" by passage through the Ruvu swamp.

The **second** stop was at a vantage point near a quarrying activity. Participants were shown the expanse of the Ruvu River swamp, and the predominance of papyrus vegetation. Waterbirds and a mix of wetland vegetation were observed and discussions centred around wetland biodiversity and access to the waters and wetlands.

The **third** stop was at the edge of the swamp where traditional bee-hives were hung on the Yellow Acacia, *Acacia xanthophloea*. *Typha* and papyrus vegetation dominated the swamp area at this point, and mudflats on the edges had several other plant species as well as waterbird species such as the Night Heron (*Nycticorax nycticorax*), Squacco Heron (*Ardeola ralloides*), Intermediate Egret (*Egretta intermedia*) and Black Egret (*Egretta ardesiaca*). Instructive at this point, though, was the obvious wetland vegetation transition: as one moved towards the open waters of Lake Jipe upstream along the swampy Ruvu River, *Cyperus papyrus* predominance faded into the bulrushes and other salinity-tolerant reed (sedge) species.

Participants visited the lake edge covered by *Typha* reeds at the **fourth** stop near the Jipe Village on the Tanzanian side. They held useful discussions with the local community.

A. Summary of Discussion with the Community at the Jipe Village

An account from the village community revealed that Jipe village was famous during the 1970s for its fishery. Most fisherfolk in the village were migrants from Malawi, who came to the area before Tanzania's independence in 1961. Fish from the village were sold in places as far away as Tanga and Dar-es-Salaam. The fishery boomed during floods and the industry sustained a buoyant local economy. Today, all that success has been left for history books.

A water plant, *Typha domingensis*, became a weed and too invasive to control. The open water surface, which up to ten years ago used to provide good fishery, became blocked or clogged by permanent weeds or drifting *Typha* islands. As a result, active commercial fishery (including fish

trade) died, a situation which triggered mass exodus of fisherfolk from the village to Nyumba ya Mungu Dam.

Those who stayed back in the village ventured into agriculture and livestock keeping. Agricultural crops in this low potential area include maize, cotton, groundnuts, beans and peas - mainly for subsistence. The 150 families resident in the village did not produce enough for food for sale. However, the village community was convinced that through irrigation they would produce surplus food for sale. And because they already have good access roads, reaching market destinations for their produce would be easy. Women of Jipe village, apart from involvement in subsistence agriculture, were mainly engaged in pot-making for sale, while men specialised in roof thatching using the *Typha* reeds.

The **fifth** stop was at MIFIPRO (Mixed Farming Improvement Project) Trust Fund. MIFIPRO Trust Fund evolved from an earlier project which was jointly supported by the Community Development Trust Fund (CDTF), COOPIBO (a Belgian NGO) and Mwanga District Council. Here, the Community Development Officer, Ms Veneranda Sichore, gave the background history of the organisation and plans to the year 2000 and beyond. Ms Sichore noted that although all MIFIPRO's activities were pegged to donor funding, elements of sustainability had already been built within individuals in the project areas. The project is currently being supported by the Netherlands Organisation for International Development Cooperation (NOVIB).

Driving around the southern end of the lake, especially along the eastern edge of the North Pare Mountains, participants saw evidence of intensive irrigated agricultural activities. These were areas where MIFIPRO focused its advisory role.

Sixth stop was at the border crossing point between Kenya and Tanzania. A landmark beacon erected almost a century ago symbolised the separation of the two countries. Participants also saw a straight border patrol road, which has since ceased being used or maintained. The group was then in Tsavo West National Park.

Seventh stop was at the lake edge inside the Tsavo West National Park where one could see the extent of the open water of Lake Jipe. There was evidence of animal activity, especially elephants and buffalo which came to bathe, feed and drink. A variety of water birds was evident here and on and over the lake.

Eighth stop was at the ranger's camp by the entrance into the Tsavo West National Park. Picnic lunch was served, and it was interesting to see participants mingle with one another to discuss issues affecting management options for Lake Jipe as a shared ecosystem. Elephants came close by and a range of water birds was in evidence at the camping site.

The **ninth** stop was at Kachoro Village, Jipe Location, Taveta, where the local administration had organised the village community to meet workshop participants. Participants introduced themselves before engaging in discussions on Lake Jipe with members of the community.

B. Summary of Discussions with the Community at the Kachoro Village

This meeting, somehow, turned into a "Complaints Forum", as the community was under the impression that the workshop group was there to listen and solve their problems concerning exploitation of Lake Jipe resources. Nevertheless, the interaction was fruitful, and in fact, the

workshop group resolved that the joint Management Plan, which is being considered, should address the issues raised by the community.

Leading the community in the discussion was Mzee Samson Madagaa, who settled in the village in 1961. Highlights of the issues raised during the Kachoro Village community meeting with the workshop participants included:

Typha:

- Lake Jipe was infested with *Typha sp.* (called **Mkuruvira** in the local language) which was said to have been introduced by a local sisal farmer (Mr Grogan) before it became invasive and spread along the riverbanks, river mouths and shallow lake edges. Today, most of the areas that used to be open water of the lake is covered with weed.
- *Typha* does not have economic or commercial value to the local residents, and even houses thatched using *Typha* were not durable.
- Floating *Typha* islands were thought to be due to elephants uprooting anchored *Typha* beds. These floating islands were said to harbour dangerous water snakes and hide-outs for hippos and crocodiles - a menace to the fisherfolk.

Fishing:

- Though still the main source of income for most local residents, the *Typha* reed infestation was a major hindrance to the fisherfolk. The wind shifted floating *Typha* islands, and it was impossible to safely cast fishing nets. Therefore, fisherfolk could no longer engage in profitable commercial fishery, thus limiting their only source of income.
- Other factors which were said to have harmed the fishery since 1972 included soil erosion, siltation, sedimentation and eutrophication from agricultural activities and overgrazing. These factors were also thought to be responsible for the changing water quality which included its increasing salinity.

Farming:

- Most villagers were squatters. Though the area is marginal, in good years subsistence food crops could be harvested if not raided and destroyed by wildlife. Human-wildlife conflict was a major issue, especially against elephants and hippos which were a menace to crops and humans. Several human deaths in the area were attributed to elephants, crocodiles and hippos. There were complaints that little assistance came from the KWS rangers, and if it came at all, it was invariably late and insufficient. The local KWS rangers disagreed with this assertion.

Other complaints included fishing restriction from the lake area within the Tsavo West National Park. The participants also supported the need to train the local community in fish-farming. This could be one of the researchable issues to be incorporated in the Management plan process.

The **tenth** stop was at the Taveta and Holili border crossing to formalise immigration requirements of exit from Tanzania and entry into Kenya. The **last** stop was at the Chala Lodge for accommodation.

DAY 3: DEVELOPMENT OF MANAGEMENT PLAN FRAMEWORK

Day Three of the workshop was dedicated to the development of an intervention strategy for the Lake Jipe ecosystem including a management plan strategy involving stakeholders, their roles and possible responsibilities. The initial basis for a logical framework for a project to manage that intervention was also developed.

Recap of the Workshop Proceedings

The meeting started at 9 a.m., with Geoffrey Howard giving opening remarks regarding the previous day's experience of cross-border excursion with participation from both Kenya and Tanzania. This was the first time that all concerned had seen both sides of the ecosystem and IUCN was very pleased that it was able to facilitate this overview.

The facilitator, Henry Ndede, gave an overview and recap of the workshop's outcome during the first two days: on Wednesday, October 13 and Thursday October 14. He highlighted the significance of the maintenance of ecological balance of Lake Jipe.

Participants were then issued with cards to identify issues of conservation and biodiversity significance resulting from the tour of the previous day. Thirteen issues were listed, and these were classified into five categories viz:

- a) Land degradation;
- b) Conservation issues;
- c) Impact of human activities;
- d) Conflict resolution;
- e) Ecological changes.

In general, it was observed that development policies formulated at national level without considering indigenous knowledge and ecological settings had significant impact on the natural environment. Other problems could include the impact of large-scale agriculture (e.g. sisal plantations), natural disasters, such as the recent *El Nino* induced rains, and externalities, such as pollution of waterways upstream.

a) Land Degradation

Causes of land degradation were said to include:

- Human activities (farming, overgrazing, tree harvesting, etc.),
- Impact of wildlife on the landscape,
- Natural phenomena, such as the *El Nino*-induced rains.

The effects of land degradation were said to include:

- Increased siltation into the lake,
- Increased pollution (eutrophication) of the lake,
- Reduced depth due to sedimentation.

It was noted that certain species have disappeared from the Lake Jipe's ecosystem, and this was attributed to siltation, spread of weeds, and change in water quality.

- *Rombo District*

Land degradation in Rombo District was said to result from overgrazing (by the livestock of the Maasai people), intensive agriculture (by the Chagga people), wildlife tracks, over-harvesting of wood for timber and transhumance of livestock.

- *Mwanga District*

Land degradation in Mwanga District was caused by agriculture, river damming, agro-chemicals (fertilisers, pesticides and insecticides), poor cultivation methods causing soil erosion, over-harvesting of firewood and timber products, intensive brick making using wetland soils, extensive wildlife grazing, forest fires and transhumance.

- *Taveta Sub-district*

Land degradation in Taveta Sub-district resulted from overgrazing (by Maasai livestock), impact of wildlife on vegetation, creation of unauthorised roads when official roads become impassable, irrigated agriculture, sand and stone mining, agro-chemicals (fertilisers, insecticides and other pesticides), large-scale sisal estates especially Ziwani, bush and forest fires, over-harvesting of firewood and timber products, creation of new settlement schemes along wildlife migration corridors.

b) Conservation Issues

One of the major gaps identified during the excursion was the lack of sensitisation on the significance of conservation and biodiversity. Communities interviewed were more or less keen to first earn a living before they could think of conservation or biodiversity issues.

The group which discussed conservation issues pointed out that when the management plan process is designed, it would be important to link conservation to development. Such a link could be made gender-sensitive and be done through participatory approaches, such as Participatory Learning and Action, which will appreciate and empower traditional conservation practices.

Participatory approaches could start by harmonisation of natural resource conservation policies and policy instrument, such as what fishing gear were authorised and accepted by the Fisheries authorities on both sides of the border.

c) Impact of Human Activities

Several human activities were identified and their impacts described - these are summarised in the table below:

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IMPACT OF HUMAN ACTIVITIES

ACTIVITY	IMPACT	
	NEGATIVE	POSITIVE
⇒ <i>Farming:</i> Whether small-scale, large-scale or irrigated	If cultivation is done with limited conservation measures on steep slopes - Erosion from reduced soil cover - Destruction of the catchment forests - Agrochemical poisoning of waterways - Increased water abstraction - Reduced aquatic biodiversity	- Improved subsistence livelihood - Improved food security - Increased income - Improved standards of living - Job creation - Reduced poaching - Improved diet
⇒ <i>Livestock production</i>	- Overstocking hence overgrazing - Human/human resource use conflict - Wildlife/livestock conflict - Livestock/crops conflict	- Most suitable way of using ASALs - Alternative source of protein - Economic and social value
⇒ <i>Fishing</i>	- Attracts migrant population - Tendency to over-fish - Human-human conflict - Burning of weeds (effect unknown yet) - Possible use of fish poisoning - Poor unsustainable fishing gear	- Alternative income generation - Alternative source of protein - Job creation - Export of protein
⇒ <i>Quarrying sand & mining stone</i>	- Soil erosion - Deforestation/de-vegetation	- Job creation - Income generation
⇒ <i>Bee keeping</i>	Using traditional methods: - Heavy demand on wood for hives - Risk of fire	- Use of tree-dominated habitats - Income generation - Increased pollination - Improved crop yield - Improved nutrition
⇒ <i>Pottery</i>	- Heavy demand on fuelwood - Causes soil erosion - Potential biodiversity loss of trees used for firewood	- Income generation - Sustenance of indigenous technology - Good hygiene - Water storage
⇒ <i>Tourism</i>	- Cultural Impact - Pollution	- Alternative source of income - Job creation
⇒ <i>Charcoal burning</i>	- Destroys environment and trees - Risk of bush and forest fire - Air pollution	- Short-term quick income - Income generation
⇒ <i>Settlements</i>	- Visual impact on the landscape - Increased demand on fuelwood - Creates conflict in resource use	- Promotes biodiversity conservation - Presents potential benefit sharing
⇒ <i>Protected Areas</i>	- Increases human-wildlife conflict - Limits access to resources	- Ensures biodiversity conservation - Presents potential benefit sharing
⇒ <i>Road Construction</i>	- Soil erosion - Altered hydrology	- Opens up areas for development - Increases mobility
⇒ <i>Wetland vegetation (growth unchecked)</i>	- Hampers fishing - Hampers boating activities - Harbours dangerous animals	- Self or community regulated benefits. - Water purification - Wildlife habitat

		- Construction (thatching) - Crafts of mats and screens
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All these human activities could form some of the researchable issues to be considered during the development of the management plan.

d) Conflict Resolution

Human-wildlife conflict was identified as a principal concern to the Jipe community. Wildlife damaged crops, infrastructure, injured and killed humans, injured and preyed on livestock. People, on the other hand, settled on and near existing wildlife corridors, poached wildlife and encroached on their territories and dispersal areas.

Human-Human conflicts were also identified. These included activities, interests and lifestyles one group of people may have which conflict with another group, such as:

- a) *Fishers - livestock keepers conflict*: Livestock tracks contributed to soil erosion leading to increased siltation, sedimentation and nutrient input into the lake. This promotes growth of weeds hence hindering fishing activities.
- b). *Fisherfolk - agriculturists conflict*: The impact of eutrophication and agro-chemical poisoning of the lake interfered with the fish breeding, hence reduced catch.
- c). *Upstream - Downstream Users Conflict*: If upstream users abstract more water, this would obviously affect downstream users.

Causes of various conflicts were noted as:

- Lack of wildlife watering points within and outside protected areas;
- Human settlements within wildlife corridors;
- Diminishing natural resource base;
- Increased agricultural activity.

Some of the conflict resolution measures identified were thought to include:

- Electric fencing of the Tsavo West National Park;
- Provision of watering points inside and outside the parks for wildlife and livestock respectively;
- Provision of alternative settlement areas instead of wildlife corridors;
- Formulation of a comprehensive water management policy for the catchment.

e) Ecological Changes

One major evidence of ecological change was the manifestation and spread of the aquatic weed Typha in the Lake Jipe wetlands and open water.

It was thought that causes to this ecological change were:

- Siltation and sedimentation;
- Nutrient inputs into the Lake.

And the effects of these ecological changes included:

- Reduced open water surface available for fishing and other activities;
- Decreased commercial fishery.

DEFINING THE BASIS FOR A LOGICAL FRAMEWORK

Geoffrey Howard initiated the process by describing what is meant by an intervention logic. The logical framework for project design (otherwise commonly known as Logframe) is a logical sequence (hierarchical arrangement) starting from the larger scope and narrowing into project activities. The progression from the larger view to the specific was presented in the following order: Vision, Goal, Purpose, Outputs/Results, Activities, Inputs/Resources. He went on to describe these individual elements of the Logframe:

- *Vision:*

In defining the vision, it was important to think of how the Jipe ecosystem should look like in the long-term. One needed to use the “mind’s eye” to focus the long distant future with a common and idealistic view.

- *Goal:*

This was the broader objective to which the project contributed in achieving the vision.

- *Purpose:*

This element described how the goal could be achieved by a project. The purpose reflected the main aim or impact, i.e., what was achievable by a project if all everything worked as planned.

- *Outputs/Results:*

These were tangible deliverables or terms of reference aimed at achieving the purpose.

- *Activities, Inputs and Resources:*

Though not considered in this workshop, they detail project actions, costs and sources of support.

After this description, participants were divided into syndicate groups to define the Vision, Goal and Purpose of the proposed Lake Jipe intervention probably through an ecosystem management planning project. The reports were then presented at a plenary session by each group through their respective rapporteurs. The most suitable wording for each element was fashioned in plenary. The Purpose was linked to the Goal and would contribute to it, and the Goal was linked to the Vision and expected to contribute towards it also.

Vision, Goal and Purpose

The VISION for Lake Jipe was proposed, debated, discussed and agreed to be:

“A Lake Jipe ecosystem that meets ecological and social-economic needs in perpetuity”

and the GOAL was similarly debated and became:

“to jointly manage the Lake Jipe ecosystem for conservation and sustainable use”.

The PURPOSE to realise the goal was described as:

“to develop an integrated cross-border management system that will ensure conservation and sustainable utilisation of the Lake Jipe ecosystem”.

The Vision was realised to be long-term and approachable over ten or more years. The goal, as a way of approaching the vision could become active in a shorter time. The purpose (or project purpose) would focus the intention of the project to work towards the goal and the vision. It was recognised that other actions and processes would and could also contribute to the goal and the vision and that any project developed here should encourage other such actions to work towards the goal and the vision. That is, no project alone could implement the goal and vision without other general support - from the communities, from the local government and from the national governments, NGOs and other interested parties.

Results and Outputs

In plenary, the outputs or results aimed at achieving the Purpose were defined. These were strategies of designing intervention measures towards the development of a management system for Lake Jipe that would work towards conservation of the natural resources with sustainable utilisation of the ecosystem. Initially there were eleven ideas for results, but these were refined and merged - resulting in the following seven areas:

- Cross-border management structure developed.
- Capacity built for management including awareness creation.
- Policy harmonisation process initiated.
- Management information generated and documented.
- Management plans developed including land-use practices.
- Alternatives to over-use of natural resources developed.
- Sustainable project funding mechanisms established and developed.

WORKSHOP CONCLUSION

As a preliminary consultative and planning meeting, the workshop was a resounding success. Various pertinent issues were critically discussed and ways forward forged. This is attested to by the various action plans that have been recorded in this Workshop Report.

The workshop realised that management challenges facing Lake Jipe were a complex mixture of socio-economic and ecological factors, including reduced runoff, increasing siltation, decreasing water quality, shrinking fishery, advancing water plants, agricultural expansion, demand for urban water supply, and expanding irrigation.

The importance of Lake Jipe and its wetlands cannot be gainsaid. As the workshop discovered during the excursion, the lake's swamps were important reservoir for the Ruvu-Pangani system. They also trapped sediments eroded from the catchment area, purified water for the Ruvu , controlled floods, and provided sanctuary for wildlife, especially birdlife.

And from the human use perspective, the Lake Jipe basin provided fisheries; water transport (across the border and within country); attraction for wildlife tourism; water supply for domestic, irrigation and livestock uses; and reeds for fishing gear, building and roofing materials and for artefacts. It was also a good environment for honey production and provided dry season grazing - transhumance. It is therefore incumbent upon the stakeholders in this important resource to take the outcome of this workshop seriously and implement its recommendations.

WORKSHOP RECOMMENDATIONS

At the end of the workshop, it was decided that the management plan should do the following during project design, development and implementation:

Consultation with Stakeholders

- hold a stakeholders meeting to update them on the progress of this initiative;

Research Interests

- establish cause and impact of the lake's changing ecology;
- evaluate resource utilisation and practices;
- assess availability of agricultural land;
- identify alternative and sustainable sources of energy;

Socio-economic Interests

- recognise and apply appropriate indigenous technology;
- identify training opportunities for skilled manpower;
- promote conservation education and awareness creation;
- recognise and respect cultural and religious beliefs;
- formulate effective Communications Strategy linking local people to authorities;
- promote sustainable forestry and agriculture;
- identify and access markets for alternative watershed products;

Institutional Collaboration

- seek cooperation and collaboration between institutions with similar objectives;
- identify partner institutions to develop and expand essential infrastructure;
- lobby local and national governments for harmonisation and promotion of appropriate policies on utilisation of shared ecosystems;
- build institutional capacities for ecosystem management.

The Way Forward

Dr. Howard gave suggestions as to the best way forward drawing from experiences of managing watersheds in other countries such as Uganda, and developing management plan for other lakes, including Lake Naivasha in Kenya.

He suggested the need to identify activities to achieve the desired outputs and that these need to be built into a Project Proposal to be presented to possible donor(s) through IUCN. IUCN would exchange ideas with CDA and PBWO which would liaise closely with NES and NEMC in their respective countries, especially where sub-committees on wetlands exist. The model for cross-border coordination (section 3.2.4) would be expanded by IUCN.

In conclusion, Dr. Howard praised the workshop as a strong networking forum, adding that a follow-up would be organised within the next six months. He urged for closer cooperation among stakeholders and underscored the centrality of CDA and PBWO in the ecological management of the Lake Jipe basin - now and in the future.

The District Administrative Secretary for Mwanga, gave a vote of thanks before the local District Officer, who was the host in Taveta, closed the workshop.

Appendix 1: Roles and Responsibilities of Different Stakeholders

This was important to understand the role and responsibilities of different stakeholders in order to see where they would benefit and assist in developing a management strategy (ecosystem management process) for the Lake Jipe ecosystem.

CDA and PBWO are very important stakeholders in the project development process, especially for coordination and communication at the national level. For the purposes of the Lake Jipe's management planning process, the role of CDA and PBWO would be decided upon during the initial stakeholders meeting. Following are brief accounts on roles and responsibilities of different stakeholders:

PBWO: The Pangani Basin Water Office (PBWO) is a regulatory body which allocates water use in consultation with the District Administration Offices. PBWO is not a management authority. Management authority responsibility is vested in other institutions of government, including the District Administrative Offices. PBWO may implement a policy or directive based on advice from NEMC through the Central Government via the district administrations.

CDA: The Coast Development Authority (CDA) is among six other statutory authorities established in Kenya. CDA's mandate spans seven districts in the Coast Province, and its jurisdiction includes the Exclusive Economic Zone. It is responsible for rural development with a vision to improve the standards of living and human condition in Coast Province. CDA is mandated to encourage development in river basins and catchment areas within the Coast Province.

NEMC: The National Environment Management Council of Tanzania is a statutory body set up in 1983. Its main objective is to carry out advisory and coordination roles (not implementation) of all environmental issues in Tanzania. It is currently under the Vice President's Office. The Council is divided into five directorates:

- Directorate of Research, Education Extension and Documentation;
- Directorate of Natural Resources;
- Directorate of Environmental Impact Assessment;
- Directorate of Pollution Prevention;
- Accounts and Administration.

Through these directorates, NEMC can effectively play advisory and coordination roles on policy issues affecting the management of a shared ecosystem such as Lake Jipe.

NES: The National Environment Secretariat is a national body mandated with the coordination and policy development of environment in Kenya. It works through the Inter-Ministerial Committee on Environment to develop policies on environment e.g. the Standing Sub-Committee on Wetlands (currently working on the development of a national wetlands policy). NES provides a secretariat for the environment policy work in the country, and also acts as chair to the policy development. There is representation of NES at district level through the District Environmental Protection Officer.

KWS: Kenya Wildlife Service is a state corporation set up to conserve wildlife in parks and reserves. It also has interests in community services providing benefits to local inhabitants.

KWS is the custodian of the Ramsar Convention in Kenya. It is an active member of the Standing Sub-Committee on Wetlands for the development of a policy on wetlands.

Involvement with wildlife conservation in protected areas does not allow KWS time to implement and manage independent projects. As a result, KWS works with NGOs and other relevant sections within the national conservation grid to effect projects. KWS is a major stakeholder in Lake Jipe as Tsavo West National Park borders the south-eastern shores of the lake. Wildlife use Jipe as a watering point, food source and good habitat.

IUCN: IUCN is a membership organisation, whose members are governments, or government institutions and NGOs. It has an international spread and is represented in all continents. Locally, IUCN has a regional mandate for conservation of nature and natural resources within ten countries of Eastern Africa and the Indian Ocean. IUCN promotes cross-border cooperation and conservation of biodiversity.

EAWLS: The East African Wild Life Society is a regional NGO whose mission is to promote wildlife conservation in East Africa. Representation in the region is high and EAWLS is already recognised by the East African Co-operation with respect to environmental conservation. EAWLS is a membership organisation, whose members are of various categories: corporate, associate, and individual. The Society collaborates with other institutions, including IUCN (of which it is one of its oldest members) to further the environmental and conservation agenda. Other collaborators include KWS, to whom the Society acts as watchdog on conservation issues.

MIFIPRO: Mixed Farming Improvement Project (MIFIPRO) started in 1984 as a collaborative effort between COOPIBO (a Belgian NGO), Community Development for Trust Fund (CDTF) of Tanzania and the Mwanga District Council. Its headquarters at Kigonigoni village, is about 50 kilometers from Mwanga District township. At the end of the funding period after ten years, COOPIBO had spent US \$ 800,000 on the project. MIFIPRO was then transformed into a Trust Fund in 1994, with a vision to: **“a better community of the rural area”**.

Since 1995 to date, the Fund, governed by Board of Trustees, has been supported by The Netherlands Organisation for International Development Cooperation (NOVIB).

MIFIPRO’s mission is: *“to contribute to sustainable agricultural and rural development as well as improvement of living conditions of smallholders”*. MIFIPRO believes that development responsibility should be in the hands of the beneficiaries. Thus the organisation promotes a bottom-up approach empowering communities it works with through decision-making and active participation at the grassroots.

The current MIFIPRO Trust Fund’s activities include:

- *Agricultural extension:*
This includes introduction and promotion of cash and food crops, such as sunflower, safflower, lablab and groundnuts;
- *Improvement of traditional irrigation schemes:*
Involves on-farm demonstrations on water management, water harvesting techniques and irrigation practices. So far more than 600 farmers have been trained;
- *Promotion of use of Draught Animal Power:*
For ploughing, cultivation and weeding;
- Livestock improvement by promoting de-stocking and zero-grazing;

- Promotion of conservation and management of natural resources through community afforestation and agro-forestry programmes, soil and water conservation, and creation of buffer zones;
- Promotion of income-generating activities to women groups including training in savings and credits, writing project proposals, identifying alternative sources for income-generation;
- Support to grassroots organisations, especially empowerment of the small-scale farmer's groups. The support extends to training in skills such as leadership, management and organisational.

Appendix 2: List of Workshop Participants

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<p>Mr. Henry Oulo Ndede, Workshop Facilitator,</p>	<p>Mr. Julius. D. Sarmett, Regional Hydrologist -</p>

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<p>Mr. John Y. Salehe, National Project Manager UNDP/GEF- East Africa Cross-Border Biodiversity Project 47 Old Moshi Road, P.O. Box 1041, ARUSHA Tel: (007-57) 8398; Fax: (007-57) 8791 Mobile: 0811 511250; Email: biodiversity@cybernet.co.tz</p>	<p>Dr. James Ngana, Project Coordinator Pangani Project, University of Dar-es-Salaam P.O. Box 35097, DAR-ES-SALAAM Tanzania Tel: (007-51) 410144; Fax: (007-51) 43393 Email: ira@udsmac.tz</p>

Appendix 3: Workshop Programme

Date	Time (hrs)	Activity	Action
12th October	1700 - ∞	Arrival of Participants in Moshi, Lutheran Hostel, Tanzania	
13th October	0830 - 0900	Registration (Lutheran Hostel, Moshi)	Organisers/Participants
	0900 - 0915	Official Opening	Administrator, Kili. Reg
	0920 - 0935	Presentation	IUCN (G. Howard)
	0935 - 0950	Presentation	EAWLS (Hadley Becha)
	0950 - 1030	Assessment Report Presentation	CDA (Musyoki and Muthuka)
	1030 - 1100	TEA BREAK	
	1100 - 1130	Assessment Report Presentation	PBWO (Kamugisha)
	1130 - 1200	Discussion on Report Presentations	Plenary/ Facilitator
	1200 - 1230	Identification of Management Issues and Needs	Plenary/ Facilitator
	1230 - 1330	Categorisation & Listing of Management Issues of Jipe and Development of Priorities for Water Balance Studies	Plenary/ Facilitator
	1330 - 1400	LUNCH BREAK	
	1400 - 1500	Syndicated Group Discussions	Groups/Facilitator
	1500 - 1600	Presentation of Group Discussions	Group Rapporteurs
	1600 - 1620	TEA BREAK	
	1620 - 1700	Continuation of Group Discussions	Plenary/ Facilitator
	1700 - 1720	Overview of Vegetation Types of Lake Jipe	Geoffrey Howard
	1720 - 1740	- Briefing on Field Trip for Day 2 - Summary of Day's Deliberations - Housekeeping Announcements	Geoffrey Howard Facilitator Edith/Yilma
14th October	- Whole Day Excursion to Lake Jipe and Environs in Tanzania and Kenya. - Overnight at Lake Chala Lodge in Taveta, Kenya		
15th October	Lake Chala Lodge, Taveta		
	0830 - 0845	- Welcome to Day 3 of Workshop	- IUCN
	0845 - 0900	- Recap of Day 1 and 2 of the Workshop	- Facilitator
	0900 - 0930	- Identification of Conservation Issues based on experiences of the first two days	- Plenary
	0930 - 1000	- Syndicated Group Discussions on identified Conservation Issues	- Group Discussions
	1000 - 1020	- Group Presentations	- Plenary/ Facilitator
		TEA BREAK (Working break)	
	1020 - 1100	- Group Presentations Continued	- Plenary/Facilitator
	1100 - 1120	- Defining Basis for an Intervention Logic	- Geoffrey Howard
	1120 - 1200	- Developing Project Intervention Logic	- Group Discussions

	1200 - 1300	- Presentation of Project Intervention Logic	- Plenary/ Facilitator
	1300 - 1400	LUNCH	
	1400 - 1500	- Fitting Logframe onto Project Outline	- Plenary/ Facilitator
	1500 - 1600	- Roles and Responsibilities of stakeholders	- Plenary/ Facilitator
	1600 - 1630	- The Way Forward	- Geoffrey Howard
	1630 - 1700	- Close Workshop	- Distr. Administration
16th October		Departure from Taveta	As convenient