

NAIROBI RIVER BASIN PROJECT

Annual Report 2001

(Regional Office for Africa, UNEP)

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1 EXECUTIVE SUMMARY

As a result of rapid population growth, urbanization and industrialization, enormous pressure has been put on Nairobi's rivers. Industrial effluents, raw sewage, and waste from human settlements situated along the river have turned the waters into sludge, causing health hazards to those communities and stress on the aquatic ecosystem.

UNEP promoted the **Nairobi Initiative**, started in April 1999, with the aim of addressing problems such as pollution, waste management, urban greening, community participation, public awareness and legislation. This initiative evolved into the Nairobi River Basin Project, focusing on the above elements as they relate to the main rivers comprising the Nairobi River Basin (Nairobi, Ngong/Motoine and Mathare Rivers).

Phase I of the project involved not only a situation assessment of pollution but also the development of community outreach and education programmes to enable capacity building amongst stakeholders. Sustainable management of the river basin was addressed through education programmes, developing an Environmental Management Information System (EMIS) and promoting awareness of available legal mechanisms.

Phase II of the project – The Nairobi Dam Initiative – focuses on a section of the river basin upstream of Nairobi Dam on the Motoine/Ngong River, the Dam itself, and downstream to the confluence with the Athi River. The aim of this phase is not only to address the problem of pollution in Nairobi's rivers but to put in place community education and information programmes to enable capacity building amongst stakeholders.

Six project components are being implemented with the main aims of showing the value of proper sanitation and waste management practices, demonstrating the utility of wetlands systems in improving the quality of impacted water systems, and promoting community involvement in safeguarding and monitoring the river basin as a vital resource. The six project components are:

- 1) Kibera Water and Sanitation Pilot Project
- 2) Pollution Monitoring Network
- 3) Public Awareness, Education and Outreach Campaign
- 4) Constructed Wetland at Nairobi Dam
- 5) Constructed Wetland at Kenya Wildlife Service Headquarters
- 6) Water Hyacinth Utilisation Project

The objectives of Phase II are, firstly, to improve the health and wellbeing of the residents of the Nairobi River Basin, and in particular in the Motoine/Ngong River area, by increasing the availability and quality of the water supply entering and emanating from the Nairobi Dam to the communities downstream. Furthermore, the value of proper sanitation and waste management practices is being demonstrated in a community pilot project upstream of the Nairobi Dam, while other demonstration projects are directed at showing the potential of artificially constructed wetlands for reusing water and improving the quality of polluted water systems. Promoting community involvement and providing training in safeguarding and monitoring the Nairobi rivers as a vital resource remains key to the success of this phase.

The third and final phase of the Nairobi River Basin Project is scheduled to begin in 2003. Replicating successful strategies identified through the demonstration and pilot projects of Phase II on a larger scale, this phase will cover the entire river basin area and, it is hoped, inspire similar projects throughout Africa and the world.

Beneficiaries of this project are first and foremost the communities living in the catchment basin and the informal settlements along the river, the Nairobi City Council (NCC), the industrialists, and the Government of Kenya (GOK).

2 BACKGROUND

Rapid population growth, urbanization and industrialization have put enormous pressure on the rivers of Nairobi. Untreated industrial effluents, raw sewage, and waste (liquid and solid) from human settlements situated along the rivers have turned the once clear waters into sludge, causing health hazards, accelerated eutrophication and stress on the aquatic ecosystem.

At Ondiri Swamp in Kikuyu, about 20km from the city, which is the source of Nairobi River, the water is clean and free of pollution. Farmers around the swamp use the water to irrigate the land and plant vegetables and other crops. They also use the water for drinking, as well as watering their animals. Pollution of the river begins as it enters the city through Dagoretti, and increases as it flows through Riruta, Kileleshwa, Chiromo, Kijabe street, Kirinyaga Road, Gikomba Market, Bahati, Eastleigh, Mathare, Korogocho, Kariobangi and Dandora before joining Athi River near Ruai.

The situation is similar for the other main rivers running through Nairobi; Ngong/Motoine River and Mathare River. Increased discharges of mostly untreated or poorly treated municipal wastewater from sewage systems in the city have literally turned these rivers into open sewers. Industries within Nairobi that have very poor waste treatment, if any, are discharging their wastewaters into the existing municipal sewerage system and/or directly into the rivers. Non-biodegradable substances as observed at the Dandora ponds overload the system.

Within the human settlements, which are mainly informal slums, inadequate access to environmental sanitation services coupled with limited, or complete lack of, environmental awareness contribute significantly to the pollution of the river basin. Lack of sanitary means of excreta disposal, haphazard disposal of refuse and poor drainage and waste water disposal means that wastes end up in the rivers, causing serious health and environmental problems. Recent outbreaks of cholera in Korogocho and Mathare slums can be attributed to the consumption of contaminated water from Nairobi River or its tributaries. Other water and sanitation related diseases such as typhoid, amoebiasis and diarrhea are also prevalent in these areas.

The Government of Kenya (GOK), realizing the magnitude of the problem facing it due to (1) uncontrolled settlements which continue to exist and expand along the rivers; (2) the unabated dumping of unwanted substances (liquid and solids) into the rivers; and (3) the weakness in law enforcement agencies to curb the above, has embarked on various outreach campaigning strategies to create awareness on environmental degradation of the river basin.

The GOK has created a specific ministry whose mandate is to address environmental issues. At policy level, Kenya has enacted sectoral legislation including the adoption of the Environmental Management and Coordination Act 1999.

UNEP, in turn, has promoted the Nairobi Initiative, started in April 1999 with the aim of addressing problems such as pollution, waste management, urban greening, community participation, public awareness and legislation. This initiative evolved into the Nairobi River Basin Project, focussing on the above elements as they relate to the main rivers comprising the Nairobi River Basin (Nairobi, Ngong/Motoine and Mathare Rivers).

The project is divided into three phases, the first of which ended in December 2000. During this phase, a situation assessment of pollution was carried out, and community outreach and education programmes developed to enable capacity building amongst stakeholders. Sustainable management of the river basin was addressed through education programmes, developing an environmental management information system and promoting awareness of available legal mechanisms.

Specifically, the outputs of Phase I included:

- A database with socio-economic and environmental information on the Nairobi River Basin
- Environmental Management Information System (EMIS) for computerized mapping
- Analysis and assessment of pollution levels at 24 sampling points throughout the river basin
- A review of pollution control legislation identifying policy gaps in relation to sustainable management of Nairobi rivers
- A report on previous experiences from community activities in the river basin
- Outreach and education aids for community capacity building
- Reports on stakeholders workshop, reporting workshop, and education and training workshop
- Promotional package including brochures, posters, newsletters, etc. as well as an enhanced CD
- “Profile of a River” photographic exhibition
- Wide media coverage of the project, especially publicity events such as parades, clean-ups, sporting events, competitions, concerts, exhibitions

The Phase I pollution-assessment data demonstrates alarming levels of pollution throughout the river basin. This has direct implications for the health and wellbeing of the residents of Nairobi, as well as all the communities downstream of the Nairobi and Athi river basins to which this water system flows, by reducing water availability and quality.

It is important that measures be taken through the Nairobi River Basin Project to demonstrate effective ways of combating these problems. Phase II of the project comprises the Nairobi Dam Initiative, which focuses on a section of the river basin upstream of Nairobi Dam on the Motoine/Ngong River. Six project components are being implemented with the main aims of showing the value of proper sanitation and waste management practices, demonstrating the utility of wetlands systems in improving the quality of impacted water systems, and promoting community involvement in safeguarding and monitoring the river basin as a vital resource:

1. A pilot project is being implemented in a community (approximately 1,200 households) upstream of the Nairobi Dam to put in place proper sanitation and waste management practices to reduce its negative impact on the river. The recommended intervention strategies derived from the first phase are being implemented and, if successful, will later be replicated in other communities throughout the river basin. Best practices and lessons learned are to be integrated into the education and public awareness elements of the project.
2. The pollution-monitoring network created during the first phase of the project has been modified to focus on providing sufficient information for the assessment of the impact of the pilot project upstream, the constructed wetland upstream of Nairobi Dam, the water hyacinth purification ponds and the identification of major point sources of pollution.
3. An intensive public information, education and awareness campaign is underway in co-operation with Habitat’s Managing Water for African Cities programme (MWAC) and the local media.
4. and 5. Constructed wetland management techniques are being applied in two areas. The first site, upstream of Nairobi Dam, is intended to contribute to improving the quality of the surface waters entering the dam. The second site, at the Kenya Wildlife Service (KWS) Headquarters (southwest of Nairobi), is designed to recycle 50,000 liters per day through constructing a wetland area which will reduce groundwater depletion in the Nairobi National Park. Both of these sites will be open to the public.
6. A water hyacinth water purification plant is to be constructed to demonstrate good management of this invasive species and its use in purifying polluted water systems. Indigenous expertise is being developed for the use of water hyacinth as a natural raw material in the production of high quality

household products and paper, thereby creating income-generating activities for the neighboring communities.

The third and final phase of the Nairobi River Basin Project is scheduled to begin in 2003. Replicating successful strategies identified through the demonstration and pilot projects of Phase II on a larger scale, this phase will cover the entire river basin area and, it is hoped, inspire similar projects throughout Africa and the world.

For each of its phases, the beneficiaries of this project are first and foremost the communities living in the catchment basin and the informal settlements along the rivers, the NCC, industry, and the GOK.

3 Project Activities: 2001

3.1 Project Approval Process

- **Phase II** of the Nairobi River Basin Project was launched in **March 2001**. However, the project was unable to access its funds and commence full-scale implementation until it received **final approval** from the UNEP Project Approval Group (PAG) on the **19th September, 2001**.

3.2 Consultative / Collaborative Meetings with Nairobi City Council

➤ Nairobi City Council: **Department of Environment**

- In his letter of 13th June 2001, the Town Clerk confirmed Nairobi City Council (NCC) **Department of Environment approval** of the Nairobi River Basin Project, Phase II.
- The Department of Environment is acting as the **focal point for NCC collaboration** with the Nairobi River Basin Project (NRBP). We strongly appreciate their support and know that with their backing, the project will be sustainable.
- A meeting is planned for February 2002 with both NCC and the National Environment Secretariat to draw-up a concrete action plan for collaboration and long-term institutionalisation of the project's sub-components.
- Alongside offering expertise in the field of the environment, the Department of Environment is coordinating NRBP collaboration with all other NCC departments. We will work in close collaboration with the following NCC departments on the following project activities (please see attached Project Document for details on each of the activities):

➤ Nairobi City Council: **Department of City Planning**

- **Implementation sites** for project activities are to be determined and allocated in partnership with - and with the full support of - the Department of City Planning. We are extremely keen to collaborate on the designation of sites for the following project activities:
 - a) Construction of Wetlands at Nairobi Dam;
 - b) Construction of Water Hyacinth Purification Ponds at Nairobi Dam.
- Preliminary meetings have been held with Mr Kibinda of the Department of City Planning. We will further this process and determine final project implementation sites in the near future.

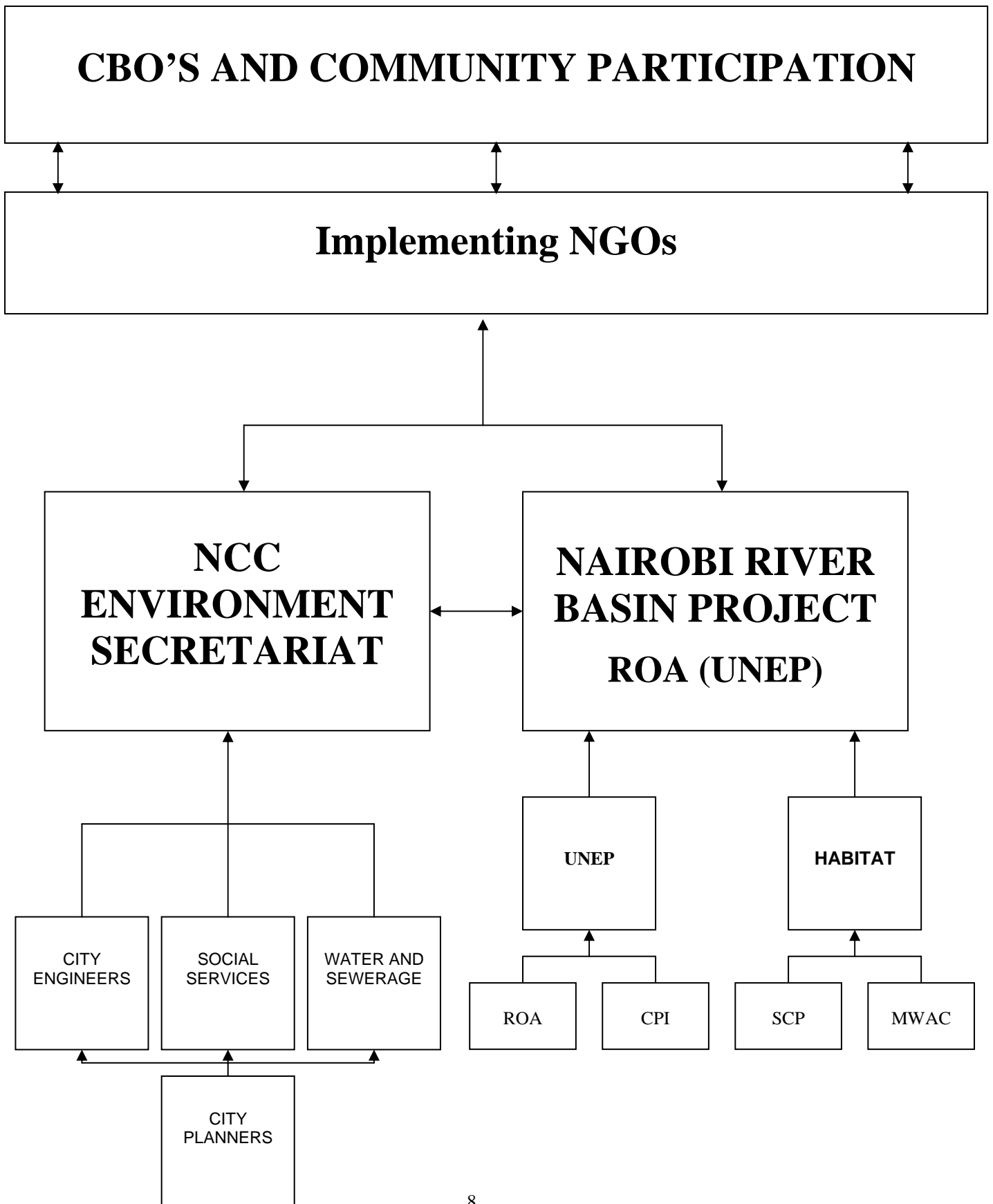
- Nairobi City Council: **Department of Water and Sewerage**
 - NRBP project activities are focused on **issues of water and sewerage**. Collaboration with NCC Department of Water and Sewerage is proposed for the implementation of the following project activities:
 - a) Construction of ablution blocks for the Kibera (Kianda) Pilot Community;
 - b) Connecting the Kibera (Kianda) Pilot Community to the existing water and sewerage systems;
 - c) Establishing a comprehensive pollution monitoring network.
 - Meetings have been held with Mr Nzainga of the Water and Sewerage Department to discuss parameters for collaboration. We appreciate his enthusiasm and support for the project.

- Nairobi City Council: **City Engineers**
 - **Technical advice** and input is strongly appreciated from City Engineers. The expertise within this department is to be utilised to maximise project success.

- The Project Co-ordinator met with the **Deputy Mayor** to further strengthen and broaden the collaborative links with the municipal authorities on the 23rd October 2001 and on October 30th 2001.

- Please see attached 'organigram' (overleaf) for an outline of the structural modalities for collaboration with NCC.

ORGANIGRAM



3.3 Consultative / Collaborative Meetings with UN-Habitat (UNCHS)

➤ **Managing Water for African Cities Programme (MWAC)**

- A series of meetings has been held with the Managing Water for African Cities (UNCHS-Habitat) programme to establish parameters for collaboration and joint modalities for operations.
- Co-operation is focusing on the Public Awareness and Education campaigns, the pollution monitoring strategies and on the Managing Water for African Cities goal of rehabilitation of the Nairobi Dam.

➤ **Sustainable Cities Programme (SCP)**

- Unfortunately, Nairobi is not yet part of the UNCHS Sustainable Cities Programme. However, we were able to benefit from the expertise of the SCP in Phase I through their work on the Environmental Management Information System (EMIS). We are also using the SCP process on Stakeholder Sensitisation and on the Preparation of a Sanitation Handbook. A continued collaboration is written into Phase II.

3.4 The NRBP Advisory Committee

- The Advisory Committee of Phase II of the Nairobi River Basin Project held its inaugural meeting on the 11th December 2001.
- The meeting focused on the fact that participation and ownership remain key to project success. The Ministry and the NCC, along with stakeholder communities, must take ownership of the project components to ensure success and sustainability.
- The members of the Advisory Committee, which is to meet on a quarterly basis, are as follows:
 - **Chairman:** Sekou Toure, Director, Regional Office for Africa, UNEP
 - Cristina Boelcke, Director, DRC, UNEP
 - Kalyan Ray, Infrastructure Unit Coordinator, UNCHS
 - Ole Lyse, Coordinator, Environment Unit, UNCHS
 - Salif Diop, Senior Environmental Affairs Officer, DEWA, UNEP
 - Donald Kaniaru, Director, DEPI, UNEP
 - Sergei Khromov, Chief, Resource Mobilisation Unit, DEPD, UNEP
 - Mr Opiyo, Director, Department of Environment, Nairobi City Council
 - Mr Nzainga, Ag Deputy General Manager, Engineering, Department of Water and Sewerage, NCC
 - Bernard K'Omudho, Director, National Environment Secretariat

- Dr Philista Onyango, Executive Director, ANPPCAN
- Dr Krhoda, Professor of Geography , University of Nairobi
- Geoffrey Howard, Regional Programme Coordinator, IUCN
- Mr M Kioko, Ag Director, KWS
- Keith Sones, Chairman, FoNNaP
- Ali Khaka, Executive Director, EAWLS
- Mike Muchilwa, Managing Director, KICK
- Samuel Wambua, Executive Director, NETWAS
- Henry Ndede, Environmental Consultant
- Esther Mwangi, National Coordinator, UNDP/GEF Unit
- Valerie Leakey, Nairobi River Basin Project Coordinator,ROA,UNEP

3.5 Kibera Water and Sanitation Pilot Project

- The NGO **ANPPCAN** (The African Network for the Prevention and Protection against Child Abuse and Neglect) and the CBO (community based organisation) Ushirika wa Maisha na Maendeleo – Kianda have been selected to implement the project.
- **Implementation strategies** have been developed in collaboration with:
 - Nairobi City Council Department of Environment
 - Government of Kenya/UNCHS: Nairobi Slum Upgrading Project
 - UNCHS: Managing Water for African Cities and Sustainable Cities Programmes
 - World Bank: Third Nairobi Water Supply Project
 - Department for International Development (DFID,UK) / Agence Francaise de Developpement / World Bank: Joint Sanitation Project
 - UNICEF: ANPPCAN (African Network for the Prevention and Protection Against Child Abuse and Neglect) Water and Sanitation Programme
 - Ushirika wa Maisha na Maendeleo-Kianda community-based organisation (CBO).
- **Project Proposals** and **MoUs** for Kibera Water and Sanitation Pilot Project have been drawn-up in conjunction with ANPPCAN and Ushirika wa Maisha na Maendeleo – Kianda (community based organisation). MoUs to cover:
 - Up-grading of existing infrastructure through community participation.
 - Connections to mains water and sewerage systems.

- Community training.
 - Recycling project.
 - Health and sanitation information materials.
 - Activities to safeguard individual and community rights under the 1999 Environment Act.
- The following **activities** have been undertaken:
- Identification of exact pilot site: Either area A or G of Kianda village, Kibera.
 - Awareness creation underway.
 - NGO + community group visits to ITDG and to recycling projects in Kisumu to see what is viable.
 - Restoration of infrastructure as an ongoing process to be stepped up by the project.

3.6 Constructed Wetlands Projects

Constructed Wetlands at Kenya Wildlife Service Headquarters

- The NGO **FoNNaP** (Friends of Nairobi National Park) has been selected to implement the project.
- FoNNaP have signed an **MoU** with UNEP and an **MoA** with the Global Environment Facility Small Grants Scheme.
- The following **activities** have been undertaken in 2001:
- The initial **wetlands design and construction bids** have been submitted.
 - Consultations continue on the exact site for the wetlands. The intended site of the old Animal Orphanage is no longer guaranteed as it has been decided to keep several of the old animal cages in place.
 - Draft EIA has been submitted to KWS for consultative review. Mr Kioko has been appointed to head KWS and his comments on the EIA have been returned to FonnAP

Constructed Wetlands Upstream of Nairobi Dam

- The NGO **EAWLS** (East African Wildlife Society) has been selected to implement the project.
- EAWLS have signed an **MoU** with UNEP and an **MoA** with the Global Environment Facility Small Grants Scheme.
- The following activities have been undertaken in 2001:
- **Four Potential sites** for the wetlands have been earmarked by the EIA Report.

- Meetings with Nairobi City Council **City Planning Department** being held to designate one of the earmarked potential sites.
- The initial **wetlands design and construction bids** have been submitted.

3.7 Public Awareness and Education Campaign

- Three primetime features on **Kenya Television Network (KTN)**, individual articles and two centre-page spreads in **Sunday Standard**.

Feature in **EcoForum** magazine.

Information passed **bi-weekly** to media partners.

- **Project website** launched via internet (www.unep.org/ROA/Nairobi_River/) and via **World Space** satellite radio connection.
- The **World Environment Day (WED)** activities undertaken by the Nairobi River Basin Project team, and linked to the project, were successfully completed:
 - **PlasticFantastic Fashion Show and Exhibition:**
 - The event was held at the Holiday Inn Nairobi on 4th June, 2001.
 - An **exhibition** was held of products made from recycled materials and photographs from UNEP's International Photographic Competition 1999-2000 were displayed.
 - For the **PlasticFantastic Fashion Show**, 12 models displayed over 30 outfits made from recyclable materials by 15 local designers. The guests, numbering over 350 and including private sector professionals, industrialists, diplomats and representatives from Kenya Government and UN Agencies, responded with great enthusiasm.
 - The event was directed at stimulating interest in **income-generating activities** using recycled products and we asked our guests to use their influence and to commit to the establishment of income-generating workshops using recyclable materials. An auction was held and the pre-event magazine was sold to raise money for the establishment of income-generating workshops.
 - **Clean-Ups:**
 - **20 Clean-Up events** were held in Nairobi and others around the country on the 9th June.
 - **Media Coverage:**
 - As a result of the UNEP Press Release, the PlasticFantastic Website and ROA Press Conference held at Nairobi Dam on the 31st May, press coverage of the events included all the major international media present in Kenya. PlasticFantastic was reported on the BBC World News, June 5th and featured seven times on Thursday the 7th June and on CNN throughout the day on Sunday 10th June with good coverage on local television and in the local press.
 - **Private Sector Sponsorship:**
 - Sponsors for WED 2001 in Kenya included Standard Chartered Bank, Kencell, KLM, Multichoice, Norfolk Hotel, Twiga Chemicals, SilverBullet, AAR, Galsheet, Safari Park Hotel, Bins, Holiday Inn, Nakumatt, Monier 2000 Ltd and Level One Productions.

- The **Clean up the World 2001** activities in Kenya, undertaken by the Nairobi River Basin Project team, and linked to the project, were successfully completed:
 - Major **clean-up** at Wakulima Market.
 - **Tree planting** at Kamakunji Grounds.
 - **Sports day** for youth and environmental groups at the University of Nairobi Sports Grounds.
- **Filming with Television Trust for the Environment**
 - One week of filming with TVE (Television Trust for the Environment) to produce film for the **United Nations Water Security and Sanitation Collaborative Council Bonn Water Forum and for the WSSD** (fulfilling NRBP Project Document Activity/Output: 3[d]).

Filming at following sites:

- Source of the river.
- Kibera:
 - Ongoing water and sanitation projects.
 - Community clinic and focus on environmental health concerns.
 - Community meeting / planning forum.
 - In-house and day-in-the-life-of filming.
- Industrial Area: Industrial effluents and impact on Mukuru.
- Dagoretti/Gikomba: *Jua Kali* + slaughter houses.
- Nairobi Dam: Water Hyacinth infestation.
 - Peri-urban agriculture.
- Formal Interviews:
 - Jaffat Mbuvi; World Bank.
 - Dr Mumma; Environmental Lawyer.
 - Dee Raymer; Wetlands Expert.
 - Duncan Ochieng; ANPPCAN.
 - Henry Ndede; EIA Consultant.
 - Geoffrey Howard; IUCN.
 - Dr Krhoda; University of Nairobi.

3.8 Pollution Monitoring Network

- The NGO **NETWAS** (Network for Water and Sanitation International) has been selected to implement the project.
- NETWAS have signed an MoU with UNEP.
- The following activities have been undertaken in 2001:
 - **A team of technical experts** from different academic and research backgrounds has been put together in order to establish a comprehensive and sustainable Pollution Monitoring Network. This team has been meeting on a weekly basis.

Dr Krhoda has been selected to head the team. He is a Professor of Geography at the University of Nairobi specialising in Hydrology, River Management and Urban Geography. Other members include:

Officers from NETWAS
Officers from IUCN
Officers from Nairobi City Council
Officers from UN-Habitat: Managing Water for African Cities

- The draft Pollution Monitoring Network design and strategy paper has been submitted.

INCLUDE SUMMARY OF THE PAPER AS BELOW WITH EIA

- The draft Baseline Survey and Environmental Impact Assessment Reports, undertaken by Henry Ndede, Environmental Consultant, under the supervision of Geoffrey Howard, IUCN have been submitted.

❖ **Baseline Study Outline:**

- **Executive Summary**
- **Introduction**
- **Delineation of Need for Project**
- **Description of the Study Area**
 - a) Boundaries of the drainage area
 - b) The pilot project's site - Maps showing:
 - i) Location
 - ii) General Layout
 - c) The Proposed constructed wetlands site
 - d) Human settlements surrounding the study area
 - e) Human activities within the drainage area
 - f) Influences outside the study area
 - g) Physical Infrastructure:
 - i) Roads
 - ii) Water pipe reticulation
 - iii) Sewerage works
 - iv) Drainage Maps: natural and artificial (waste water collection systems)
 - h) The Nairobi Dam:
 - i) Size

- ii) Capacity
- iii) Inlets and inlet volumes
- iv) Outlet and outlet volume

• **Description of the Proposed Project**

- a) Architectural drawings/diagrams showing project specifications
- b) Population Trends and dynamics
- c) Income-generating Activities (micro- and small-scale-enterprises)
- d) Influent and effluence characteristics
- e) Pre-construction activities
- f) Construction activities
- g) Schedule
- h) Staffing
- i) Support facilities and services
- j) Operation and maintenance activities
- k) Life-span
- l) Prevailing wind directions
- m) Project elements e.g. effluent control systems

• **Description of the Environment**

- a) Baseline Data on the General Environmental Characteristics of the Study Area
 - i) Watershed
 - ii) Floodplains
 - iii) Site of the project and constructed wetlands
 - iv) Anticipated changes due to the project
 - v) Neighbourhood layout
- b) Physical Environment
 - i) Geology
 - ii) Surface and ground water hydrology
 - iii) Topography
 - iv) Aesthetics
 - v) Soils
 - vi) Climate and Meteorology
 - vii) Run-off characteristics and discharge volumes
 - viii) Location of private and public water supply
 - ix) Description of receiving waters
 - x) Chemistry
 - xi) Abstraction
- c) Biological Environment
 - i) Terrestrial communities in the project sites
 - ii) Aquatic communities
 - iii) Rare or endangered species
 - iv) Sensitive habitats e.g. wetlands
 - v) Species of commercial importance
- d) Socio-cultural Environment
 - i) Present and projected population (e.g. density)
 - ii) Community structures and local leadership
 - iii) Education, awareness, and sensitivity of public to proposed siting
 - iv) Present land-use
 - v) Planned development activities
 - vi) Present and projected employment by enterprise category

- vii) Distribution of income, goods and services
- viii) Social amenities e.g. recreation
- ix) Sanitation and Public health
- x) Cultural properties, pioneer settlers, customs, aspirations and attitudes
- xi) Public concern over identified impacts
- xii) Vulnerable groups

- **Legislative and Regulatory Considerations**

- a) Operational relationships between the Central Government and Local Authorities
- b) Description of technical assistance, environmental monitoring, and regulatory enforcement provided by governing authorities to the local community
- c) National and Local Government (NCC) regulations and standards governing:
 - i) environmental quality, pollution discharges to surface water and land
 - ii) industrial discharges to public sewers
 - iii) water reclamation and reuse
 - iv) agricultural landscape
 - v) health and safety
 - vi) siting
 - vii) protection of sensitive areas
 - viii) protection of endangered species
 - ix) land-use control
 - x) solid waste management responsibility
 - xi) ordinances governing public responsibility and participation
 - xii) submission of environmental monitoring data
 - xiii) submission of environmental impact assessment statement
 - xiv) use of inspection and enforcement to assure compliance with the available regulations

- **Determination of the Potential Impacts of the Proposed Project**

- a) Distinctions between:
 - i) significant positive and negative impacts
 - ii) direct and indirect impacts
 - iii) immediate and long-term impacts
- b) Special attention will be given to:
 - i) Social and ecological effects (control over resource allocation and alteration of the riparian ecology)
 - ii) Potential for rehabilitating the Nairobi Dam
 - iii) Impacts of the proposed new projects
 - iv) Potential conflicts between planned and unplanned (spontaneous) development
 - v) Potential for increased incidences of water-borne and water-related diseases
 - vi) Socio-economic environment: Impact of the project on the existing and predicted land-use, land tenure and land titling in the project area.
 - vii) Impact on the present water supply and water uses
 - viii) Impact on the ground water
 - ix) The extent to which receiving water quality standards and/or beneficial use objectives will be achieved from the proposed constructed wetlands
 - x) The length of inlet and outlet rivers and expanse of dam which will be positively or negatively affected by the new projects and the magnitude of the changes in water quality parameters
 - xi) Projected quantitative changes in beneficial uses, such as fisheries (species composition, productivity), recreation and tourism (visitor-days, expenditures), waters available for portable supply, irrigation, industrial use etc.
 - xii) Sanitation and public health benefits being anticipated.
 - xiii) Impacts of/on:

- (1) Project Location
 - (2) Project Design (disruption of hydrology, drainage problems, design of dams and other structures, crossings for people and/or animals)
 - (3) Construction works (disposal of construction spoils)
 - (4) Project operation: Planned Environmental Monitoring
- c) Determine environmental costs and benefits (carry out a CBA) where feasible.
- i) Calculation of avoided costs
 - ii) Resource recovery plans
 - iii) Avoided costs in the form of health care expenditures and lost workdays which would otherwise result from poor sanitation
 - iv) Reduced cost of water treatment for industrial and domestic use downstream
 - v) Increased fisheries
 - vi) Recreation revenues
 - vii) Cost of constructing and managing the constructed wetlands
- d) Cite significant information deficiencies and any uncertainties associated with predictions of impact.
- **Evaluation of Alternatives to the Proposed Project**
 - a) Description of alternatives that were examined in the course of developing the proposed project and identity of other alternatives which would achieve the same objectives
 - i) The concept of alternatives extends to siting and design, technology selection, construction techniques, and phasing, and operating and maintenance procedures
 - b) Compare alternatives in terms of potential environmental impacts, land and energy requirements, capital operating costs, reliability, suitability under local conditions, and institutional, training, and monitoring requirements.
 - c) Determine impacts in the following categories:
 - i) unavoidable,
 - ii) irreversible
 - iii) those which can be mitigated.
 - d) Quantify the cost and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures
 - e) Include the alternative of not constructing the project, in order to demonstrate environmental conditions without it.
 - **Development of Management Plan to Mitigate Negative Impacts**
 - a) Recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels
 - b) Estimate the impacts and costs of those measures, and of the institutional and training requirements to implement them
 - c) Consider compensation to affected parties for impacts which can not be mitigated
 - d) Prepare a management plan including proposed works programmes, budget estimates, schedules, staffing and training requirements, and other necessary support services (e.g. monitoring) to implement the mitigating measures

- **Parallel Programmes (Annexes)**
- a) Solid Waste Disposal Systems
 - i) Improvement of solid waste collection
 - ii) Waste transfer and disposal
 - iii) Strategic siting of disposal facilities
 - iv) Public education and involvement
 - v) Cost recovery systems
 - vi) Economic justification for the overall strategic plan
 - vii) Equipment specification and procurement plans
 - viii) Implementation plans
 - ix) Operation and maintenance procedures
- b) Public water supply systems
- c) How is the community participation part of the earlier conceptualisation and design phase of the project? Without this, EIA might be a more complicated process. Should such a project be there in the first place according to the communities?
- d) Water Quality Standards (effluent discharge standards):
 - i) National
 - ii) WHO and World Bank Guidelines
 - iii) Level of loading of the flowing water (use an appropriate mathematical model)
 - iv) Seasonal data on receiving water quality, volume and concentration of discharges
 - v) Historical hydrologic data to show seasonal flow (river gauging)
- e) Enumeration of uses of the River downstream (receiving waters): industrial, agricultural, domestic, recreation, fishery etc.

3.9 Water Hyacinth Utilisation Project

- The NGO **KICK** (Kisumu Innovation Centre-Kenya) has been selected to implement the project.
- **KICK** have signed an **MoU** with UNEP and an **MoA** with the Global Environment Facility Small Grants Scheme.
- The following **activities** have been undertaken in 2001:
 - On the 9th June 2001, a **Sponsored Water Hyacinth Harvest** was held at the Nairobi Dam Sailing Club.

The event was hosted by Sekou Toure, Director of UNEP's Regional Office for Africa. Graham Alabaster (Managing Water for African Cities - UNCHS), as Secretary of the Sailing Club gave a brief history of the Dam and Cristina Boelcke, Director of UNEP's Division of Regional Cooperation, presented the prizes.

Amongst the 400 people present were **17 teams** from youth, conservation and private sector organisations which competed to see which team could remove the most water hyacinth from the Dam within a limited timeframe. Everyone joined in the spirit of the day and **seven tons** of hyacinth were removed.

Eight demonstrations of income-generating utilisation of water hyacinth were held (fuel-briquettes, furniture, paper, rope, compost etc) by NGOs and community and women's groups.

- **A one month market exposition** assessing the commercial viability of water hyacinth products in Europe has been successfully completed with promising results.

- **Contractees have been identified** to construct the workshop
- **KICK has established** contacts in Kibera
- A **request has been made** to the Nairobi Sailing and Sub-aqua Club to assist with project site
- KICK has begun the process of identifying a Nairobi-based project **micro-manager**
- KICK has begun the process of identifying **potential trainers**
- KICK has begun the process of identifying a **consultant to design the purification ponds**
- **The draft Environmental Impact Assessment has been submitted for consultative review.**

7. Problems

8. Completed Project Document Outputs

The below chart shows the present status of the outputs set-out in the project document:

<u>1. Pilot Project</u>	a) Improved infrastructure in a pilot community, including existing access pathways restored	ONGOING
	b) Sanitation facilities and ablution blocks constructed and administered by the community	
	c) Sewerage, water and electricity systems connected by the local authorities	
	d) A handbook and an information kiosk developed to increase sensitivity to waste management and sanitation	
	e) Solid waste recycling facility established in the pilot community	
	f) Information leaflets on individual and community rights under the 1999 Environmental Management and Coordination Act produced. Legal action taken by individuals and/or the community under the 1999 Environmental Management and Coordination Act recorded	
<u>2. Monitoring/Assessment</u>	a) Pollution monitoring network established	COMPLETED
	b) Baseline assessment and environmental status report, including recommendations and an environmental impact assessment (EIA)	COMPLETED

	c) Updated EMIS mapping system showing the “hot-spots” along the river system in the project area	
	d) Assessment of the impact of the project activities on the quality of the river water	
<u>3. Public Awareness and Education</u>	a) Public awareness material produced jointly with the Managing Water for African Cities Project (UNCHS)	
	b) Comprehensive media coverage and special events	ONGOING
	c) Training and awareness material on wetland and water hyacinth purification systems	
	d) Film produced in conjunction with UNEP Communications and Public Information (CPI) and the Television Trust for the Environment (TVE)	COMPLETED
<u>4. Wetlands at KWS</u>	a) Functioning and well-managed constructed wetland and micro-ecosystem	
	b) 3 workers trained in wetlands construction and management	
	c) Wetlands education and public awareness facility established	
<u>5. Wetlands at Nairobi Dam</u>	a) Functioning and well-managed constructed wetlands and micro-ecosystem	
	b) 3 workers trained in wetlands construction and management	
	c) Training manual on construction and management of wetlands	
	d) Wetlands education and public awareness facility established	
<u>6. Water Hyacinth Utilisation</u>	a) Functioning and well-managed water hyacinth purification ponds	
	b) Production unit for household products and paper made from water hyacinth established	
	c) 20 artisans trained in the production of household products made from water hyacinth	
	d) Marketable, high quality household products and paper made from water hyacinth	

9. New Initiatives

ANNEX ONE: TECHNICAL SUPPORT FRAMEWORK

Nairobi River Basin Project (Phase II)

➤ **IUCN:**

IUCN (The World Conservation Union) is providing the institutional framework for technical support and expertise.

Alongside a direct budget allocation for expert technical staff-time, IUCN has also contributed support to the EIA.

➤ **Pollution Monitoring Team:**

A team of scientists from different academic and research backgrounds has been put together in order to establish a comprehensive and sustainable Pollution Monitoring Network.

The team is headed by Dr Krhoda, Professor of Geography at the University of Nairobi specialising in Hydrology, River Management and Urban Geography.

➤ **Baseline Survey and Environmental Impact Assessment (EIA):**

Baseline Survey and EIA have been undertaken by Henry Ndede, Environmental Consultant, under the supervision of Geoffrey Howard, IUCN. Project implementation will take full account of all technical recommendations and input from the EIA process.

➤ **Nairobi City Council:**

Nairobi City Council (NCC) is collaborating on all aspects of the project and is contributing both expert knowledge and capacities.

As yet, NCC is contributing technical expertise from the following departments: Water and Sewerage, Environment and City Planning.

Input is coordinated through a secretariat in the Environment Department established specifically for the purpose.

➤ **Expert Consultant:**

The leading tropical wetlands expert in Kenya, Dee Raymer, is being contracted to plan, design and oversee the construction of the wetlands at Kenya Wildlife Service Headquarters.

➤ **Implementing NGO's:**

All implementing NGOs are selected for a proven track record in relevant technical areas.

➤ **Technical Focal Point:**

Sharon Kahara, an aquatic systems analyst, is assisting with co-ordination of, and liaison between, all of the above.

ANNEX TWO: POLICY BACKGROUND FRAMEWORK

Nairobi River Basin Project (Phase II)

The project is directed at supporting the Executive Director's commitment to help develop an "action plan" for UNEP's host city and at protecting the sustainability of freshwaters in the Nairobi River Basin. As such, the project supports the following policy decisions:

- **Agenda 21**; Chapter 18/5, which proposes the following programme areas for the freshwater sector:
 - a) Integrated water resources development and management
 - b) Water resources assessment
 - c) Protection of water resources, water quality and aquatic ecosystems
 - d) Drinking-water supply and sanitation
 - e) Water and sustainable urban development
 - f) Water for sustainable food production and rural development
 - g) Impacts of climate change on water resources
- Programme Element 5.2; Result 1.3, of UNEP's Programme of Work for the 2000/01 Biennium: **"increased public participation in river basin management"**.
- **The GEF/SGP** (Global Environment Facility / Small Grants Programme) Kenya Country Programme Strategy states, "Tana and Athi are major rivers that empty into the Indian Ocean. This means that pollution of inland lakes, rivers and water catchments and dams that are directly connected to them would eventually effect the international waters".

As such, the project is also directed at protecting the international waters of the Indian Ocean and thereby supports the following policy decisions:

- **Priorities of the Medium-Term Programme approved by the first meeting of the Inter-Sessional Committee of AMCEN** (Abuja 2000, Annex 1; Paragraph 7):
 - To promote common strategies to address major water concerns.
 - To develop and adopt guidelines for environmental impact assessment of activities in and around shared water bodies.
 - To strengthen national, subregional and regional capacities for formulating and implementing water policies and programmes that are founded on sustainable development principles.
- **GC21/15 Decision on Support to Africa** to assist in the implementation of the Nairobi Convention for the Protection, Management and Development of Marine and Coastal Environments of the East African Region.

ANNEX THREE: INSTITUTIONAL FRAMEWORK

Nairobi River Basin Project (Phase II)

- **Nairobi City Council** - Project Secretariat established in the Environment Department.
- **National Environment Secretariat** - Support for the Project
- **UNEP / CPI** – Public awareness and information, design and preparation of publications and film
- **UNCHS (Habitat) / Managing Water for African Cities (MWAC) Programme** – Pollution control and rehabilitation of the Nairobi Dam; Public awareness campaign
- **UNCHS (Habitat) / Sustainable Cities Programme (SCP)** – Technical support, advisory capacity
- **UNCHS (Habitat) with the Government of Kenya** – Nairobi slum-upgrading project
- **UNDP-GEF Small Grants Project** – Support for Phase II/Nairobi Dam Initiative
- **Government of Belgium** - Support for Phase II/Nairobi Dam Initiative
- **Government of France** - Support for Phase II/Nairobi Dam Initiative
- **Rotary International** – has indicated interest in supporting the project
- **UNICEF** – proposed link with **African Network for the Prevention and Protection Against Child Abuse and Neglect (ANPPCAN)**
- **Nairobi Informal Settlements Coordinating Committee (NISCC)** with support from **British Department for International Development (DFID)** and **Nairobi City Council** – Sanitation and environmental management in Kibera
- **The World Conservation Union (IUCN)** – Support for the Nairobi Dam Initiative
- **Nairobi Central Business District Association (NCBDA)** – Projects focusing on the rehabilitation of Nairobi’s central business district through which Nairobi River runs
- **University of Nairobi (UON), Kenyatta University (KU)** and the **Jomo Kenyatta University of Agriculture and Technology (JKUAT)** – Technical support / research on Nairobi River Basin
- **Kenya Alliance of Residents Associations (KARA)** and **Nairobi Neighborhood and Community Groups** – Community activities related to the environmental protection of the Nairobi River Basin
- **EAWLS, KICK, FONNAP, ITDG, ANPPCAN, NETWAS** and **other NGOs** – Implementation
- **Sunday Standard, KTN** – Media support programme.

ANNEX FOUR: ABBREVIATIONS

Nairobi River Basin Project (Phase II)

UNEP	United Nations Environment Programme
DRC	Division of Regional Cooperation and Representation (UNEP)
ROA	Regional Office for Africa (UNEP)
NRBP	Nairobi River Basin Project
NCC	Nairobi City Council
DEWA	Division of Early Warning and Assessment
UNDP	United Nations Development Programme
IUCN	The World Conservation Union
ANPPCAN	The African Network for the Prevention and Protection against Child Abuse and Neglect
EAWLS	East African Wildlife Society
EIA	Environmental Impact Assessment
UoN	University of Nairobi
NES	National Environment Secretariat
KWS	Kenya Wildlife Service
FoNNaP	Friends of Nairobi National Park
KICK	Kisumu Innovation Centre – Kenya
NETWAS	Network for Water and Sanitation International