

LTBP

Pollution Control and Other Measures to Protect Biodiversity in Lake Tanganyika

Strategic Action Plan

Congo

Conclusions of the National Consultation :

National Diagnostic Analysis - National Environmental Policies and Strategic Review

30 October 1998
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1. Background : the NDA, the NEPSR AND the SAP

One of the (LTBP) project objectives is to establish a regional management plan to control pollution and protect biodiversity of Lake Tanganyika.

The approach adopted for this management objective is the Strategic Action Plan (SAP) based on the idea that management plans have to be revised in response to changing circumstances. The SAP will set up a management framework and will define a revisable plan of interventions classified by priorities.

The process of developing the SAP initially agreed on was made up, for each country, of seven steps from which three of them are at national level and four at regional level:

a) National level :

- NWG Preparatory meeting
- NDA, National Diagnostic Analysis
- NEPSR, National Environmental Priorities and Strategies Review.

b) Regional level:

- Technical Advisory Committee Meeting
- TDA, Transboundary Diagnostic Analysis
- Preparation of the draft SAP
- Signature of SAP

The NDA and the NEPSR precede the TDA which they prepare. The current report aims to account for the national process especially for the NDA et NEPSR of the Democratic Republic of Congo and to set out the outputs.

2. Objectives of NDA – NEPSR National Consultation

The objective of each national consultation (NDA-NEPSR) is to prepare the TDA and the SAP. For this, national consultations aim to provide the same background of preparation for the four delegations, so that the regional putting together will be possible in the TDA. The preparation of each country must also help the delegation to stress efficiently its own interests and special concerns.

Therefore, the specific objectives of the process NDA-NEPSR were the following:

1. To complete the three levels of the « Analytical Problem Matrix » on the diagnosis of the lake biodiversity problems (NDA) and the review of proposed actions account relating to policies, strategies and legislation and institutional measures existing at national level (NEPSR).

The three levels are the following :

Level 1. Main biodiversity problems (in principle pollution, sedimentation, unsustainable fishing practices), transboundary implications, underlying institutional causes, related action areas.

Level 2 : Proposal of measures by action area, specific problems, related stakeholders, uncertainties (needs of investigations and additional studies), actions to be proposed. timing, key agency, availability of human and material resources.

2. To prioritise the identified specific problems (five within each general action area).

3. Progress

The NWG Preparatory Meeting was held in Kinshasa on 14 -15 July 1998. A programme was prepared including proposal of participants, tasks distribution, dates and venue for NDA and NEPSR (respectively in Uvira in September and Kalemie in November). The outbreak of fights on August, with invasion of Uvira and Kalemie by rebellion or foreign forces, has inevitably disturbed the follow up of the programme and landed the country in serious difficulties. The war nevertheless did not prevent the achievement of objectives of the NDA-NEPSR process. A comprehensive workshop, including NDA and NEPSR was finally made possible in Arusha in October 1998. The experience of national consultation processes in other countries had allowed to conclude that the two workshops could easily be grouped without affecting the outputs.

The participants in Arusha workshop were M. Mady Amule, National Coordinator, Me Bashige (INCN), Mr M Baluku (CRSN-Bukavu), Prof Bitijula (ISDR), Mr M.Gayo (Min. Environment), Golama (ISP-Gombe), Kitungano (CRH- Uvira), Mandgi (SENADEP), Me Mbombo (CIC), Mr Mulimbwa (CRH-Uvira), Nshombo (CRH-Uvira), Prof Palata (Univ. Kinshasa), Mr Swedi (CADIC), Prof Takoy (Univ. Kinshasa), and JP Ledant, Facilitator (NRI).

The Arusha workshop was help as follows:

1) 20 - 22 October. Preparatory works by Eastern participants (CRSN , CRH, CADIC, ISDR), awaiting for Kinshasa delegation delayed by unpredicted flying difficulties: preliminary elaboration of Level 2 matrix and first proposal of priorities.

2) 23 rd October. Opening ceremony by the National Coordinator and presentation of the framework and objectives by the Facilitator

3) 23 rd - 24 rd October. Papers presentation by the eleven N.W.G. members :

Lake Biodiversity (Nshombo)

Pollution (Baluku)

Rusizi valley specific problems (Bitijula)

Erosion and sedimentation (Swedi)

Fishery (except gear and practices) (Mandgi)
Fishery (gear and methods) (Mulimbwa)
Protected Areas(Me Bashige)
Demography (Gayo)
Socio-economics inputs of the lake (Kitengano)
Legislation and institutions (Takoy)
Education and awareness

4) Final elaboration of matrices and prioritisation in the following order :

1. Level 1 Matrix
2. Analysis of specific problems and prioritisation
3. Identification of uncertainties and actions
4. Identification of stakeholders and key agencies
5. Assessment of resources availability
6. Timing

5) Argumentation of the main priorities (5 by general of action area) and recapitulation of particular points to be submitted to TDA.

6) Conclusions and closing

3. Results

3.1. Three level matrix analysis

The completed matrix is given in annex 1.

The matrix calls for the following comments:

Level 1 :

1. The three specific problem areas or general action areas (control pollution, reduce sedimentation, regulate fishing) do not facilitate the incorporation of critical sites for the protection of the lake, that are the main deltas and the outlet. That is why the protection of these key sites was added as separate subject.

Level 3:

1. Timing : the mention « suspended » means that the action is normally in progress but interrupted by military events.
2. Availability of resources : the diagnostic is preliminary and does not engage the relevant organisations (which could not be systematically consulted).

3. Availability of human resources: the resource is considered available when the staff is in post with appropriate training (here despite economic and financial constraint for mobilisation or effective motivation)

3.2.Priorities

The specific problems have been listed in two categories: C (Current) and P (Potential). Are considered as P the actions or alterations of the environment which are likely to happen in the future or are happening now without knowing clearly their impact on the Lake Tanganyika biodiversity .

Secondarily, the C problems are prioritised in each of general action areas taken separately.

The criteria of priority are :

1. The seriousness of the problem for the Lake biodiversity
2. The feasibility of the solution to the problem
3. Additional benefits awaited from the solutions to the problem from the point of view of sustainable development.

The outputs are presented as follows:

- Classification C / P : in the second column of matrix level 2 (see annex)
- Prioritisation of C problems: by a number in the same column.
- Justification and explanation of priority criteria for the 5 main problems in each of the three general action areas (see separated table in annex 2)

3.3. Subjects of special transboundary dimension

Every problem or action affecting the lake Tanganyika concerns jointly the four countries and has a transboundary dimension, justifying cooperation, notably by exchanging experience or information between the four countries. However, some problems or topics for of action carry an additional and special transboundary dimension. Those topics that need a special attention in the TDA are presented in annex 3.

ANNEX 1. ANALYTICAL PROBLEM MATRIX (D.R. CONGO)

LEVEL 1

Main Problems	Transboundary Implications	Institutional Problems	General Action Areas
<p>Of first rank :</p> <p>A. Pollution</p> <p>B. Sediment Discharge</p> <p>C. Impact of Fisheries</p> <p>Of second rank :</p> <p>D. Weakness of key sites on the littoral</p>	<p>Loss of quality of water shared between the four countries</p> <p>Loss of shared fisheries resources</p> <p>Loss of regional and global biodiversity</p>	<p>Too many institutions, lacking of coordination, means, and awareness of problems.</p> <p>Laws obsolete, unsuitable, disparate, badly disseminated or known, lacking of effectiveness</p> <p>Legislative reform on going but not yet achieved</p> <p>Military rebellion</p>	<p>A. Control Pollution</p> <p>B. Reduce Sedimentation</p> <p>C. Regulate Fishery</p> <p>D. Protect key sites</p>

LEVEL 2
POLLUTION

Specific Problem	Pr.	Stakeholders	Uncertainties	Actions
1. Pollution by Kiliba sugar factory	1 A	Kiliba sugar factory ; CRH ; CRSN ; INERA ; ISDR ; NGOs and Local Communities ; Min . of Energy ; Ministry of Environment	Impact of pesticides and lime on the lake biodiversity. Non polluting sugar cane fertilising modes and cheep in fertilisers	1.1 Recycling of by - products (bagasse, treacle, lime) 1.2. Assessment of the impact of herbicides on the Lake waters and the biodiversity. 1.3 Research for more appropriate fertilising modalities 1.4 Update legislation 1.5. Control
2. Harbour Pollution (Kalemie, Kabimba, Kalundu, Moba)	2 A	Ministry of Environment Transport and Communication ; CRH ; Ship owners	Nature and quality of pollutants and impact on the Lake biodiversity	2.1. Raise awareness 2.2. Update regulations (eco tax combined system dissuading from legal pollution and penalising illicit pollution) 2.3. Strengthen control 2.4. Installation of controlled disposal sites on dry land 2.5. Identification of pollutants and assessment of their impact on the lake biodiversity

3. Pollution from Kabimba cement factory	3 A	Ciment –lac ; CRH ; CRSN ; INERA ; ISDR ; NGOs and local Communities ; Ministry of Environment	Impact of ashes ; dusts and smokes on lake biodiversity	3.1. Assessment of the impact and identification of the measures to be taken 3.2. Feasibility study of agricultural recovering of ashes 3.3. Implement recommendations 3.4. Update legislation 3.5 Control (= 1.5.)
4. Pollution by lake transport	4A	Min. of Environment ; Transport and Communication service ; CRH ; Ship owners ; CRSN ; External Commerce ; Congolese Office for Control	Nature and quantities of pollutants and impact on lake biodiversity	4.1. Raise awareness (ship operators and other stakeholders) 4.2. Review regulations (navigation rules ; pollution and security standards, transport of hazardous cargo) 4.3. Strengthen control 4.4. Technical control of ships (with anti – pollution and security standards) 4.5. Pollution watching 4.6. Evaluate impact (scale of problem, frequency of discharge, risks, harmfulness of pollutants)
5. Pollution by domestic effluents and	5A	Ministry of Environment (Sanitation services) ; Local Authorities ;	Nature and quantity of pollutants and impact on the Lake biodiversity	5.1 Sanitation (construction of latrines, installation of controlled disposal sites and waste collecting,

waste		Population ; NGOs and Local communities ; Health services ; Urban services ; INERA ; Ministry of Energy		setting up waste and sewage network connected to a treatment plant) : Uvira, Mboko, Kalemie, Moba, Baraka 5.2 . Health education 5.3 Research –development agricultural with view of agricultural and energetic of organic waste 5.4 Identification of pollutants, evaluation of impact.
6. Water blooms	6A			see 1 and 5
7. Salinization of lands in Rusizi plain	P	CRSN ; INERA ; ISDR ; CRH ; Minagri	Impact on waters quality and lake biodiversity	7. 1. Evaluation of impact on the lake and its biodiversity
8. Use of poisons for fishery	P	Min. of Environment ;CRH ; CRSN ; NGOs and local communities	Nature of chemicals, scale of problem and impact	8.1. Raise awareness 8.2. Supervising and monitoring 8.3 Evaluation of scale of problem and its impact.
9. Fallout of bush fire smokes	P	see Sedimentation : 5 CRH	Impact on Lake biodiversity	9.1 Evaluation of impact 9.2 see Sedimentation
10. Normal leakage of hydrocarbons	P	CRH ; CRGM ; Ministry of Energy	Impact on biodiversity: adaptation or tolerance of species	10.1 Study of effects on the biodiversity
11. Prospecting and exploitation	P	Min Environment ; CRH ; CRGM ; Min. of Oil ;	Probability and localisation of works	11.1 Studies of impact on the environment

of oil		Ministry of Energy		11.2 Environment follow up of activities
12. Pollution from cotton farming and processing	P	ESTAGRICO ; FILTSA ; INERA ; CRH ; Min. of Environment	Less polluting methods (integrated or biological) for pesticides control Probability / date of activity resuming	12.1 Developing of better appropriate methods for pesticides control 12.2 Oil cake recovering 12.3 Control enforcement of legislation related to pesticides
13. Risks of introduction of exotic species (fauna and flora)	P	CRH ; Min. of Environment NGOs and local communities ; ISDR ; CRSN	Nursery grounds of exotic fish in the lake basin and scale of risk State of <i>Gnatochromis sp</i> in Rusizi delta and risks	13.1 Inventory of fish farming sites, identification on farmed species and evaluation of risks. 13.2 Assessment of risk linked to <i>Gnathochromis sp.</i> presence in Rusizi delta. 13.3 Biological watching of lake and coastline 13.3. Regulations 13.4. Control 13.5 Raise awareness of fish farmers
14. Risk of spreading for water hyacinth (<i>Eichornia crassipes</i>)	P	CRH	Risk	14.1. Assessment of risk 14.2. Development of control methods
15. Risk of spreading for	P	CRH ; Ministry of environment	Impact	15.1 Supervise

<i>Pistia Stratiodes</i>				
16. Risk of disturbance of plain - lake transfer caused by hydraulic works	P	MINAGRI ; Min of Energy Min. Environment ; CRH ; NGOs ; concerned local communities and population	Impact	16. Studies of impact on the Environment by the hydraulic and hydro farming projects in the catchment of Rusizi Plain
17. Risk of pollution by rice farming (Rusizi)	P	MINAGRI ; M. Environment ; CRH ; INERA ; NGO ; Local communities ; Farmers	Impact	17.1 Control law enforcement on pesticides 17.2 Follow up of impact 17.3 Development and extension of rice farming practices favouring environment

LEVEL 2.
FISHING

Specific Problem	Pr	Stakeholders	Uncertainties	Actions
1. Use of beach seines and tam-tam fishing	1 A	Min. Environment ; Fishermen and associations of fishermen; Manufacturers and suppliers of nets ; CRH ; Fish sellers ; Local authorities ; NGOs and local communities	Accurate impact on biodiversity Development potential of littoral zone Alternatives to the use of seines	1.1 Update legislation 1.2 Strengthen control and supervising capacities 1.3 Raise awareness and education(combined with action 1.5) 1.4. Identification of more adequate gear 1.5 Avail adequate gear at affordable price 1.6. Supervise and train in cooperative management 1.7. Diagnosis of encountered problems during training and functioning of fishermen cooperatives, recommendations for cooperative set up 1.8. Implement recommendations 1.9. Assess development potential of littoral zone 1.10 Assessment of impact on

				biodiversity
2. Use of mosquito nets	2A	Min Environment ; Local authorities ; CRH ; Populations ; Schools NGOs and local communities	Accurate impact of mosquito nets and scale of problem	2.1 Raise awareness and education 2.2 Strengthen control and capacities 2.3. Assessment of scale of problem and impact
3. Fishing in sensitive spawning zones	3A	Min Env. ; Local Authorities ; Fishermen and associations of fishermen ; CRH ; NGOs and local communities ; ICCN ; Religious communities	Complete localisation of the sensitive zones	3.1 Establish protected areas: Rusizi, Ubwari, Kazimia 3.2. Identify other sensitive zones 3.3 Establish protected areas in these zones 3.4. Participative preparation of plans and rules for management with fishermen 3.5 Adapt legislation 3.6 Strengthen control of law enforcement (outside protected areas) 3.7 Establish supervising system for protected areas 3.8 Raise awareness and education
4. Excessive extraction of ornamental fish	4 A	Local authorities ; CRH ; Customs ; Exporters ; Min Environ ;	Vulnerability of all the species potential per species and per site	4.1 Improvement and strengthening of licence delivery (authorised species, quantities, extraction sites)

		ICCN		<p>4.2 Strengthen extraction and exporting control</p> <p>4.3 Establish natural reserves : Luhanga, Pemba, Kalamba, Kiriza (Ubwari)</p> <p>4.4 Additional prospecting in order to expand the network of protected areas</p> <p>4.5 Inscription of lake Cichlides on CITES list, except fish identified as capable to support extraction</p>
5. Excessive density of fishing units in the North	5 A	Min Env ; Fishermen and associations of fishermen ; Local authorities ; CRH ; Fish sellers ; NGOs and local communities ; MINAGRI	Maximal exploitable production	<p>5.1 Strengthen regulations : introduce licence system (according to type of FU) with recording of existing fishermen ; regional harmonisation</p> <p>5.2 Strengthen control</p> <p>5.2 Improvement of statistics</p> <p>5.3 Assessment of potential (maximal exploitable production) both in Northern and Southern zones</p> <p>5.4 Feasibility study of tax raising system aiming to regulate fishing effort (feeding at the same time a lake management fund)</p>

				<p>5.5 Identify reasons of catches increase in the South</p> <p>5.6 According to the results of 5.3 and 5.5 possible identification and implementation of actions for transport and marketing from South to North</p> <p>5.7 Identify actions to develop fish farming</p> <p>5.8 Raise awareness - information</p> <p>5.9 Research aiming at establishing how better fish conservation could decrease pressure on stock and favour transfer of demand towards bigger fish</p>
6. Inadequate mesh sizes in nets used for pelagic fishing (lift nets and gill nets)	6 A	Min Env. ; Fishermen and associations of fishermen ; Local authorities ; Manufacturers and suppliers of nets ; Fish sellers ; CRH ; NGOs and local communities	Sizes of meshes and optimal timing Biology of secondary species	6.1 Follow up of the studies on commendable meshes according to periods of mixing or separation between juvenile schools of younger Lates stapersi and adult Clupeidae 6.2. Studies of secondary species

				<p>6.3 Legislation and system of licence distinguishing 3 categories of meshes: prohibition of smaller meshes, restriction of licence for the nets with medium meshes adequate for the Ndagala, less restrictive limitation for big mesh nets.</p> <p>6.4 Strengthen control of and capacities of control</p> <p>6.5 Education and awareness</p>
7.Excessive lighting by fishing unit (risk of misuse of echo sounders)	7 A	Ministry of Envir ; Fishermen ; and associations of fishermen ; Local authorities ; Manufacturers and suppliers ; CRH ; NGOs and local communities	Optimal equipment	<p>7.1 Regulation of number, types and power of lamps and regulations for echo sounders</p> <p>7.2 Studies aiming at selecting optimal equipment and tolerable equipment</p> <p>7.3 Control</p>
8. Poverty and lack economic alternative to fishing	8 A	Populations ;NGOs and local communities ; ILD (Local initiatives for Development ; Local Authorities ; Minagri ; Ministry of Social Affairs		8.1 Development of infrastructure basic services (education, alphabetisation, health, family planning, water and sanitation, electrification, communication....)

				8.2 Micro projects to develop activities of substitution and backing sector for fishing (processing, preservation) 8.3 Recovering of the eco tourism potential
9. Insecurity, piracy	9 A	Fishermen ; Navy ; Ministry of Environment		9.1 Strengthen supervision 9.2 Raise awareness for the Navy
10. Lack of research data in the South	P	CRH ; Ministry of Education	Hydrobiological data from South	10.1 Establish a station (CRH antenna) in the south
11. Fishing with explosives	P	Ministry of Envir. ; Armed Forces		11.1 Control law enforcement 11.2 Education and awareness

LEVEL 2
SEDIMENTATION

Specific problem	Pr	Stakeholders	Uncertainties	Actions
1. Deforestation	1A	Ministry of Environment ; ICCN ; Local authorities ; NGOs and local communities ; Population ; Ministry of Energy ; MINAGRI		1.1. Education and awareness (including authorities) 1.2 Promotion of private woods and agro forestry (extension, demonstration) 1.3 Protection and restoring of public forests along rivers 1.4 Identification of forestry areas to be protected 15. Establish protected forest areas 1.6 Update legislation 1.7 Strengthen environmental services capacities 1.8 Creation of micro hydropower plants in order to supply substitution energy inciting to protect the catchment 1.9 Action towards improved stoves, improved process for carbonisation and smoking of fish and alternative energy (biogaz, solar etc..)
2. Inadequate farming practices and extensive agriculture	2A	Minagri (SNV) ; Ministry Environ ; INERA ; Population ; NGOs and local communities ; CRH ; Local authorities ; AT	Sensitive zones	2.1 Education and awareness 2.2 Identification of sensitive to erosion zones 2.3 Regulation of soil use in these zones 2.4 Implementing demonstrations (anti erosive techniques, agrozootechnical, agroforestry integration)

				2.5 Extension
3. Anarchic urbanisation	3A	Land affairs, town planning and housing ; Local authorities ;CRGM ; CRSN ; INERA ; NGOs and local communities ; ISDR ; UCB ; REGIDESO ; IBTP		3.1. Planning and regulation of housing (soil occupation planning, urbanism regulations) 3.2 Control 3.3. Strengthen capacities and raise awareness (Land affairs, Urbanism and housing) 3.4. Installation and equipment of real estates 3.5 Re planning of the existing urban centres (Uvira, Mboko, Kalemie, Moba, Baraka) : sanitation (with decanting and treatment), anti-erosive devices, protection against floods, plantations ...
4. Interventions in gullies and river beds	4A	SMG ; TP ; CRGM ; Min. of Envir. ; Local authorities ; Developers	Suitable extraction sites	4.1. Planning barrages for sediments and works to strengthen rivers banks and gullies 4.2. Identify more appropriate stones quarries 4.3 Review legislation 4.4 Raise awareness for developers 4.5 Strengthen control capacities in material extraction (Mines and Geology services, Environmental services)
5. Bush fires	5A	Min. Envir. ; Local authorities ; CRSN ; INERA ; CRH ; ISDR ; NGOs and local communities ; Peasants	Impact of fires on lake and regime or intervention strategies commendable	5.1 Review legislation 5.2 Control 5.3 Education and awareness 5.4. Strengthen capacities for Environment and Minagri services 5.5 Studies on the impact of fire on the lake

			by ecological zone	biodiversity, fire regime and commendable strategies
6. Road maintenance	6A	T.P. (Roads Office) ; Building contractors ; Min. of Envir. ; CRH ; SNR ; NGOs and local communities		6.1. Introduction of environmental clauses in the contractors specifications (prescriptions regarding discharging places, places for material extraction, strengthening of embankments, protection of existing trees etc.)
7. Exploitation of mines and stone quarries (out of riverbeds)	7A	SMG ; CRGM ; Developers ; CRH ; CRSN ; Min. of Environ. ; Local authorities	Impact of Makala charcoal mining on lake biodiversity	7.1 Review mining and quarry legislation 7.2. Review system of licence delivery system 7.3 Strengthening supervising capacities for Geology and Environment services 7.4 Assessment of the impact of Makala charcoal mining (Kalemie) 7.8 Awareness and education
8. Damages on land and vegetation from extensive grazing in Ruzizi plain	8A	MINAGRI ; Cattle farmers ; Local authorities ; Real estate services ; INERA ; CRSN ; CRH		8.1. Clarification of real estate statute 8.2. Intensification of cattle breeding, with precaution for bank stability and quality of Ruzizi waters
9. Possible exploitation of mines deposits not yet exploited	P	Min. of Environment ; Developers ; SMG ; CRGM ; NGOs, local communities and population concerned by impacts		9.1. Promulgation of law on EIA 9.2. Environmental impact assessment (EIA) prior to exploiting, and to heavy prospecting

10. Construction of new roads on littoral or near rivers	P	Min. of Env. ; TP (Roads office) ; NGOs , local communities and population concerned by impacts		10.1. Promulgation of law on EIA 10.2. Prior EIA

LEVEL 2

PROTECTION OF KEY SITES

Specific problem	Pr	Stakeholders	Uncertainties	Actions
1. Need to protect Ruzizi delta		ICCN ; CRH ; CRSN ; NGOs, local communities ; Population		1.1. Establish a protected area adjoining the Burundian area 1.2. Participative preparation of a management plan 1.3. Supervise rate of flow, charge and quality of water
2. Need to protect Lukuga outlet		ICCN ; CRH ; CRSN ; NGOs, local communities ; Population		1.1. Establish a protected area 1.2. Participative preparation of a management plan 1.3. Hydrologic supervising (rate of flow from

				lake)
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LEVEL 3
POLLUTION

Action	Timing	Key Agency	Material Res.	Human Res.
1.1 Recycling of by - products (bagasse, treacle, lime)	Ac. to resources	Min. of Environment	N	N
1.2. Assessment of the impact of herbicides on the Lake waters and the biodiversity.	Ac. to resources	CRH	N	Y
1.3 Research for more appropriate fertilising modalities	Ac. to resources	INERA	N	Y
1.4 Update legislation	On going	Min. of Environment	Y	Y
1.5. Control	Ac. to resources	Min. of Environment	N	Y
2.1. Raise awareness	Ac. to resources	Min. of Environment	N	Y
2.2. Update regulations (eco tax combined system dissuading from legal pollution and penalising illicit pollution)	On going	Min. of Environment	Y	Y
2.3. Strengthen control	Ac. to resources	Min. of Environment	N	N
2.4. Installation of controlled disposal sites on dry land	Ac. to resources	Min. of Environment	N	N
2.5. Identification of pollutants and assessment of their impact on the lake biodiversity	Ac. to resources	CRH	N	N

3.1. Assessment of the impact and identification of the measures to be taken	Ac. to resources	CRH	N	Y
3.2. Feasibility study of agricultural recovering of ashes	Ac. to resources	INERA	N	Y
3.3. Implement recommendations	>3.1, 3.2	Min. of Environment	?	?
3.4. Update legislation	On going	Min. of Environment	Y	Y
3.5 Control	Ac. to resources	Min. of Environment	N	Y
4.1. Raise awareness (ship operators and other stakeholders)	Ac. to resources	Min. of Environment Transp. & Comm.	N	Y
4.2. Review regulations (navigation rules ; pollution and security standards, transport of hazardous cargo)	On going	Min. of Environment	Y	Y
4.3. Strengthen control	Ac. to resources	Min. of Environment	N	N
4.4. Technical control of ships (with anti – pollution and security standards)	Ac. to resources	Transp. & Comm.	N	Y
4.5. Pollution watching	Ac. to resources	CRSN	N	Y
4.6. Evaluate impact (scale of problem, frequency of discharge, risks, harmfulness of pollutants)	Ac. to resources	CRH	N	Y
5.1 Sanitation (construction of latrines, installation of controlled disposal sites and waste collecting, setting up waste and sewage network connected to a treatment plant) : Uvira, Mboko, Kalemie, Moba, Baraka	Ac. to resources	Min. of Environment	N	N
5.2 . Health education	Ac. to resources	Health services	N	Y
5.3 Research –development agricultural with view of agricultural and energetic of organic waste	Ac. to resources	INERA	N	Y
5.4 Identification of pollutants, evaluation of	Ac. to resources	CRH	N	Y

impact.				
see 1 and 5			N	Y
7. 1. Evaluation of impact on the lake and its biodiversity	Ac. to resources	CRH	N	Y
8.1. Raise awareness	>8.3	Min. of Environment	N	Y
8.2. Supervising and monitoring	>8.3	Min. of Environment	N	Y
8.3 Evaluation of scale of problem and its impact.	Ac. to resources	CRH	N	Y
9.1 Evaluation of impact	Ac. to resources	CRH	N	Y
9.2 see Sedimentation	(see Sed.)	(see Sed.)		
10.1 Study of effects on the biodiversity	Ac. to resources	CRH	N	Y
11.1 Studies of impact on the environment	Ac. to projects	Min. of Environment	Y	N
11.2 Environment follow up of activities	>11.1	Min. of Environment	Y	N
12.1 Developing of better appropriate methods for pesticides control	Ac. to resources	INERA	N	Y
12.2 Oil cake recovering	Ac. to resources	INERA	N	Y
12.3 Control enforcement of legislation related to pesticides	Ac. to resources	Min. of Environment	N	Y
13.1 Inventory of fish farming sites, identification on farmed species and evaluation of risks.	Ac. to resources	CRH	N	Y
13.2 Assessment of risk linked to <i>Gnathochromis sp.</i> presence in Rusizi delta.	Ac. to resources	CRH	N	Y
13. 3 Biological watching of lake and coastline	Ac. to resources	CRH	N	Y
13.3. Regulations	Without delay	Min. of Environment	Y	Y
13.4. Control	Ac. to resources	Min. of Environment	N	N
13.5 Raise awareness of fish farmers	Ac. to resources	Min. of Environment	N	N

14.1. Assessment of risk	Ac. to resources	CRH	N	Y
14.2. Development of control methods	Ac. to resources	CRH	N	Y
15.1 Supervise	Ac. to resources	CRH	N	Y
16.1 Studies of impact on the environment	Ac. to projects	Min. of Environment	Y	N
17.1 Control law enforcement on pesticides	Ac. to resources	Min. of Environment	N	Y
17.2 Follow up of impact	Ac. to resources	CRH	N	Y
17.3 Development and extension of rice farming practices favouring environment	Ac. to resources	MINAGRI	N	Y

LEVEL 3 FISHING				
Action	Timing	Key Agency	Material Res.	Human Res.
1.1 Update legislation	On going	Min. of Environment	Y	Y
1.2 Strengthen control and supervising capacities	Ac. to resources	Min. of Environment	Y	N
1.3 Raise awareness and education(combined with action 1.5)	Suspended	Min. of Environment	Y	Y
1.4. Identification of more adequate gear	Without delay	CRH	Y	Y
1.5 Avail adequate gear at affordable price	>1.4	Min. of Environment	Y	Y
1.6. Supervise and train in cooperative management	Suspended	Min. of Environment	Y	Y
1.7. Diagnosis of encountered problems during training and functioning of fishermen cooperatives, recommendations for cooperative set up	Ac. to resources	Min. of Environment	N	Y
1.8. Implement recommendations	>1.7	Min. of Environment	N	Y
1.9. Assess development potential of littoral zone	Ac. to resources	CRH	N	Y
1.10 Assessment of impact on biodiversity	Ac. to resources	CRH	N	Y
2.1 Raise awareness and education	Suspended	Min. of Environment	Y	Y
2.2 Strengthen control and capacities	Ac. to resources	Min. of Environment	N	N
2.3. Assessment of scale of problem and impact	Ac. to resources	CRH	N	Y

3.1 Establish protected areas: Rusizi, Ubwari, Kazimia	Ac. to resources	ICCN	N	Y
3.2. Identify other sensitive zones	Ac. to resources	CRH	N	Y
3.3 Establish protected areas in these zones	>3.1	ICCN	N	Y
3.4. Participative preparation of plans and rules for management with fishermen	>3.1; 3.2	ICCN	N	Y
3.5 Adapt legislation	On going	Min. of Environment	Y	Y
3.6 Strengthen control of law enforcement (outside protected areas)	Ac. to resources	Min. of Environment	N	Y
3.7 Establish supervising system for protected areas	>3.1 and 3.7	ICCN	N	N
3.8 Raise awareness and education	Suspended	Min. of Environment	Y	Y
4.1 Improvement and strengthening of licence delivery (authorised species, quantities, extraction sites)	Without delay	Min. of Environment	Y	Y
4.2 Strengthen extraction and exporting control	Ac. to resources	Min. of Environment	N	N
4.3 Establish natural reserves : Luhanga, Pemba, Kalamba, Kiriza (Ubwari)	Ac. to resources	ICCN	N	Y
4.4 Additional prospecting in order to expand the network of protected areas	Ac. to resources	CRH	N	Y
4.5 Inscription of lake Cichlides on CITES list, except fish identified as capable to support extraction	Without delay	Min. of Environment	Y	Y
5.1 Strengthen regulations : introduce licence system (according to type of FU) with recording of existing fishermen ; regional harmonisation	Ac. to resources	Min. of Environment	N	Y

5.2 Strengthen control	Ac. to resources	Min. of Environment	N	N (Insuf.)
5.2 Improvement of statistics	Ac. to resources	CRH	N	Y
5.3 Assessment of potential (maximal exploitable production) both in Northern and Southern zones	Ac. to resources	CRH	N	
5.4 Feasibility study of tax raising system aiming to regulate fishing effort (feeding at the same time a lake management fund)	Ac. to resources	CRH	N	Y
5.5 Identify reasons of catches increase in the South	Ac. to resources	CRH	N	Y
	Ac. to resources	Min. of Environment	N	Y
5.6 According to the results of 5.3 and 5.5 possible identification and implementation of actions for transport and marketing from South to North	Ac. to resources	MINAGRI	N	Y
5.7 Identify actions to develop fish farming	Suspended	Min. of Environment	Y	Y
5.8 Raise awareness - information	Ac. to resources	CRH	N	Y
5.9 Research aiming at establishing how better fish conservation could decrease pressure on stock and favour transfer of demand towards bigger fish				

6.1 Follow up of the studies on commendable meshes according to periods of mixing or separation between juvenile schools of younger Lates stapersi and adult Clupeidae	Ac. to resources	CRH	N	Y
6.2. Studies of secondary species	Ac. to resources	CRH	N	Y
6.3 Legislation and system of licence distinguishing 3 categories of meshes: prohibition of smaller meshes, restriction of licence for the nets with medium meshes adequate for the Ndagala, less restrictive limitation for big mesh nets.	>6.1; 6.2	Min. of Environment	N	Y
6.4 Strengthen control of and capacities of control	Ac. to resources	Min. of Environment	N	N
6.5 Education and awareness	Suspended	Min. of Environment	Y	Y

7.1 Regulation of number, types and power of lamps and regulations for echo sounders	>7.2	Min. of Environment	Y	Y
7.2 Studies aiming at selecting optimal equipment and tolerable equipment	Ac. to resources	CRH	N	Y
7.3 Control	>7.1	Min. of Environment	N	N
8.1 Development of infrastructure basic services (education, alphabetisation, health, family planning, water and sanitation, electrification, communication....)	Ac. to resources	Government	N	Y
8.2 Micro projects to develop activities of substitution and backing sector for fishing (processing, preservation)	Ac. to resources	NGOs and Government	N	Y
8.3 Recovering of the eco tourism potential	Ac. to resources	Government	N	Y
9.1 Strengthen supervision	>9.2	Navy	Y	Y
9.2 Raise awareness for the Navy	Without delay	Min. of Environment	Y	Y
10.1 Establish a station (CRH antenna) in the south	Ac. to resources	Min. of Education	N	N
11.1 Control enforcement of law	Ac. to resources	Min. of Environment		
11.2 Education and awareness	Ac. to resources	Min. of Environment		

LEVEL 3 SEDIMENTATION				
Action	Timing	Key Agency	Material Res.	Human Res.
1.1. Education and awareness (including authorities)	Ac. to resources	Min. of Environment	N	Y
1.2 Promotion of private woods and agro forestry (extension, demonstration)	Ac. to resources	Min. of Environment	N	Y
1.3 Protection and restoring of public forests along rivers	Ac. to resources	Min. of Environment	N	Y
1.4 Identification of forestry areas to be protected	Ac. to resources	ICCN	N	Y
15. Establish protected forest areas	>1.4	ICCN	N	Y
1.6 Update legislation	On going	Min. of Environment	Y	Y
1.7 Strengthen environmental services capacities	Ac. to resources	Min. of Environment	N	Y
1.8 Creation of micro hydropower plants in order to supply substitution energy inciting to protect the catchment	Ac. to resources	Min. of Energy	N	Y
1.9 Action towards improved stoves, improved process for carbonisation and smoking of fish and alternative energy (biogaz, solar etc..)	Ac. to resources	Min. of Environment	N	Y
2.1 Education and awareness	Ac. to resources	MINAGRI (SNV)	N	Y
2.2 Identification of sensitive to erosion zones	Ac. to resources	INERA	N	Y
2.3 Regulation of soil use in these zones	>2.2	Min. of Environment	Y	Y
2.4 Implementing demonstrations (anti erosive techniques, agrozootechnical, agroforestry integration)	>2.2	INERA	Y	Y
2.5 Extension	>2.2	MINAGRI (SNV)	Y	Y

3.1. Planning and regulation of housing (soil occupation planning, urbanism regulations)	Ac. to resources	Town Planning	N	Y
3.2 Control	Ac. to resources	Town Planning	N	Y?
3.3. Strengthen capacities and raise awareness (Land affairs, Urbanism and housing)	Ac. to resources	Town Planning	N	Y?
3.4. Installation and equipment of real estates	Ac. to resources	Town Planning	N	Y?
3.5 Re planning of the existing urban centres (Uvira, Mboko, Kalemie, Moba, Baraka) : sanitation (with decanting and treatment), anti-erosive devices, protection against floods, plantations ...	Ac. to resources	Town Planning	N	N (Insuf.)
4.1. Planning barrages for sediments and works to strengthen rivers banks and gullies	Ac. to resources	TP	N	Y
4.2. Identify more appropriate stones quarries	Ac. to resources	CRGM	N	Y
4.3 Review legislation	On going	SMG	Y	Y
4.4 Raise awareness for developers	Ac. to resources	Min. of Environment	N	Y
4.5 Strengthen control capacities in material extraction (Mines and Geology services, Environmental services)	Ac. to resources	SMG Min. of Environment	N	Y
5.1 Review legislation	On going	Min. of Environment	Y	Y
5.2 Control	Ac. to resources	Min. of Environment	N	N
5.3 Education and awareness	Ac. to resources	Min. of Environment	N	N
5.4. Strengthen capacities for Environment and Minagri services	Ac. to resources	Min. of Environment MINAGRI	N	Y
5.5 Studies on the impact of fire on the lake biodiversity, fire regime and commendable strategies	Ac. to resources	INERA	N	Y

6.1. Introduction of environmental clauses in the contractors specifications (prescriptions regarding discharging places, places for material extraction, strengthening of embankments, protection of existing trees etc.)	Without delay	Min. of Environment	Y	Y
7.1 Review mining and quarry legislation	On going	SMG	Y	Y
7.2 Review system of licence delivery system	Ac. to resources	SMG	Y	Y
7.3 Strengthening supervising capacities for Geology and Environment services	Ac. to resources	SMG	N	N
7.4 Assessment of the impact of Makala charcoal mining (Kalemie)	Ac. to resources	CRH	N	Y
7.5 Awareness and education	Ac. to resources	Min. of Environment	N	Y
8.1. Clarification of real estate statute	Without delay	Real estate services	Y	Y
8.2. Intensification of cattle breeding, with precaution for bank stability and quality of Ruzizi waters	>8.1	MINAGRI	N	Y
9.1. Promulgation of law on EIA	Without delay	Min. of Environment	Y	Y
9.2. Environmental impact assessment (EIA) prior to exploiting, and to heavy prospecting	Ac. to projects	Min. of Environment	Y	N
10.1 Promulgation of law on EIA		Min. of Environment	Y	Y
10.2 Prior EIA		Min. of Environment	Y	N

LEVEL 3 PROTECTION OF KEY SITES				
Action	Timing	Key Agency	Material Res.	Human Res.
1.1 Establish a protected area adjoining the Burundian area	Ac. to resources	ICCN	N	Y
1.2 Participative preparation of a management plan	Ac. to resources	ICCN	N	Y
1.3 Supervise rate of flow, charge and quality of water	Ac. to resources	CRH	N	Y
1.1 Establish a protected area	Ac. to resources	ICCN	N	Y
1.2 Participative preparation of a management plan	Ac. to resources	ICCN	N	Y
1.3 Hydrologic supervising (rate of flow from lake)	Ac. to resources	CRH	N	Y

ANNEX 2

REASONS FOR PRIORITISATION OF THE FIRST 5 PRIORITIES BY GENERAL ACTION AREA

1. Pollution

Problem of POLLUTION	Seriousness	Feasibility of Solutions	Additional Criteria
1. Kiliba Sugar Factory	Combined pollution, continued, in quantities	- Localised pollution - Existence of technical solutions	- Profit for water users - Waste development in recycling - Potential saving of fertiliser
2. Pollution from Harbour	Dangerous pollutants (e.g. hydrocarbons)	- Localised pollution - Existence of technical solutions	- Profits for water users - Concentration of the latter near sources of pollution - Development of some waste in recycling
3. Kabimba Cement Factory	Continued pollution, relatively in large quantities, but little toxicity	- Localised pollution - Existence of technical solutions	- Profits for water users - Development of some waste in recycling
4. Lake Transportation	- Cumulative chronic pollution (e.g. hydrocarbons) - Risk of serious accidental pollution	- Potential identifiable pollutants - Existence of technical solutions	- Profits for water users - Improvement of transportation security
5. Domestic Sewage	Important organic pollution	- Localised pollution - Existence of technical solutions	- Profits for water users - Concentration of the latter near sources of pollution - Particular effects on public health

REASONS FOR PRIORISATION OF THE FIRST 5 PRIORITIES BY GENERAL ACTION AREA

1. Fishing

Problem of FISHING	Seriousness	Feasibility of Solutions	Additional Criteria
1. Beach seines	<ul style="list-style-type: none"> - Gear very much in use - Non selective gear and catching small or young fish - Use on littoral rich in biodiversity 	<ul style="list-style-type: none"> - Good perspective of finding alternatives 	<ul style="list-style-type: none"> - Sustainable maximum production compromised by practise
2. Mosquito nets	<ul style="list-style-type: none"> - Scale of use unknown, under estimated by surveys - Gear catching small or young fish - Use on littoral rich in biodiversity 	<ul style="list-style-type: none"> - Existence of alternatives - Minor activity 	<ul style="list-style-type: none"> - Sustainable maximum production apparently compromised by practise
3. Fishing in spawning areas	<ul style="list-style-type: none"> - Extraction at sensitive stage - Disturbance of non extracted species - Use in areas rich in biodiversity 	<ul style="list-style-type: none"> - Localised phenomenon 	<ul style="list-style-type: none"> - Sustainable maximum production compromised by practise
4. Ornamental fish	<ul style="list-style-type: none"> - Targeted extraction of some vulnerable endemic species, for which demand increases with scarcity 	<ul style="list-style-type: none"> - Specialised exporters, not very numerous, identifiable 	
5. Density of FUs in the North	<ul style="list-style-type: none"> - Major cause of stock decrease in the pelagic North - Possible impact on secondary species 	<ul style="list-style-type: none"> - Existence of commendable solutions 	<ul style="list-style-type: none"> - Sustainable maximum production compromised by practise

REASONS FOR PRIORISATION OF THE FIRST 5 PRIORITIES BY GENERAL ACTION AREA

1. Sedimentation

Problem of SEDIMENTATION	Seriousness	Feasibility of Solutions	Additional Criteria
1. Deforestation	Primary cause (triggering and major of erosion at wide range)	- Existence of commendable solutions - Existence of locally favourable social dynamics (afforestation, agro- forestry)	Various usefulness of forest other than its anti sedimentation role (wood production and others, regulation of waters, conservation of forest biodiversity, including endemic species)
2. Farming practices	Major cause of erosion at wide range	- Existence of technical solutions with large improvement potential	Sustainability of agriculture
3. Anarchic urbanisation	Cause sharp erosion, included on non sedimentary shores, where biodiversity is very sensitive to sedimentation	- Localised problem, confined (urban centres) - Existence of technical solutions	Improvement of urban environment for direct profit of inhabitants and socio-economic development
4. Disturbance of rivers (extraction of materials)	Direct cause of sediment transfer to lake	- Fairy localised problem, confined (rivers) - Existence of alternatives	Potential effects in the field or protection against floods, mudslides
5. Bush fires	Very large surface concerned, but impact on surface unit limited	- Difficult to solve, but possibility to improve strategy - Need to consider benefits of	Hope to optimize cost- advantage appraisal for fires, including in the land ecosystems (protection of

	fire	plantations, saving of useful biomass)
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ANNEX 3

SUBJECTS OF SPECIAL TRANSBOUNDARY NATURE

Any problem affecting Lake Tanganyika is of joint concern for the four riparian countries. The following table gives subjects of special transboundary nature.

Subject	Country specially concerned	Rank of priority
Coordinated management of fishing (regulation of total fishing effort, possible tax raising system for the management of the lake, regional projects in order to solve joint problems such as beach seines)	DRC, B, T, Z	1
Police and surveillance	DRC, B, T, Z	2
Lake transportation	DRC, B, T, Z	3
Transboundary trade :		4
Ornamental fish	DRC, B, T, Z	
Fish	DRC, B, T	
Fishing equipment	DRC, B	
Fuelwood and charcoal	DRC, B	
Gold (export to Burundi)	DRC, B, T	
Pesticides	DRC, B	
Protection of Ruzizi delta	DRC, B	5
Presence of water hyacinth in DRC, likely to modify strategies of other countries	DRC, B, T, Z	6
Security of power supply (on which depends the Uvira sewage treatment plant)	DRC, B	7
Management of rice and cotton sectors in the plain of Ruzizi	DRC, B	8
Possibility to use Mpulungu Station for scientific exploration of southern lake in Katanga	DRC, Z	9
	DRC, B, T	10

Possible exploration (and transportation) of oil

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