

Policy options

This section aims to identify feasible policy options that target key components identified in the Causal chain analysis in order to minimise future impacts on the transboundary aquatic environment. Recommended policy options were identified through a pragmatic process that evaluated a wide range of potential policy options proposed by regional experts and key political actors according to a number of criteria that were appropriate for the institutional context, such as political and social acceptability, costs and benefits and capacity for implementation. The policy options presented in the report require additional detailed analysis that is beyond the scope of the GIWA and, as a consequence, they are not formal recommendations to governments but rather contributions to broader policy processes in the region.

Problem definition

Lake Victoria is an international water body that offers the riparian communities several environmental services. Over the past three decades or so, the Lake has come under increasing and considerable pressure from a variety of inter-linked human activities such as overfishing, species introductions, industrial pollution, eutrophication, and sedimentation. The waters of Lake Victoria and its shoreline are shared between three countries; Kenya (6%), Uganda (43%), and Tanzania (51%). Additionally, the catchment of the principal affluent river, the Kagera, runs through the countries of Rwanda and Burundi. The two GIWA concerns that are addressed for Lake Victoria are: Unsustainable exploitation of fish and other living resources, and Pollution. Under the first concern, the two important issues that were identified were overexploitation and destructive fishing practices. Under the concern Pollution, the important issues identified were

microbiological, eutrophication, chemical and suspended solids, but the latter has been integrated into the former three issues.

In the Causal chain analysis, the root cause of Unsustainable exploitation of fish resources was identified as the existence of a market for fish, both domestic and, more importantly, export. This is not to say that the market is undesirable, but that it should be regulated. Other root causes are inadequate regulation, poverty, poor institutional and legal arrangements, low civic education and awareness, low management capacity by communities, availability of market for undersized fish, and corruption. Whereas these root causes lead to unsustainable exploitation practices for subsistence fishing, in most cases profit is the main factor driving the process. This prompts people to even indulge in rent-seeking behaviour for short-term gain regardless of future outcome. As a result of these mainly illegal practices, individuals and governments end up losing out on income and revenue, respectively. The EU export ban is a relevant case in point where fish contamination as a result of using poison for fishing resulted in a boycott of fish from Lake Victoria by the EU in 1999. The environmental degradation of the Lake Victoria Basin over the last three decades (due to high population, massive algal blooms, water-borne diseases, water hyacinth infestation, oxygen depletion, introduction of alien fish species etc.) has been determined as placing a present value of 270–520 million USD at risk to the lake communities, if the large export fishery for Nile perch was lost (World Bank 1996). The collapse of the Nile perch fishery may become a reality sooner rather than later in the event that things are left in a “business as usual” scenario. However, many of these concerns are being addressed through a 30 million EUR grant, from the European Union to the East African Community States, being implemented by the Secretariat of the Lake Victoria Fisheries Organization.

Sources and causes of pollution in Lake Victoria have also been discussed in the Causal chain analysis. Four types of pollution issues

have been identified: microbiological, eutrophication, chemical and suspended solids. All these emanate from the catchment areas in both urban and rural settings. The role of the Kagera River as a main contributor of suspended solids, nutrients and water hyacinth is an extremely important consideration when evaluating policy options for sustainable management of the Lake. Untreated industrial and municipal effluent together with agricultural run-off are the main contributors of microbiological and chemical pollution and are a source of nutrients contributing to eutrophication, while suspended solids are derived from erosion of degraded catchments, riverbanks and lake-edge environments due to poor agricultural practices and high grazing intensities. All these contaminants make the Lake water unfit for recreation (swimming), consumption and other uses unless a huge processing cost is incurred. Pollution destroys habitat for freshwater life forms while at the same time making them unavailable for nutritional purposes. For the majority of people living by the lake shore and subsisting by fishing, this implies that malnutrition and health problems will entrench themselves and exacerbate the deepening poverty among their ranks.

When developing the Policy options for Lake Victoria, a multitude of options were discussed and evaluated. Tables 30 and 31 present the various Policy options that were considered for mitigating the identified problems in the Lake Basin.

Political and organisational frameworks

The feasibility of policy options in Lake Victoria is looked upon in conjunction with the establishment of the regional integration of the East African Community (EAC 2001). The East African Community offers a good prospect for the success of the policies, which have been proposed here, in that it provides a conducive environment for Kenya, Uganda and Tanzania to work together towards common goals. It thus provides a good framework for policy harmonisation and closer co-operation in overseeing closer and effective implementation of activities collectively agreed upon. Article 112 in the East African Community Treaty (EAC 2001) lists areas of agreement in the management of the environment as follows:

- The development of a common environmental management policy;

Table 30 Policy options analysis matrix: overexploitation and destructive fishing issues.

Issue	Root cause	Policy options	Effectiveness	Efficiency	Equity	Political feasibility	Implementation capacity
Overexploitation	Availability/access to markets for fish.	Quota for fisheries (in order to restrict effort).	High Existence of BMUs.	Moderate Community participation.	High All stakeholders to benefit intergenerational.	Moderate Existence of political will in EAC.	Moderate Existing capacity could be boosted with new programmes.
		Quota for processing.	High Few processing plants.	High Restriction of demand hence supply.	Low Structure of fish supply left intact.	Moderate Existence of political will in EAC.	High Existing national fisheries offices.
	Governance	Review of the rules and regulations and existing fisheries policies. Political will to implement rules and regulations.	High Some of the regulations and penalties are inadequate.	High Will address present and future environmental and social needs.	High Policies and rules geared towards safeguarding the sustainability of fisheries.	High Existence of political will in EAC.	High National fisheries departments with EAC secretariat.
		Civic education and awareness. Incorporation of environmental education in school curricula.	High Will enhance compliance and community co-operation.	Moderate Cost of training high.	High Enhanced awareness of rights and obligations.	High EAC framework facilitates.	Moderate NGOs and government departments exist.
Destructive fishing practices	Poor institutional and legal arrangements.	Strengthening monitoring and enforcement of restrictions.	High Curb illegal gear use.	Moderate High set-up cost for monitoring and enforcement.	High Involves all beneficiaries.	Moderate Exists under EAC initiative.	Moderate Cost element should be solved by involving communities under co-management.
	Corruption	Enforce rule of law.	High Reduced illegal activities.	High Safeguarding values of resources and enhancement of sustainability.	High Fairness in access to resources enhanced.	Moderate Fight against corruption is a priority by all three EAC governments.	High Existing police and legal authorities and the community at large in all three EAC countries.
	Low civic education and awareness and low management capacity by communities	Provide civic education and awareness, empower and involve more communities in management.	High Will enhance compliance and community co-operation.	Moderate Cost of training high.	High Enhanced awareness of rights and obligations.	High EAC framework facilitates.	Moderate NGOs and government departments exist.
	Availability of markets for undersized fish.	Impose slot size restrictions on the fish processing factories.	Moderate Maybe jeopardised by unscrupulous civil servants.	Moderate	High Everyone wins in the long run.	High Sustainability of fishery at stake.	Moderate Cost of monitoring high.
	Poverty	Provision of credit to artisan fishers.	High Most people in need of credit do not access it presently.	Moderate Improved methods of fishing.	High Enable poor to exploit economic opportunities.	High Included in national development policies	Moderate NGOs, relevant government departments programs.

- The development of special environmental management strategies;
- Taking measures to control transboundary air, land and water pollution arising from developmental activities;
- Integrating environmental management and conservation measures in all development activities.

The Treaty further spells out the Partner States' intention in the management of natural resources: conserve natural resources; co-operate in the management of natural resources for the conservation of the eco-systems and the arrest of environmental degradation; and adopt common regulations for the protection of shared aquatic and terrestrial resources (in Article 114).

Due to the recognition of the inevitability of negative impact on the environment and natural resources depletion arising from development activities, the Treaty further highlights areas of co-operation in its chapter 19, Article 111, as to:

- (a) Foster cooperation in the joint and efficient management and sustainable utilisation of natural resources;
- (b) Co-operate and co-ordinate policies and actions for the protection and conservation of the natural resources and environment against all forms of degradation arising from developmental activities;
- (c) Adopt common policies for control of transboundary movement of toxic and hazardous waste including nuclear materials and any other undesirable materials;
- (d) Provide timely and relevant information on natural and human activities that may or are likely to have significant transboundary environmental impact, and consultation at an early stage;
- (e) Develop and promote capacity building programmes for a sustainable management of natural resources.

The above actions, which have been agreed by the community member states, aim to:

- (a) Process, protect and enhance quality of the environment;
- (b) Contribute towards sustainability of the environment;
- (c) Ensure sustainable utilisation of natural resources such as lakes, wetlands, forests and other aquatic and terrestrial ecosystems;
- (d) Jointly develop and adopt water resources conservation and management policies that ensure sustainability and preservation of ecosystems.

In Article 112, the Partner States further agree to, "integrate environmental management and conservation measures in all developmental activities such as trade, transport, agriculture, industrial development, mining and tourism in the community". This agreement is crucial to the integrity of the natural environment of member states and

is bound to facilitate a greater co-ordination and success in conserving the natural environment while benefiting from it.

A lot of work has been done on sustainable development in the Lake Victoria Basin, which has been designated as a regional economic growth zone to be exploited jointly to maximise economic and social benefits while ensuring effective environmental management and protection (EAC 2001:40). Amongst these areas of cooperation are:

- (a) The implementation of the Fisheries Management Plan for Lake Victoria through the Lake Victoria Fisheries Organisation (LVFO) by a grant to the East African Community States from the European Union;
- (b) Establishment of the Lake Victoria Fisheries Organisation Secretariat, an information clearing-house for fisheries related information on Lake Victoria;
- (c) Review of a study report on the Economic Potential and Constraints for Sustainable Development of Lake Victoria Basin as an Economic Growth Zone;
- (d) Extension of Lake Victoria Environmental Management Programme (LVEMP) for Tanzania and Uganda, while Kenya has applied for a 2-year extension from the World Bank.

Reports on progress and achievements of LVEMP, since its inception, show that work on various issues pertaining to the environment and natural resources is continuing. Some of the ongoing work includes:

- i. Treatment of plastic materials with special emphasis on polyethylene materials. A study is to be conducted;
- ii. Development of a shared EAC Water Vision, Common Water Policy and Comprehensive Development Strategy;
- iii. Implementation of the Lake Victoria Development Programme through the establishment of a Sectoral Council. The Committee on the Lake Victoria Development Programme also recommended that ways should be explored to ensure that the next phases of the LVEMP are funded on a grant basis, since most of the programmes are of a biodiversity nature with global benefits;
- iv. Apart from emphasising the enforcement of slot size prohibiting processing of fish less than 50 cm or greater than 85 cm for Nile perch harvesting, the Lake Victoria Fisheries Organisation (LVFO) has been urged to initiate the patenting of the Victoria Perch by the EAC, Council of Ministers of the LVFO;
- v. Other measures of practical nature which have been discussed include establishing a proper monitoring, control and surveillance (MCS) mechanism, issuing of seizure forms for confiscated items and official receipts for any fines, the use of courts of law for culprits and the sharing of this information with Partner states, etc., and a strong condemnation of fish smuggling.

The above are only some of the developments taking place in the EAC co-operation on environment and natural resources management. There has been good progress in the implementation of the decisions taken by the Council although there are funding problems. During the year 2002, the Lake Victoria Development Programme (LVDP) put emphasis on activities, which lead to strengthening and consolidating its role in promoting, coordinating and harmonising the various programmes and projects in the Lake Victoria Basin. The LVDP has already established and operationalised National Focal Points in the Partner States' Ministries responsible for Lake Victoria development. These Ministries include the Ministry of Environment and Natural Resources in Kenya, the Ministry of Water Livestock Development in Tanzania and the Ministry of Foreign Affairs in Uganda. Other achievements include studies conducted to form a basis for objective decisions on environmental and natural resources management in the implementation of the Treaty. The implication for East Africa is that the feasibility of policy options suggested here has a high probability of success owing to the solid foundation of the co-operation, which manifests the existence of political will among the member countries.

Options

Overexploitation of fish

Policy options that can address overexploitation of fish are (see also Table 30):

- Quota for fishing
- Quota for processing
- Review of the rules and regulations and existing policies
- Civic education and awareness

Option 1: Quota for fishing

This policy option has a high probability of success in the medium-term (5 years). There should be involvement of stakeholders (fishers in co-management) and a change of attitude from a government-driven to a community-driven process including ownership. The process should be initiated in areas where there is a felt need. This will ensure self-regulation and sustainability. A conducive environment should be created for the success of the instruments required (revision of by-laws, scientific basis for decision-making, education and training; financial and technological assistance, etc.). This should control the number of entrants and ensure that efforts are at a sustainable level with minimum cost. The wise use of resources and democratisation of political processes for sustainable development should be politically feasible and provide equitable dividends to stakeholders. There is, however, the risk that some people

will fight against it if they are not well informed of its benefit, namely, the sustainability of the fishery. Some business people, however, may not be interested in sustainability, but would want to reap the highest profit allowed by the market. As long as their market exists, they may continue to provide effective demand to fishers by buying what is available in the market. This implies that quota for fishing should be combined with other policy options such as quota for processing to make the market conditions binding. The sustainability of fishery means that the presently threatened livelihood of the majority of the riparian people would be assured. The implementation cost for this policy option is large considering aspects such as monitoring and enforcement. However, it need not be an obstacle if communities are involved in a participatory manner. The communities, properly empowered through co-management, will absorb most of these costs.

Option 2: Quota for processing

This policy option should follow the same lines as the quotas for fisheries. However, this measure will not provide for equity since the basis for redistribution of benefits lies in the fishing and selling of fish. It does not guarantee fair distribution of access to fish. However, it holds the highest possibility of controlling the amount of fish landed by restricting the main market. Resistance is expected from both sellers and buyers of fish, but with the dwindling stock of fish and reduced supply, in terms of both quantity and quality, it is expected that proper awareness will avoid this obstacle. Recently (April/May 2003), fishers in Musoma, Tanzania, were on strike for several days withholding fish supplies to the processing plants in the area of Musoma demanding better prices and the establishment of a new buying and selling arrangement. The fishers wanted to sell directly to the processing plants instead of dealing with middlemen or agents. They succeeded in getting processing plant owners to consider their demands. Such development indicates the possibility of achieving a consensus between fishers and processors in controlling catch quantity and quality in terms of size.

Option 3: Review of the rules and regulations and existing policies

In order for co-management to succeed, a favourable environment should be provided. This includes the recognition of property rights and entitlements. This option is highly effective since the existing situation provides a loophole for offenders to escape justice through different rules and policies or uncoordinated implementation. The existing rules on buying and selling fish allow buyers to accept or even demand fish below the recommended size. Revision of these policies, regulations and rules alone does not mean success. They also require enforcement. Benefits from the review of policies and regulations are enormous across all stakeholder groups. Curbing overexploitation will greatly facilitate the sustainability of fisheries. In this case everybody wins. The review

of policies, rules and regulations is already being worked out under EAC. This, however, should be carried out in conjunction with effective enforcement. The policy option will have a high probability of success if well implemented in a participatory manner, with stakeholders in the fishing communities along the lake shores, as has already begun under co-management through the Beach Management Units (BMUs).

Option 4: Civic education and awareness

It is important to increase public participation in order to enhance effective decision-making and compliance by self-regulation. There is, however, a risk of failure in some localised areas due to lack of political will at grassroots level in communities where political leaders benefit from passivity and ignorance among the constituents. Such political leaders will obstruct and hinder the move to make villagers aware of their rights and obligations. This is a localised risk and should not constitute a major obstacle to the success public participation in decision-making, as such passive communities are very few and widely scattered. There is political will at regional level, as demonstrated by the EAC treaty document and the implementation of the intended objectives so far. This option will help to remove corrupt, irresponsible and authoritarian leadership and to bring in transparent, democratic and accountable leaders. This means more popular participation of communities in environmental, economic and development issues that affect their livelihoods. It would also be more inclusive in terms of sharing accruing costs and benefits. Environmental education should also be incorporated in school curricula as an effective long-term policy.

Destructive fishing practices

The policy options that can address destructive fishing practices are listed below (see also Table 30).

- Strengthening monitoring and enforcement of restrictions; enforcing the rule of law;
- Provision of civic education and awareness; empowering and involving more communities in management;
- Imposing size restrictions on fish processing factories;
- Provision of credit to artisanal fishers.

Option 5: Strengthening monitoring and enforcement of restrictions and the rule of law

Monitoring and enforcement of regulations and restrictions encourages compliance. As has been noted, good policies and regulations exist though some may be outdated. However, without enforcement, compliance among the target group (fishers) is reduced due to the desire to maximise benefit at minimum cost, threatening the sustainability of fishery. The civil service reforms in Tanzania have

aimed to reduce the number of civil servants so as to increase labour productivity and efficiency. The outcome of this exercise has been to cut down the number of field staff to below the necessary requirement for efficient operation, thus encouraging rampant law-breaking. This includes non-compliance with restrictions of fishnet mesh size and the use of illegal gear such as beach seines. The effectiveness of this policy is high, especially considering the political will and intention towards strengthening the management of Lake Victoria through the EAC initiative. The move towards co-management should be supported as it involves communities in effective management at a lower cost, thus making it possible to achieve the monitoring and enforcement goal.

Option 6: Provide civic education and awareness; empowering and involving more communities in management

The lack of awareness of the fishery status and trends, and of the impact of their actions, may be a contributing factor to the irresponsible behaviour of the people. The lack of knowledge of their rights and obligations in bringing about a conducive environment for a sustainable fishery may also undermine an effective participation in the management of natural resources, fisheries in particular. Empowering the community in both these and other forms of awareness would go a long way towards effective management and consequently sustainable utilisation of fisheries resources. As with overexploitation, implementing this policy option has a risk of failure. However, with proper and careful planning and implementation, bearing in mind that there are leadership elements who might want to reject the idea, success can be achieved.

Option 7: Imposing size restrictions on fish processing factories

Fish processing factories are the major buyers of Nile perch, in other words they provide the market for the majority of fishers and buyers. It has been alleged that the processing factories prefer smaller size fish to meet the demand of European buyers. The argument put forward is that small size fish (1 kg) contain less fat than larger fish. Scientists argue that at 1 kg, the Nile perch is still growing and has not reached the reproductive stage. Therefore, discouraging the sale of small size fish will facilitate reproduction and replenish stocks. This policy option is achievable when processing plant owners realise that the availability of fish is becoming a problem. In Tanzania, a meeting between processing plant owners and officials from the Fisheries Department achieved consensus on this issue.

Option 8: Provision of credit to artisanal fishers

Lack of capital for the purchase of recommended fishing gear hampers compliance by small-scale fishers. Having being dispossessed of their illegal gear, they cannot afford to buy new legal fishing gear. The provision of credit to fishers will facilitate compliance with restrictions

and regulations by enabling them to purchase the required gear, which does not endanger sustainability. With the experience gained by numerous NGOs in credit provision to small-scale entrepreneurs, this policy option has a high probability of success. It has a double advantage of alleviating poverty among the fishing communities while at the same time facilitating sustainable utilisation of fisheries resources.

Pollution

Policy options that address the issues of pollution are listed below (see also Table 31).

- Accreditation of analytical laboratories for standards enforcement;
- Liberalisation of waste disposal activities to involve the private sector and communities;
- Revision of regulations in urban planning that have not taken into account environmental issues, and improvement of monitoring and enforcement;
- Improvement of natural resource management and farming practices through training, governance and agricultural technology;
- Stronger vetting of technology promoted by national and international agencies;
- Strengthening enforcement of regulations for mandatory effluent treatment in municipalities and industries;
- Incorporating all stakeholders in the drafting of regulations and in monitoring and enforcing agreed regulations;
- Integration of institutional framework, regulations and laws at two levels: national and regional;
- Creation of a public complaints institution with powers to investigate and recommend prosecution;
- Enforcing compliance with international conventions e.g. Ramsar, CITES, and the Biological Diversity Convention of Agenda 21;
- Strengthening the capacity of National Environmental Protection Authorities to enable a more effective enactment of legislation by providing trained manpower and sufficient funding.

Option 9: Accreditation of analytical laboratories for standards enforcement

Currently, results from analytical laboratories in the Lake Victoria Basin are not recognised internationally. In order to achieve recognition, East African laboratories must send samples to Europe or USA and other places for tests. This process is costly in both time and money. In order to facilitate water quality standards enforcement in a cost efficient way, the accreditation of water quality laboratories is essential. Implementation of this policy option will go a long way in reducing health costs and increase labour productivity. Under the EAC, programmes are

already underway to address this situation, where the capacity for implementation exists within the three EAC countries.

Option 10: Liberalisation of waste disposal activities to involve the private sector and communities

Waste disposal activities have been the mandate of the government through its municipal councils. With the implementation of the Structural Adjustment Programmes where civil service reforms were undertaken, there arose a situation of inadequate capacity to carry out efficient waste disposal services. In addition, government withdrawal from commercial activities under the economic liberalisation banner, made the case for private sector participation in the economy even stronger, particularly for Tanzania. This is obviously important in order to fill the void left by public institutions, which used to render these services. The effectiveness of this policy option is in it being a business venture with the capability of generating enough income to justify its feasibility. This is already manifested by the existence of environmental and sanitation companies in urban centres of Dar es Salaam and other towns. In some places community youth groups are formed which engage in waste collection and disposal from residential areas.

Option 11: Revision of regulations in urban planning that have not taken into account environmental issues and improvement of monitoring and enforcement

Urban centres are expanding all over East Africa due to population pressure. Apart from increased population in cities and towns, changing consumption patterns driven by a modern consumerist society lead to more waste being generated today than before. In some cases town planning ignores such changes. In addition, most urban centres have a significant number of squatters in shanty structures haphazardly constructed without regard to the need for waste collection, disposal facilities, or provisions for access by disposal trucks. This is a result of outdated urban planning regulations and inadequate town planning, resulting in squatting due to a lack of surveyed plots. New approaches are being implemented to facilitate the survey of building plots in urban centres through clients' contributions towards the survey cost. Previously, budgetary inadequacy constrained the survey exercise. More plots are surveyed today under this scheme which has led to less haphazard building. Capacity to undertake the revision and corrective measures exists within relevant land offices in the EAC partner states.

Option 12: Improvement of natural resource management and farming practices through training, governance and agricultural technology

Bad farming practices result in eutrophication of the Lake, through pollution. Deforestation and loss of vegetation cover cause soil erosion

Table 31 Policy options analysis matrix: Pollution issues.

Issue	Root cause	Policy option	Effectiveness	Efficiency	Equity	Political feasibility	Implementation capacity
Microbiological Eutrophication Chemical Suspended solids	Lack of water quality standards and/or enforcement.	Accreditation of analytical laboratories for standards enforcement.	High Enable convenient & acceptable water quality monitoring at a cheaper cost.	High Reduces health costs & increase labour productivity.	High Better health for all and sustained fishery.	High Programs already underway within EAC protocol.	High Exists within the EAC partner countries.
Microbiological	Inadequate capacity for environmental sanitation.	Liberalisation of waste disposal activities to involve the private sector & communities particularly in large urban centres.	High Reduced pollution due to increased waste disposal capacity.	High (benefits include improved health)	High All win due to clean environment .	High Approach already practiced under economic liberalisation.	High Environmental sanitation companies, NGOs and community groups already work in some areas.
Chemical Microbiological	Inadequate regulations and weak enforcement of urban and rural planning and implementation.	Revise regulations in urban planning that have not taken into account environmental issues and improve monitoring and enforcement.	High Most urban centres do not have proper infrastructure for waste disposal.	Moderate (improvement of urban environment at a cost of relocating some people)	High Improved sanitation and reduced of medical bills.	High Exists under EAC.	High Exists with relevant lands offices in EAC partner countries.
Eutrophication	Bad farming practices.	Improve natural resource management, farming practice through training governance and technologies in agriculture.	High A large area is used for unsustainable farming practices of cotton and coffee.	Moderate Reduced pollution but cost of implementation.	High Protection of lake environment for all.	High Political will exists exhibited by the existence of LVEMP/ LVFO.	Moderate Exists within the LVEMP/LVFO and relevant departments in the partner states.
Chemical Suspended solids	Inappropriate technologies used in farming.	Stronger vetting of technologies that are being promoted by the national and international agencies.	High Will reduce pollution to some extent by stopping the used of prohibited chemicals.	High Reduced pollution but high cost may delay implementation.	High Protection of lake environment for all.	Moderate Existence of business lobby that may delay implementation.	High Existence of relevant national institutions e.g. Tanzania Bureau of Standards.
Chemical	Weak monitoring and enforcement of regulations for effluent treatment.	Strengthen enforcement of regulations requiring effluent treatment in municipalities and industries.	High Most industrial establishments possible to be monitored.	Moderate Financial constraints.	High Cleaner & safer environment for all.	High Existence of LVEMP/LVFO and other like programs is a testimony.	Moderate Exists within the LVEMP/LVFO and relevant departments in the partner states.
Microbiological Eutrophication Chemical Suspended solids	Implementation failure of policies and regulations.	Incorporate all stakeholders in drafting of regulations and in monitoring and enforcing agreed upon regulations.	High Ownership	Moderate Cost element.	High Sustainability is assured.	High Exercise of participatory processes.	High General acceptance of regulations.
Microbiological Eutrophication Chemical Suspended solids	Uncoordinated institutional level frameworks.	Integration of institutional framework at two levels: national and regional.	High Taking place under EAC.	Moderate Budgetary constraints, implementation rigidities.	High Region-wide acceptance.	High EAC	High Region-wide agreed regulations.
Microbiological Eutrophication Chemical Suspended solids	Conflicting and unsupportive rules and regulations at national and regional levels.	Integration of regulations and laws at two levels: national and regional.	High Taking place under EAC.	Moderate Budgetary constraints, implementation rigidities.	High Common basis for regulations.	High EAC	High Commonly accepted regulations, e.g. EAC.
Microbiological Eutrophication Chemical Suspended solids	Inadequate capacity & lack of legitimacy of national implementing institutions in conflict resolution.	Legal and economic empowerment of institutions e.g. LVFO.	High Reduction of transboundary conflicts.	High Harmonious co-existence of EAC partner states inhabitants.	High Popular participation in conflict resolution.	Moderate Dependent on successful establishment of EAC institutional framework.	Moderate Budgetary constraints.
Microbiological Eutrophication Chemical Suspended solids	Low compliance of international conventions.	Enforce compliance to international conventions e.g. Ramsar, CITES, & Biological Diversity Convention of Agenda 21*.	Moderate Difficult to implement at local level.	Moderate Budgetary constraints, implementation rigidities.	High Resource conservation for the benefit of all.	Moderate Vested interests by individuals and group lobbies.	Moderate Budgetary constraints, implementation rigidities.
Microbiological Eutrophication Chemical Suspended solids	Weak capacity of national environment protection agencies.	Strengthening of capacity of National Environmental Protection Authorities in order to be more effective.	High Process on-going for Tanzania, Kenya and Uganda.	High Protection of environment.	High Enhancement of sustainable livelihoods.	High Feasibility manifested by the existence of the National environmental protection authorities.	High Existence of Environmental protection agencies and laws in Kenya, Uganda and Tanzania.

**It should be noted that compliance to regional treaties/conventions such as the EAC and LVFO Convention, and international conventions such as POPs and BASEL conventions can go a long way in helping to tie up legislation, regulations and laws that would operate at regional levels.*

(including in wetlands). In addition, lack of buffering results in the flow of pollutants into the Lake. Furthermore, poor waste management, lack of stormwater drainage, and destruction of wetlands exacerbate the situation. Training farmers around the Lake to practice clean production

and avoid bad farming practices, which result in pollution of the Lake, is essential. Currently, run-off from cotton and coffee farms carries with it solid organic waste. This is mainly due to lack of education and awareness. The establishment of a proper waste management

infrastructure, and educating farmers as to the importance of wetlands, together with strengthening monitoring and enforcement, will improve the environmental status of the Lake. The implementation capacity of this policy option exists within partner states and the political and technical feasibility is manifested by LVEMP.

Option 13: Stronger vetting of technology promoted by national and international agencies

Some chemical pollution is due to the use of prohibited chemicals such as DDT. Stronger vetting of such chemicals will reduce the risk of adverse effect on human health and the environment. The political feasibility of this policy option is moderate owing to the fact that a business lobby will fight to maximise their benefits, regardless of the cost imposed on people and the environment. However, communities could be a good counter lobby to pressure their governments to take the right decisions through constituent representation in parliament.

Option 14: Strengthening enforcement of regulations for mandatory effluent treatment in municipalities and industries

While rules and regulations exist in all three countries on waste disposal, their enforcement is seriously lacking. Under Tanzanian industrial law, all processing plants must have waste treatment facilities. However, few industries have “working” treatment plants or ponds. Wastewater and solid waste is left to spread to streams and residential areas where they affect the health of inhabitants living in the vicinity and who use contaminated water from streams and rivers. In other places in Tanzania, outside the Lake Basin, the disposal of industrial and municipal effluent leads to huge economic losses through the destruction of tourist attractions such as coral reefs. With the enactment of environmental policies and frame-work legislation in all three partner states, and the establishment of environmental protection agencies, this policy option has a high probability of succeeding. The existence of LVEMP adds another dimension of seriousness and commitment in the three partner states towards proper management of the Lake.

Option 15: Incorporating all stakeholders in the drafting of regulations and in monitoring and enforcing agreed regulations

Participatory approaches have been found to be effective in the implementation of policies and decisions which require the input of the community and where the communities in turn stand to benefit from the process. This is because involvement of the beneficiaries instils a sense of responsibility and participation. They share the cost of implementation and the benefit accrues to them, thus becoming effective partners ensuring proper and successful implementation. This policy option has a high probability of success. However, traditional practices of bureaucrats and politicians may pose an initial obstacle

to this new way of doing things. This approach has its setbacks in terms of speed of the process and implementation costs. However, high success rates have been experienced across the region in several project implementations.

Option 16: Integration of institutional framework, regulations and laws at two levels: national and regional

In order to have a consistent and smooth policy implementation for the management of the Lake, a harmonisation of policies, regulations and legislation is vital. Any loopholes would make the effort ineffective. This work is underway within the auspices of EAC for fisheries, the environment and natural resources management. However, this may take time and requires extensive negotiation. At the end of the day, it will facilitate smooth implementation of collective objectives.

Option 17: Creation of a public complaints institution with powers to investigate and recommend prosecution

Given that conflicts occur between people from the partner states, the current practice is that national rules, regulations and institutions are used to solve such transboundary problems. In order to avoid complaints from outside parties in conflict, the establishment of an impartial institution is recommended to take care of all disputes related to fisheries; the number of such disputes has lately increased between Kenya and Uganda, and between Kenya and Tanzania. A more harmonious co-existence among inhabitants of the three states sharing the same resources will be created through the reduction of transboundary conflicts. The political feasibility and success of this policy option will depend on the success of the establishment of an EAC institutional framework and budgetary aspects.

Option 18: Enforcing compliance with international conventions e.g. Ramsar, CITES, and the Biological Diversity Convention of Agenda 21

All the partner states have ratified international conventions including the ones mentioned above. However, not all the ratified conventions are implemented as desired. Non-implementation of such conventions is as good as non-ratification. This has resulted in exacerbated environmental degradation and biodiversity decline with disastrous effects. Conventions such as Agenda 21 set the ground for sustainable national, and ultimately global development. Disregarding or not honouring such conventions means that the future of the Lake Victoria Basin is bleak. Due to the vested business interest in natural resources exploitation, a huge lobby exists which may provide a significant obstacle. However, with proper awareness, mobilisation and commitment, popular participation seems to be one way of facilitating the achievement through putting pressure on relevant authorities.

Option 19: Strengthening the capacity of National Environmental Protection Authorities in order to be more effective

To date, the National Environmental Management Council (NEMC) of Tanzania has been a “toothless dog” in that it has not had legal backing to enable it to execute the mandate of an effective environmental protection agency, as we know it. Hopefully, this situation will soon be relegated to history books. With the work on Institutional and Legal Framework for Environmental Management in Tanzania nearing completion and with the formulation of the environmental framework law, NEMC will have executive powers to monitor and enforce rules and regulations pertaining to environmental management and protection. As for Uganda’s and Kenya’s National Environment Management Authority (NEMA), the situation is also much improved.

Recommended policy options

In summary, the Policy options analysis resulted in the following recommended options to combat the identified priority concerns in the Lake Victoria Basin:

- Overexploitation
 - Fish processing quota.
- Destructive fishing practices
 - Provide civic education and awareness; empowering and involving more communities in management.
- Microbiological pollution
 - Liberalisation of waste disposal activities to involve the private sector and communities.
- Eutrophication
 - Improvement of natural resource management and farming practices through training, governance and agricultural technology.
- Chemical pollution
 - Strengthening enforcement of regulations for mandatory effluent treatment in municipalities and industries.
- Suspended solids
 - Improving natural resource management, soil conservation, farming practices through training, governance and agricultural technology, improved road construction design to minimise erosion.
- Cross-cutting
 - Integration of institutional framework at two levels: national and regional;
 - Integration of regulations and laws at two levels: national and regional;

- Enforcing compliance with international conventions e.g. Ramsar, CITES, and the Biological Diversity Convention of Agenda 21;
- Strengthening the capacity of National Environmental Protection Authorities in order to be more effective;
- Provide economic incentives for the use of clean technology;
- Promote self-regulation in fisheries and pollution management.

Conclusions and recommendations

In several cases, more than one policy option should be adopted in order to achieve the desired impact. This is true for quotas for fishing and processing. Also the successful implementation of these policy options will never be achieved without involving, in a participatory manner, the communities living on the lake shores who depend on fishing as a source of subsistence livelihood and income generation. Capacity building in terms of civic education and leadership and management skills will enhance this empowerment.

Knowledge gaps exist when it comes to quantitative estimates of benefit and cost in both physical and monetary terms of the Lake Victoria water and fisheries resources. The EAC has identified natural resource valuation and accounting as highly important aspects in planning and development. The economic, social and environmental values of natural resources must be understood in order to allow efficient and equitable allocation for present and future generations. Studies on the impact of pollution and decline of fish are required to establish the extent and the gravity of the situation. In-depth studies should be carried out to establish the processes involved and to analyse the impact on various groups of people. This will help to address the impact and establish who to include in the remediation process.

Immediate further studies are required on:

- Water quality assessment;
- Socio-cultural issues (holistic, rather than only focusing on the fisheries sector, encompassing health, agriculture, education, etc. within the entire Lake Basin);
- Resource inventory, mapping and use (including mapping of critical resources);
- Assessment and harmonisation of the legal and institutional status of National Acts, regional and international treaties and conventions;
- Study of the biology of the Nile perch, suspected to have up to three different sub-populations.