

GOVERNMENT OF THE REPUBLIC OF ZAMBIA

Ministry of Tourism, Environment and natural Resources

Views and experiences for the in-depth review of work on invasive alien species in Zambia

1. INTRODUCTION

Zambia has over 5,500 plant species and 1,400 species of vertebrates, including at least 700 bird species and over 200 species of mammals (NBSAP, 1999). Diverse wetlands and other types of water bodies comprise at least 6% of Zambia's total surface area. These are particularly important to the existence of biodiversity on which many people's livelihood depends (representing about 70% of the rural population – with an estimated population of 10.2 million; Population Census of 2000). However, much of the rich biodiversity of Zambia is threatened by invasion of Invasive Alien Species (IAS). Key among the IAS are invasive plant species, which have had enormous economic and human health impacts as well as causing or potentially threatening to degrade many ecosystem properties that society values (especially the floodplain ecosystem). This, has exacerbated biodiversity loss and promoted poverty at the micro economic level by reducing home based income.

IAS as defined by the CBD are species, subspecies or lower taxa, (including any part, gametes, seeds, eggs, or propagules of such species), introduced outside their natural past or present distribution and whose introduction and/or spread threaten biological diversity. They are a global threat to the conservation of biodiversity through their proliferation and spread, displacing or killing native flora and fauna and affecting ecosystem services. Zambia as a country has not been spared by the these biological invasion. In response to this threat, Article 8(h) of the CBD calls on parties to “prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species”. Zambia being party to the CBD has endeavored to implement Article 8(h) through the Ministry of Tourism, Environment and Natural Resources implemented by the Environmental Council of Zambia and IUCN Eastern Africa Region Office, with financial assistance from GEF through UNEP (UNEP/GEF) and counterpart funds from the Government of the Republic of Zambia are implementing a project called “**Removing Barriers to Invasive Plant Management in Africa**” (RBIPMA).

2. PROJECT RATIONALE AND OBJECTIVES

The development objective of the intervention (project) is to conserve ecosystem, species and genetic diversity in Africa by protecting it from the threat of invasive alien species. Appropriate indicators for such an objective are the subject of ongoing debate, so the indicators used are based on the provisional goals, targets and indicators discussed at COP7, contained in document UNEP/CBD/COP/7/20/Add.3 “Implementation of the strategic plan: evaluation of progress towards the 2010 biodiversity target: development of specific targets, indicators and a reporting framework” and adopted in Decision VII/13. Secondly, it's hoped that the project would contribute to the improvement of biodiversity indices for protected areas, at the pilot sites, but at a national level biodiversity indices will

be required for all protected areas, and over a longer period of time than this intervention. Thirdly, it's hoped that the (project would contribute to the biodiversity conservation and improve the status of threatened species, though these improvements would be seen beyond the life of the project, and in areas beyond the pilot sites.

However, the immediate objective of the project is to remove barriers to the management of IAS through effective implementation of CBD Article 8(h) based on indicators as discussed at the 7th Conference of Parties to the convention on Biological Diversity in Kuala Lumpur (February 2004) COP7.

The *first* indicator is the recognition of IAS guidelines, policies, plans and institutional arrangements. The *second* indicator is an increase in the amount, availability and accessibility of IAS information. The *third* indicator is a reduction in socio-economic cost of existing invasions. For the pilot sites where significant invasion has already occurred, reduction in socio-economic cost has been demonstrated. As described in component three below. The *fourth* indicator is a reduction in the rate of spread of invasive alien species. Though this is not easy to measure, as it requires an evaluation of what the invasion rate would have been without the intervention and invasion rate can fluctuate from year to year (and has diverse invasion fronts) due to factors outside the control of the project. The *fifth* indicator is the maintenance of biodiversity indices in the globally significant ecosystems (tropical forest and inland aquatic/wetland) undertaken at pilot sites level. However, indices may not show clear trends in the period of the project as they might take some time to respond to management interventions. The *sixth* indicator is an increase in capacity (institutional and human resources) for IAS management in Zambia Wildlife Authority (ZAWA) National Heritage Conservation Commission, local Communities surrounding the infested areas.

The indicators mentioned above form four sets of barriers to effective IAS management and form the basis or areas in which the project is operating or intervening and forms four components executed in an integrated manner with strong linkages between each component. However, the project does not target invasives primarily of agricultural ecosystems (although some do impinge on agricultural activity), but by establishing the enabling environment, information systems and capacity, invasives of agricultural importance it's hoped would be more effectively addressed, including existing problems and future ones that are likely to arise. Similarly, although this project focuses on plants because they are currently the greatest threat to biodiversity in Zambia, the outputs of this project will have application in dealing with other invasive species including vertebrates, invertebrates and micro-organisms, also with impact not only on biodiversity but on a range of economic activities.

As described above, four categories of barriers to IAS management identified and forms the four components of the project, each addressing one set of barriers:

Strengthening the enabling policy environment for IAS management

Provision and exchange of critical information amongst key stakeholders in IAS management

Implementation of IAS control and prevention programmes

Building capacity for sustainable IAS management.

3. **LEGISLATIVE MEASURES AND NATIONAL POLICIES**

It's worthy to note that there is no institutional co-ordination mechanism for ensuring that IAS issues are addressed with the necessary broad, multisectoral ecosystem approach, despite the country giving more prominence to IAS issues in the National Biodiversity Strategy and Action Plan (NBSAP). But there are gaps, overlaps and inconsistencies in existing policies, regulations, strategies and institutional arrangements concerning IAS in Zambia. This came to light during the legislation and policy analysis of about 18 pieces of legislation related to IAS in Zambia, conducted during the early phase of the project. The project has developed (in draft) a National Invasive Species Strategy and Action Plan (NISSAP), and would use it to guide further activities, which will include a revision, if necessary and as far as possible, of other policies, plans, laws and regulations. It may not be possible to change legislation during the time span of the project. However, necessary changes have been facilitated by maximising 'buy-in' from legislators through targeted and extensive stakeholder consultations, meetings and workshops. This has already yielded some benefits by inclusion of IAS in National Plans and some policy's e.g. the Fifth National Development Plan FNDP has targeted the reduction of *Mimosa pigra* from the current 30% to 5% infestation by 2011. There also has been the inclusion of risk assessment requirement for introductions of biofuel related plants with the focus on the introduction of *Jathropha curcus*.

Institutional arrangements for managing IAS have been reviewed and a co-ordinating mechanism developed, including government, private sector, parastatal companies and local communities which will culminate in the establishment of an IAS apex body.

Last but not the least, the project has developed cost-recovery mechanisms, and hope to implement a pilot phase, to ensure sustainability of IAS management, particularly those that generate revenue from the private sector and reduce reliance on central government funding. The process involves investigating possible cost recovery systems (e.g. charges for phytosanitary services, levies on utilities affected by IAS, contributions from protected area entry fees, EIA fees, etc.) models developed elsewhere that includes the formulation of financial plans as well as collection and mobilisation plans.

4. **MANAGEMENT**

Pilot sites for practical control operations on existing invasive species were identified during the second Project Development phase (known as the PDF – B) and surveys conducted to assess the extent of the invasion. Monitoring protocols have been developed and commenced to provide baseline data. The monitoring will continue throughout the project as the control programmes are implemented, providing indicators of progress with respect to both the invasive plant and the biodiversity at the site. Further details of the sites are given below. The sites were selected using a number of criteria:

Biodiversity importance of the sites

A range of situations to provide broad experience from which lessons can be learned.

One site is wetland/aquatic and terrestrial ecosystems.
 The sites have well established and known invasives, common to many countries.

Based on the above criteria the following sites were selected. The principal problem IAS in each area is indicated in brackets. The management is based on ecosystem goals and not single species management. The two pilot sites selected for the project are Chunga Lagoon, Lochinvar National Park and Mosi-oa-Tunya National Park (Victoria Falls). At Chunga Lagoon, Lochinvar National Park (*Mimosa pigra*), Mosi-oa-Tunya National Park area (*Lantana camara* and *Eichhornia crassipes*) are priority species. *Figure 1* below shows the “Removing Barriers to Invasive Plant Management in Africa Project” Pilot Sites.

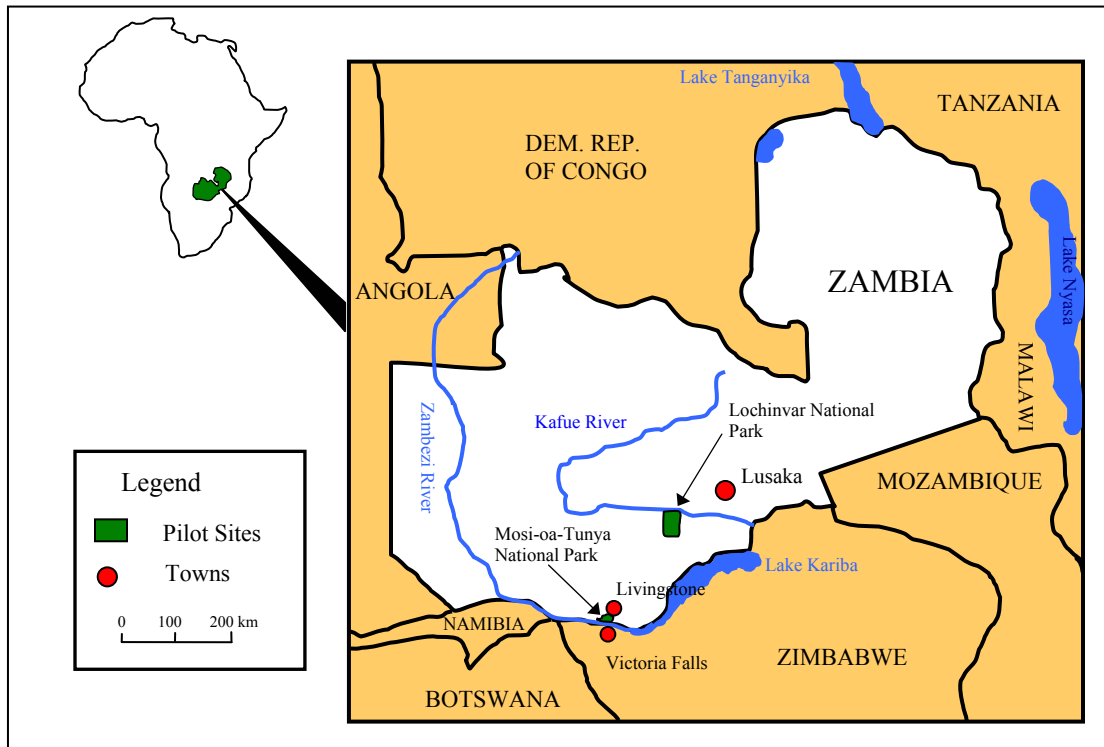


Figure 1: Location of Project Pilot Sites in Zambia.

4.1 *Chunga Lagoon, Lochinvar National Park*

Lochinvar National Park is situated on the extensive Kafue Floodplain and adjacent area on the southern side of the Kafue River in the Southern Province of Zambia – centred at 15° 59’ S, 27° 20’ E. The northern boundary of the park is the Kafue River which is connected to the Chunga Lagoon, a large expanse of seasonally-inundated floodplain within the park. The floodplain of the Kafue Flats, especially that within Lochinvar NP, including the Chunga Lagoon, is an area of globally-important biodiversity involving mammals, birds, reptiles and plants. Back in 1980 *Mimosa pigra*, a spiny shrub of tropical American origin (a species that had been naturalised in Zambia for at least a century) began to spread from the river banks onto the floodplain, especially around the edges of Chunga Lagoon and the

associated Nampongwe stream. For twenty years this spread was slow and steady, but over the last few years it has accelerated such that much of the edge of the lagoon and many parts of the floodplain, edges of the floodplain and associated streams are now entirely covered by *Mimosa*.

The significance of this invasion is that it has excluded the native fauna and flora from the most productive and special areas of the Lochinvar NP and the Kafue Flats – with significant impact on biodiversity as well as tourism and livestock grazing. Most affected are the indigenous mammals and birds of the floodplain – especially the Kafue Lechwe (*Kobus leche kafuensis*, an endemic marsh antelope that feeds primarily on the vegetation of the flats). The infestation of *M. pigra* has also denied access to the threatened Wattled Crane (*Grus carunculatus*, which has its largest breeding population on the Kafue Flats dependent upon vegetation now excluded by the mimosa invasion), the large populations of ducks, geese and other waterfowl, and numerous Palaearctic migratory birds as well as small mammals, passerine birds, reptiles and amphibians and even significant insects that depended upon the seasonal flooding and vegetation of the lagoon and surrounds.

The Kafue Flats is a Ramsar Site and an Important Bird Area with six other key species apart from the cranes (including the Vulnerable Slaty Egret, *Egretta vinaceigula* and Corncrake, *Crex crex* which use the floodplain) and many concentrations of both resident and migratory waterbirds. The Chunga Lagoon area is also home to the Sitatunga Antelope (*Tragelaphus spekei*) and the Oribi (*Ourebia ouribi*). All of these are affected by the advancing *Mimosa* as well as accumulations of Water Hyacinth in the few remaining open water areas. The situation with regard to submerged organisms – vegetation, fish and amphibians is not presently known but they are highly likely to be negatively affected by this alien vegetation and its shading of a previously highly productive aquatic system.

Mimosa has had significant impact on tourism in Lochinvar National Park both by denying access to the area (both terrestrial and aquatic habitats), by making water availability very difficult and altering the scenery – but most significantly by rendering the area almost monospecific with regard to plants and almost completely devoid of the wildlife which is the basis of NP's tourism. *Mimosa* is also starting to spread outside of the NP boundaries where it serves to deny the transhuman cattle access to the rich grasses and other vegetation of the floodplain in the low-flood season.

The project is addressing the invasion of the Chunga Lagoon area by thoroughly assessing the extent and spread of the *Mimosa* and then actively controlling its spread. A total of 40 field workers have been employed to physically remove the *Mimosa*. The area expected to be cleared of *Mimosa* by the end of the project is 500 ha, which is 17% of the 2,900 ha. In order to cover a significant area there is an urgent need for additional funding. These funds will cover the scaling up of the activities and employment of more workers to clear the weed. The total estimated amount currently being spent on the clearing of *Mimosa pigra* is US\$100, 000.00 for three years, which is the life of the project (three years), and the area to be cleared is expected to be 500 hectares of *Mimosa* infestation. The expenses include equipment, wages, maintenance and administration costs. In order to clear 2,900 hectares

of *Mimosa Pigra* an estimated amount of US\$ 625, 000.00 (K2, 5 billion local currency) is required.

4.2 *Mosi-oa-Tunya National Park Area*

Mosi-oa-Tunya is the local name for the Victoria Falls on the Zambezi River at around 17° 55' S, 25° 51' E. The river level at the top of the falls is around 875 m.a.s.l and the water descends a maximum of 103 m over an edge which is 1,708 m across traversing the Zambia-Zimbabwe international border. The surrounding vegetation is dominated by mopane woodland and areas of Zambian teak forest. Nearer the river there is classic riparian vegetation and below the falls a unique growth of plants that are sustained by the spray in a “mist forest”. Unfortunately, *Lantana camara*, a shrub originating from tropical and sub-tropical regions of Central and South America has invaded both the woodlands, the riparian areas and the unique mist forest below the falls. The Mosi-oa-Tunya National Park itself encompasses woodland and riparian areas with fringing forest while the riverine and falls area is a World Heritage Site managed by both Zambia and Zimbabwe. *Lantana* is present in the National Park and the peri-urban areas around the falls as well as in the area immediately below the falls – including steep slopes that support unique forest vegetation as well as a myriad of special habitats for mammals, birds and many invertebrates. *Lantana* is steadily altering the structure of the vegetation around and below the falls and is thus affecting the flora as well as the fauna of this unique area.

Mosi-oa-Tunya (and the river valley downstream of the falls) is an Important Bird Area primarily because of the presence of nesting sites of the rare Taita Falcon (*Falco fasciinucha*). It is also a representative of the limited “Zambezi biome” with a large number of species of that system recorded here. The Black Stork (*Ciconia nigra*) and the Rock Pratincole (*Glareola nuchalis*) are known to breed in the falls area. The Mosi-oa-Tunya National Park is a woodland area which is slightly artificial since it has several introduced mammals and is surrounded by a fence (as it is not far from urban Livingstone). Nevertheless it is a refuge for some of the remaining mammals of the area and so is an area of globally-important biodiversity – which is being infested by *Lantana*. The area below the falls, however, is unquestionably of great biodiversity importance not only for its unique combination of plants (species dependent on relatively high rainfall in a surrounding area of relatively low and very seasonal rainfall) but for the fact that it has a set of species of both plants and animals that are representative of the lower parts of Southern Africa – in the centre of the African Plateau. For example there are several species of butterflies found at Mosi-oa-Tunya that are characteristic of the coastal areas of Mozambique – because the Zambezi River Valley acts as an incursion of the “coastal fauna” inland at relatively low altitude. In addition the spray and the falls themselves harbour a range of aquatic and semi-aquatic invertebrates that are unique to the area. There are several endemic plants, especially herbs like *Rotala cataractae*, unique to the mist forest and an abundance of ferns and moisture-loving plants of the families *Lythraceae* and *Lentibulariaceae*. Much of this unique assemblage is threatened by *Lantana* as it spreads across the face of the falls, amongst the mist forest, the fringing forest and the surrounding woodlands.

The project is addressing the invasion of the Victoria falls/Mosi oa tunya area by thoroughly assessing the extent and spread of the *Lantana camara* and then actively controlling its spread. A total of 22 field workers have been employed to physically and chemically remove lantana. However, possibilities of biological control of *Lantana* are being explored. The infestation of area is about 10% of the 3,900 ha World Heritage Site. The total estimated amount currently being spent on the clearing of *Lantana camara* is US\$120,000.00 for three years, which is the life of the project (three years). The expenses include equipment, wages, maintenance and administration costs.

Water hyacinth is present in the sewage ponds serving Livingstone and also in pockets in the Maramba River, a tributary of the Zambezi River. Because of the fast flowing nature of the Zambezi in the area Water hyacinth is not likely to infest the river around Livingstone. However, these reservoirs are a source for slower flowing locations downstream. Under the project it is planned to contain and if possible eradicate these reservoirs.

4.3 *Capacity Building*

- i. Training needs assessment were undertaken in 21 institutions in the country and a training strategy developed based on a clear understanding of the needs identified by the various stakeholders interviewed. In order to ensure that there is capacity in the long term; stakeholders suggested that the education sector should integrate IAS issues into formal and informal educational systems.
- ii. The majority of the institutions surveyed confirmed that some programmes have been tried in the past and some are underway in managing some IAS. However, it was clear that there was no strategy to build capacity for the management of invasive species in Zambia. It was also established that there is a reasonable human resource level to carry out taxonomic work on IAS if only the capacity of these individuals can be enhanced through training in workshops, seminars, short courses and specialized training.
- iii. Based on the needs assessment undertaken during the PDF-B, and modified as appropriate to take account of the institutional cooperation mechanisms that are established under Component 1, a capacity building programme will be implemented during the project implementation. The primary focus of the programme will be on human resources, with necessary training provided to existing staff. Training provided will comprise of modules on IAS in existing courses, short courses on topics such as IAS awareness, risk analysis, control methods and identification skills.
- iv. To ensure available capacity in the longer term, support will be provided to the education sector to include IAS issues in school and tertiary education activities. Through cooperation with key institutions responsible for education activities, large numbers of students at different levels will receive training on IAS as an important environmental issue.

- v. National delegates have been facilitated to participate in the global bodies related to IAS like COP 8 of CBD in Curitiba Brazil, March 2006, which is hoped would contribute to building local capacity as well as fulfilling international obligations.

5. **ASSESSMENT**

Prevention is a key component of IAS management, so a number of activities will aim to reduce the probability of invasives entering the country. Pest risk analyses have not previously addressed environmental risks, but the IPPC has recently adopted a supplement to ISPM 11 (Pest Risk Analysis for Quarantine Pests) covering environmental risk. Pest Risk Analysis including environmental risk assessment will therefore be implemented. Monitoring and reporting systems for early detection of invasives will be developed and implemented, focusing on ecosystems that are most vulnerable to invasion, and most likely to suffer damage. Early detection allows the possibility of eradication, requiring a rapid response capability that will be established as part of Component 4.

Details of appropriate early detection and rapid response mechanisms for IAS around national entry points such as national airports and busy land border crossings and project pilot sites will be produced in parallel with the IAS risk analysis procedures.

6. **ECONOMIC INSTRUMENTS**

An economic impact assessment of the *Mimosa pigra* was conducted in Zambia. The exercise suggests that the encroachment of *M. pigra* is diminishing the land available to grazing cattle and Lechwe, increasing poaching, and forcing animals out of the national park and into the abutting game management area (GMA). The plant also seems to be having adverse effects on tourism revenue and park expenditures.

7. **PROVISION OF RESOURCES**

Project implementation is co-financed by the Global Environment Facilities (GEF) through the United Nations Environment Programmes (UNEP) and the government of Zambia which provides funds stated as in-kind and in-cash to support the implementation of the full project in the country.

8. **COMMUNICATION, EDUCATION AND PUBLIC AWARENESS**

- i. The weak policy and institutional environment results in critical information for informed decision making being unavailable. Three categories of information and communication have been identified as lacking. *First*, there is inadequate sharing and exchange of information between the different stakeholders, including the different arms of government, the private sector, civil society and the general public. For example information about the invasive potential of *Mimosa pigra* existed in Zambia from the early 1980s but it is only in the last few years that this has become widely known by the relevant authorities. To address this barrier the project has developed a National Communication Strategy which would form the basis for most of the awareness-raising activities.

- ii. One part of the overall communication strategy will be information dissemination through databases and website. A national IAS website has been developed and hosted on the National Executing Agency website (www.necz.org.zm/invasiveweed/). It is currently being updated so that it contains a comprehensive bibliography of national IAS related work that has been undertaken to date, documents produced on IAS in electronic form where copyright considerations permit, individual species dossiers, project documents including training modules and contact details for institutions and individuals with relevant experience in IAS-related areas. The website will be linked with global IAS resources such as the ISSG and GISP websites and the GISP global interactive map.
- iii. Various sectors are being targeted using modern media (radio, television documentary and printed media, in addition to the internet) and meetings (workshops, community meetings and field meetings). Other awareness-raising activities were conducted at the community level together with the pilot control programmes.
- iv. Other types of awareness-raising materials produced are radio and television documentaries, brochures, posters and T - shirts. They are displayed and distributed at different gatherings.

9. COOPERATION

Activities relating to invasive plant management in Zambia are undertaken under the auspices of the UNEP/GEF project Removing Barriers to Invasive Plant Management in Africa whose Focal Point is the Ministry of Tourism, Environment and Natural Resources (MTENR), also the GEF Focal Point institution in Zambia. Its role as the project focal point is to ensure that project outputs, notably those related to policy, are disseminated to the government of Zambia at the highest level. Its involvement will also help to ensure maximum participation in the project at all levels. International project coordination is being undertaken by CABI Africa and the World Conservation Union Eastern Africa Regional Office (IUCN - EARO), while the Environmental Council of Zambia (ECZ) is the National Executing Agency in Zambia on behalf of the MTENR.

Key national stakeholders participate in the project activities through representation on the National Steering Committee (NSC). The NSC, consisting of 12 members, meets regularly to approve project plans, to review reports and other project outputs. The NSC provides overall policy guidance to the project, especially in regard to national political and administrative issues.

10. CONCLUSION

The intervention explicitly addresses Article 8(h) of the CBD, and as such contributes to the implementation of the CBD. Decision V/8 called on parties to develop national strategies and action plans, elaborated in Decision VI/23. Decision VI/23 also contained a

set of guiding principles for the implementation of Article 8(h), with which this intervention is fully consistent. It's envisaged that at the end of the project implementation in December 2009: -

- i. The enabling policy environment for IAS management will have been strengthened
- ii. Critical information amongst key stakeholders in IAS management will be provided and exchanged
- iii. IAS control and prevention programmes implemented
- iv. Capacity for sustainable IAS management built among key stakeholders.