

**PROJECT: KAZUNGULA BRIDGE**  
**COUNTRIES: BOTSWANA AND ZAMBIA**

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**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY**

*Date: July 2011*

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# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) SUMMARY

**Project Name:** Kazungula Bridge  
**Country:** Botswana-Zambia  
**Project Number:** P-Z1-DBO-031

## 1. Introduction

The Governments of Botswana and Zambia intend to construct a road-rail bridge at Kazungula, linking the two countries by crossing the Zambezi River. The feasibility study for the project is funded by the African Development Bank and the Governments of Botswana and Zambia. The ESIA Summary presents here-below the Project Description and Justification; Policy, Legal and Administrative Framework; Description of the Project Environment and Location; Project Alternatives; Potential Impacts and Mitigation/Enhancement Measures; Environmental and Social Management Plan; Monitoring Program and Cost; Public Consultations; Complementary Initiatives; the Conclusion; References and Contacts. Attached to the Summary is an Annex which summarises the abbreviated Resettlement action Plan (ARAP).

## 2. Project Description and Justification

The Project involves the construction of a bridge, new border facilities in each country, and related infrastructure. The ESIA scope also includes a proposed 3 kilometre railway line on each side of the bridge. The proposed bridge has been designed as an extra-dosed road-rail bridge configuration with middle deck sections of 129m, and 4 piers in the river, with a total length of 923m. It will follow a curved alignment layout to avoid the border area in the Zambezi waters between Botswana and Zimbabwe, where the exact border positions have not been ratified.

The proposed border facilities are designed along the one-stop principle and measure 590m x 350m to provide space for future expansions. The traffic flow at the facilities will be separated into passenger and freight categories. For the location of the border facilities on the Botswana side, the preferred option (1A) adopts a road alignment approaching the bridge that is different from the current road but nevertheless, allows the border facilities to be located close to the existing road. The result of this realignment is that the border post plot will be outside the 1:100 year floodline.

A single track railway line will be included on the bridge deck, which will be operated in such a way that road traffic will be stopped when a train is crossing, and trains will not be allowed to cross when vehicles are on the bridge. Connection to the existing railway networks in Zambia and Botswana will form part of the scope of future projects.

Project activities and processes during the construction period will include the following: -

- Relocation of existing facilities and settlements (e.g. Lumbo Village) as necessary.
- Construction / setting up of temporary site offices, site facilities such as workshops, equipment storage, and site accommodation. The set up will include sanitary facilities with septic or conservancy tanks of sufficient capacity, as sewerage reticulation systems do not exist on the Zambian side near the project area and the existing system on the Botswana side will be unable to handle the additional load.

- Mobilisation of equipment, labour and materials to site. This includes the sourcing of suitable base materials such as gravel for the road base.
- Surveying and setting out of the proposed alignments and facilities.
- Construction of any temporary access or ramps, to ensure undisturbed service of the pontoon during construction.
- Vegetation clearance.
- Earthworks and surfacing of the approach roads.
- Transportation of construction materials (both raw and finished materials) and machinery to site.
- Construction of the bridge foundation into the river bed.
- Construction of bridge support and bridge deck
- Construction of the railway line on the bridge
- Construction / building work of border facilities on both sides
- Road signage
- Landscaping and rehabilitation of degraded sites including borrow pits and detours
- Re-vegetation
- Decommissioning of Project

### 3. Policy, Legal and Administrative Framework

The ESIA was carried out with reference to the key policy, legal and administrative instruments of both Botswana and Zambia. The Environmental Impact Assessment Act (2005) and the Environmental Protection and Pollution Control Act (1990) are the supreme environmental laws in Botswana and Zambia respectively, with their associated subsidiary legislation. These Acts, together with the ADB's environmental and social requirements and the SADC Protocol (2000) that governs the utilisation and management of the Zambezi River, being an internationally shared resource, form the basis of the environmental assessment study for the implementation of this Project. ,

Some of the instruments consulted from the Botswana national body of legislation included the following:

<b>BOTSWANA</b>	<b>ZAMBIA</b>
Wildlife Conservation and National Parks Act (Act No.28 of 1992)	The Lands Act (1995) and Land (Acquisition) Act (1995)
• Forest Act (1968)	• The Forests Act (1999)
• Electricity Supply Act (1973)	• The Zambia Wildlife Act (1998)
• Monuments and Relics Act (2001)	• The Mines and Minerals Development Act of 2008
• Mines, Quarries, Works and Machinery Act (1978)	• The Water Act (1994)
• Mines and Minerals Act (1999)	• The Public Health Act of (1930)
• Tribal Land Act (2001)	• The Noxious Weed Act, 1953
• Waste Management Act (1998)	• The Energy Regulation Act, 1995 & the Petroleum Act, Cap. 1995
• Atmospheric Pollution (Prevention) Act (1971)	• Roads and Road Traffic Act
• Factories Act (1979)	• The Public Roads Act (2002)
• Herbage Preservation (Prevention of Fires) Act, (1978)	• The National Heritage and Conservation Act, 1998, and
• Public Health Act (1981)	• The World Health Standards (International Standards for Drinking Water)

<b>BOTSWANA</b>	<b>ZAMBIA</b>
• Town and Country Planning Act (1977)	For Resettlement specifically the following legal instruments apply:
• Water Act (1968)	The Constitution of Zambia (1991);
• Waterworks Act (1962)	• The Land Act (1995);
• National Settlement Policy (2004)	• The Land Acquisition Act (1995);
• National Implementation Plan for POPs (2008)	• The Public Roads Act (2002);
• Tourism Act (1992)	• The Environmental and Pollution Control Act (1990) and Environmental Impact Assessment Regulations (1997);
• Tourism Policy (1990)	• The Arbitration Act (2000)
• Explosives Ch: 24:02, and	
• The Chobe District Development Plan (2003)	

The relevant international conventions to which both Botswana and Zambia are signatories, such as convention on Wetlands of International Importance (RAMSAR); Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); UN Framework Convention on Climate Change; and Convention on Biological Diversity (CBD) were also outlined.

#### **4. Description of the Project Environment and Location**

The project site is situated where the borders of 4 countries meet, namely Zambia, Namibia, Botswana and Zimbabwe. The proposed bridge will create a link between Botswana and Zambia across the Zambezi River at its confluence with the Chobe River, a link which is currently provided by a ferryboat operation. The primary reference beacon in the project area, to which all site surveys are referenced, is the international bench pillar No. 841, located at the UTM coordinates Easting 315883.444 Northing 8031888/ and elevation 929.880 in the UTM zone 35 south.

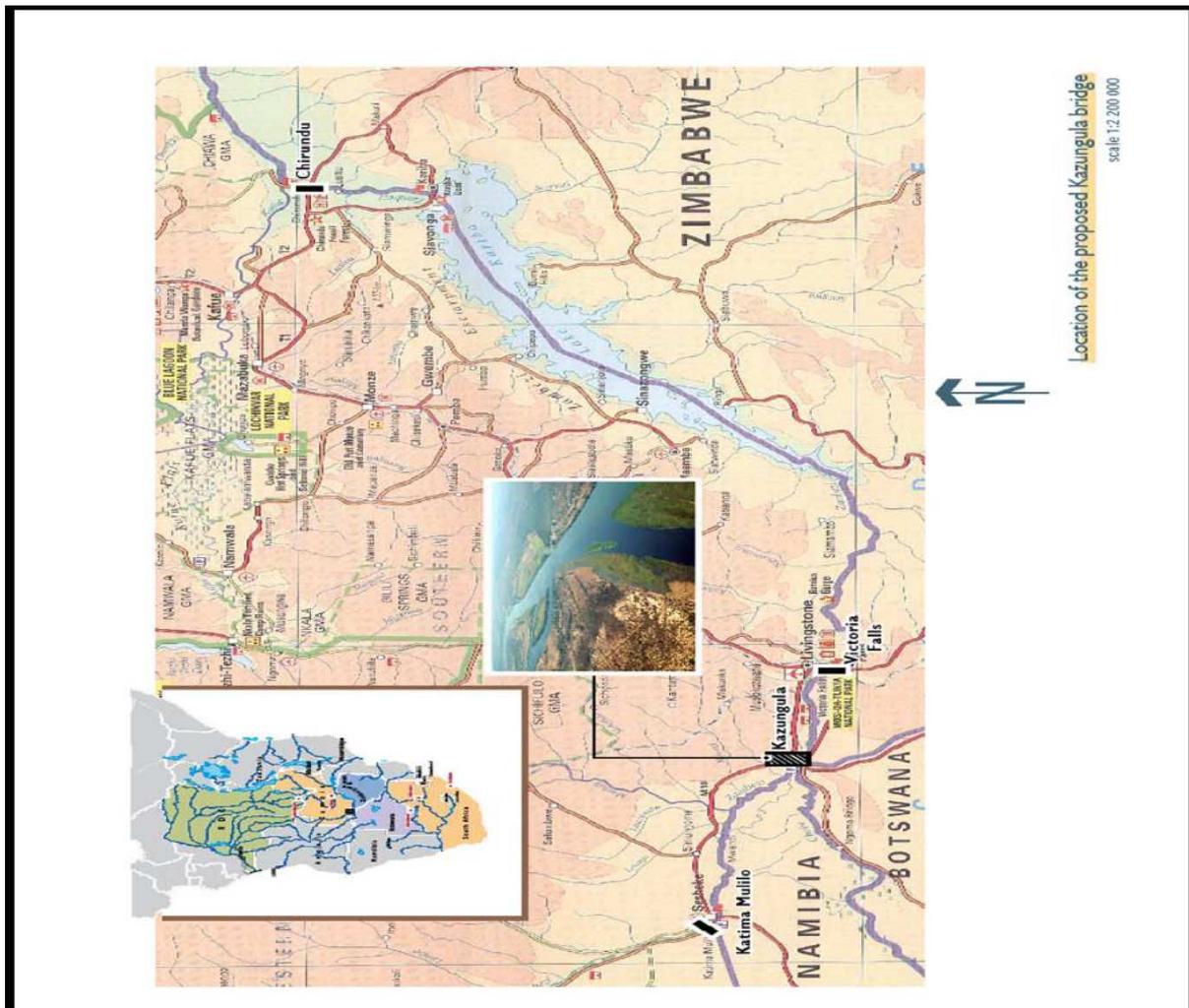
The terrain is sloping more steeply to the north-east on the Zambian side; rising 6 metres within a kilometre of the river, while on the Botswana side to the south-west, the elevation rise is only 2 metres over the same distance. To the west of the project site, the terrain is generally flat. The Zambezi River originates in the north-western region of Zambia and flows southward through the eastern area of Angola and western area of Zambia. On its way to the Indian Ocean it flows over the Victoria Waterfalls, into Lake Kariba in Zimbabwe, through the Zambezi Gorge through Mozambique, passing through the Cabora Bassa Dam.

The proposed project site is located in the mid-reaches of the river at the confluence of the Zambezi River with the Chobe River. To the west of the site the area is a flat flood plain crossed by several flood channels, several being perennial while others dry out during the dry season. The direction of drainage is towards the east. However when the Zambezi River is in flood, water backs up into the Chobe River resulting in a backflow along the Chobe River towards the west. The middle section of the Zambezi River, in which the project site is located, is between Congo Craton and Kalahari Craton base rock. The area is underlain by Palaeozoic-Mesozoic sedimentary rocks called the Karroo Complex. The Karroo Complex is a geosyncline deposit including a glacial deposit at the initial stage and basaltic lava at the last stage. The basaltic lava is widely distributed along the middle section of the Zambezi River, forming many waterfalls and cataracts with faults such as Victoria Falls.

The basaltic lava of the Karroo Complex is covered with Tertiary-Pleistocene sedimentary rocks called the Kalahari Group. The Kalahari Group consists of calcretes, silcretes and ferricretes (laterites) which are members of the duricrust group of secondary surface deposits formed by the near-surface cementation of pre-existing soils. Furthermore, in the south-western part of the Chobe Swamps, deposits from an ancient lake called Greater Palaeo - Lake Makgadikgadi are to be found. The lake has an area of about 60 000 km<sup>2</sup>, roughly the size of present day Lake Victoria (in Central Africa). The lake was in existence up to geologically recent periods of only 50 000 years ago

The large faults located in the area generally trend south westward. They intercept the flow of the Zambezi River and cause many waterfalls and rapids. A second set of cross-faults is also present. They trend northwest and determine the direction of various water channels and drainage networks including the Okavango, Chobe and Zambezi Rivers. The geology in the proposed project area is considered suitable for the construction of a stable foundation for support of the bridge

The diagram below shows the location of the Zambezi River and its confluence with the Chobe River. It also shows the current access roads to the ferry crossing from both the Botswana and Zambian side of the border



The soils/materials found at the bridge site can be divided into seven categories:

1. Top soil: This consists of dark-brown organic silty sand with pebbles ranging from 0.2 cm to 1.0 cm in diameter. The layer ranges from 0.45 m to 1.0 m in thickness.
2. Alluvial Gravel: This gravel consists of dark brown coloured medium sand with plenty of pebbles ranging from 2 cm to 5 cm in diameter. This layer can be up to 1.75 m thick.
3. Alluvial Sand: This was found in all the trial pits and can vary from 1.2 m to 6.0 m in thickness. This layer is thickest on the left bank (Zambian) side and thinnest on the right bank (Botswana Side). This sand consists of yellowish grey coloured calcareous silty fine to medium sand.
4. Alluvial Gravel: This gravel consists of yellowish grey coloured medium sand with many pebbles of sandstone and basalt ranging from 3 cm to 5 cm in diameter. The thickness of this layer can be up to 7 m.
5. Chalcedony: Mainly found on the Botswana side below the silty sand with a thickness of up to 0.5 m. It is a greenish grey coloured hard rock associated with the volcanic activity of basalt.
6. Volcanic Sand: This sand consists of reddish brown to black coloured unconsolidated coarse sand with fragments and breccia of basalt. It can range in thickness between 0.5 and 1.25 m in thickness.
7. Basalt: The basement rock at the site is basalt. Basalt is a very hard rock even in its weathered state, The weathered rock shows a reddish brown colour with frequently spaced joints and calcite veins. Fractured basalt is also encountered.

The general climate of Botswana is classified as semi-arid. Though it is hot and dry for much of the year, there is a rainy season, which runs through the warm months (November to March). Rainfall tends to be erratic, unpredictable and highly regional. January and February are generally regarded as the peak months. Nov - Mar rainfall accounts for 90% of the total rainfall. Summer temperatures can be as high as 38°C to 44°C. Zambia is generally classified as a tropical country modified by its high elevation. Rainfall is confined to the wet season, which sometimes starts as early as October and finishes as early as March. Average temperatures are moderated by the height of the plateau. Maxima vary from 15°C to 27°C in the cool season with morning and evening temperatures as low as 6°C to 10°C and occasional frost on calm nights in valleys and hollows which are sheltered from the wind. During the hot season maximum temperatures may range from 27°C to 35°C.

There are no designated “sensitive landscapes” or “Areas of Outstanding National Beauty” in Botswana or Zambia. However, there are designated environments within the region that are linked to natural and pristine landscapes, such as the Chobe National Park (Botswana), Mosi Oa Tunya (Zambia) and the Chobe/Zambezi Rivers. The Chobe National Park is located 20km from the project area, while Mosi Oa Tunya National Park is approximately 30km away, and the waters of the Chobe and Zambezi Rivers make up a substantial section of the project area itself. The fact that the project area comprises national border crossing facilities is another special feature of the location. However, the project area is located within fragile wetlands particularly on the Botswana side of the river which are unique, valuable and highly productive ecosystems that provide vital habitat and refuge for birds, fishes and wildlife.

The vegetation of the project area is broadly classified as Zambezian biome it covers the majority of the basin, around 95%, and comprises of woodlands, grassland, swamp and lakes. This biome is sometimes subdivided in to moister areas with miombo broad-leaved

woodland, and drier areas with mopane or *acacia* woodland. The Chobe District has teak forest and *Pterocarpus angolensis* being the dominant species, while on the Zambian side, Kazungula district vegetation is predominantly *Pterocarpus angolensis*, which is exploited by timber industries. In general they show a high distribution of vulnerable and threatened species. This is an indication that continued protection of these eco-regions is paramount for conservation of vulnerable and threatened species.

The Zambezi River Basin along the Botswana border and the Zambian border are in a Zambezi biome and are thus comparatively similar in ecological composition. The Zambezi ecosystem is a fragile ecosystem within flood plains which are popular with wildlife. The proposed location for the new border post facility is in a currently densely vegetated area on the Zambian side. A total of 47 plant species were identified during the site investigation, including; *Baikiaea plurijunga*, *Combretum imberbe*, *Trichilla emetic*, *Pterocarpus angolensis*, *Burkea Africana*, and, *Julbernardia glabiflora* within 3km of the Zambia and Botswana border, in the riparian zone which is the interface between land and Chobe and Zambezi River where the Proposed Kazungula Bridge and border facilities project will be located. Plant communities along the river margins are called *riparian vegetation*, characterised by hydrophilic plants. Riparian zones are significant in ecology, environmental management and civil engineering because of their role in soil conservation, their biodiversity and the influence they have on aquatic systems. Riparian zones occur in many forms including grassland, woodland and wetland. There were 3 plant communities identified and named by the dominant species that occurred in the sample area namely, Grassland (wetlands areas), *Acacia Dichrostachys* mixed veldt, and *Baikiaea combretum* mixed.

## 5. Project Alternatives

The main project alternatives are essentially two, namely the ‘no project’ option, and the ‘project implementation’ option. The ‘no project’ alludes to the possibility that the Kazungula Bridge would not be developed, thus the river crossing would continue to be operated by the ferryboat operation. The existing land use would remain as it is in the current situation, and the existing environmental and social problems, especially related to queuing trucks on each side of the river and under maintained ferries, are also likely to remain, and even increase.

Under the ‘project implementation’ option both the above mentioned positive and negative impacts are expected. However, the long term positive impacts far outweigh the negative impacts, which in any case are mitigated. This option also has many technical design options that have been considered, and the final choices made are summarised in the table below.

**Table: Summary of alternatives considered for the Kazungula Bridge development**

Aspect	Design Element	Alternative Considered	Selected Option
<b>Bridge alignment</b>	Bridge layout	Curved 600 m radius	
		Curved 1000 m radius	X
		Straight design	
<b>Border facilities</b>	Botswana location	Adjacent to existing border facilities - (Option 1)	
		Similar to Option 1, but 70 metres closer to existing road (Option 1A)	X
		At Kazungula junction, 4.3km from the bridge (Option 2)	
		At the existing cutline, close to weighbridge, combined with	

Aspect	Design Element	Alternative Considered	Selected Option
		raised access road (Option 3)	
	Zambia location	At bridge entrance	
		Behind riverine forest	X
Height of bridge	Clearances	Number of options / combinations based on flood levels and known clearances for safari boats and ferryboats	
		Sufficient height to accommodate safari boats at 20 year flood level and ferry boats (during construction) at 5 year flood level	X
Bridge design	Hydrology constraints	Number of combinations based on distance between abutments, shape of piers in river, number of piers, finish of abutments and level of bridge bearings	
		Abutment distance 700m, 3 piers in the river, rounded pier shape, rounded stone finish on abutments and bearings positioned above 100 year flood level	X
Bridge Sub structure	Construction of foundations	Piled foundations	
		Spread footing foundations	
		Combination of piled and spread footing foundations	X
Bridge super structure	Bridge deck	Extra Dosed system – alternative Arf	X
		Concrete Box system – alternative Brf	
		Composite concrete / steel “warren truss” system – alternative Crf	
	Span alternatives	One span 500m wide	
		160m span over Chobe and 340m span over Zambezi River	
		Three spans of 170m wide	
		Four spans of 125m wide	X
		Five spans of 100m wide	
		Nine spans at 100m wide	
Bridge construction	Construction methods	Prefabrication of concrete elements	
		In-situ casting of concrete elements	X
Earth berms	Accommodation of wildlife	One or multiple arches on both Botswana and Zambia sides of the river	
		Arch on one side only (Botswana)	X
		No arches needed	
Railway design	Method of inclusion of tracks into bridge deck	Flush / level fit with road deck	
		Raised island on bridge deck	X
Border facilities	Border stop principle	Conventional two stop arrangement	
		One-stop border facilities	X
Existing facilities	Use of existing facilities after completion	Demolish existing facilities	
		Keep facilities and use for alternative purpose	Expected
Project	Project need	Development of Kazungula bridge	X
		No-Development alternative	

The alternatives were chosen based on aesthetics, hydraulic impact, deck length, environment and social impact, approach embankments, foundations and piers, road safety, ease of construction, design complexity and economic factors.

## **6. Potential Impacts and Mitigation/Enhancement Measures**

The main environmental and social impacts resulting from the bridge and border crossing facilities construction activities will include; creation and expansion of borrow pits, dust, soil erosion, noise, loss of vegetation, air pollution, water pollution, potential loss of archaeological and cultural sites, limited loss of property and land and subsequent displacement of persons, some potential damage to the sensitive ecosystem around the Zambezi river area, and other cumulative impacts such as increased population due to influx of construction workers, increased cross border traffic, tourists and business people in general due to more efficient border crossing arrangements, and therefore improved access to the area; increased pressure on social services, land and natural resources such as trees and wildlife; increased health risks (including STI/HIV/AIDS); and some improvement in poverty reduction. Among the negative social impacts will be those resulting from land and property loss (see attached Annex – RAP summary)

Among the positive impacts emanating from the bridge project are the creation of job opportunities both during construction and operation. Improvement in the border crossing facility itself will be a major benefit to the two neighbouring countries and enhance the operations of the North-South corridor which is part of the Trans-African Highway network traversing the continent. It will serve as an alternative to the existing road crossing at Chirundu linking Zambia and Zimbabwe. The proposed infrastructure is of strategic importance to enhance transport links and operations between the two countries and other SADC member States. The objective is to ease movement of goods and people and reduce the transit times considerably thereby strengthen regional integration, trade facilitation and economic growth and development.

Impacts on gender (especially in favour of women) shall include a deliberate policy to increase employment chances for women on the project, with a bias towards a 30% quota for women as indicated in the SADC Gender Policy. In addition to the increased employment opportunities directly in the project, will be increased income generating opportunities from emerging demand for services such as restaurants, small shops and allied activities which tend to favour women, due to the expected increase in traffic. There will also be opportunities for trading with salaried project workers, and provisions of roadside services to subsequent road users, especially truck drivers -- activities dominated by women.

In the short term there will be an increase in heavy traffic due to construction vehicles and therefore an increase in road safety risks, but in the long term the removal of the ferries, which are considered to be unsafe, will lead to a safer environment. Special provisions for pedestrian on the bridge and border facilities in general, will also improve road safety. Further, the risks associated with heavy vehicle congestion at the border posts will also be minimised in the long term.

There will be potential impacts on climate change caused by equipment, machine and vehicular exhaust emissions both during construction and especially during operation. There may be a net air pollution increase due to increase in traffic brought about by improvements in the border crossing facilities, and a reduction in the truck waiting time at the border. Never-the-less mitigation measures are being contemplated which will include control over the condition of machines and equipment during construction to ensure that machines are well maintained.

Mitigation measures are proposed and incorporated in the project design and budgets. River water contamination, for example, will be mitigated by carryout 'in-river' construction during low water level times. Erosion will be mitigated by limiting the amount of bare soil to avoid erosion and silt transport during high intensity rainfall events. Impacts from solid waste, waste water and the presence of hydraulics, fuels and oils will be mitigated through locating the site camps at an area away from flood levels and alluvial sediments, installing washing out pits, and developing suitable chemical / fuel storage facilities and sanitation facilities. In order to retain the natural vegetation cover, individual trees of conservation importance that are within the proposed project area will be marked and avoided during vegetation clearing, clearing of old mature trees will be avoided as mature trees provide many benefits to developing sites locating temporary project infrastructure in sensitive ecological areas such as wetlands and near river banks will be avoided, landscaping with native plants will be undertaken.

## **7. Environmental and Social Management Plan**

An initial Environmental and Social Management Plan (ESMP) has been prepared as part of the ESIA and has been approved by the national departments in the two countries; and its main purpose is to ensure that all identified negative impacts are minimised, mitigated or reversed. The final and standalone ESMP compliant with AfDB's requirements will be compiled and is expected to include detailed monitoring, costing and apportionment of responsibilities. The project contractor will be expected to use specific intervention measures to control negative impacts of the project. These will include; the use of appropriate environmental management designs in the project execution to protect the river or surface water from the risk of large scale spillage of hazardous chemicals; minimising vegetation clearance to protect wildlife habitat and minimise soil erosion, stockpiling topsoil for re-vegetation after construction; the use of standard equipment when working 'in-river' to minimise the risk of concrete spillage, and use of dust suppression equipment during construction, as well as traffic control to mitigate the risk of vehicular and pedestrian as well as animal accidents.

Supervision of implementation of mitigating measures is by various authorities. The current ferry and border crossing facilities will be maintained during the project construction phase to enable people continue to freely reach their intended destinations. There will be provision of alternative livelihood systems for the re-settled Lumbo Village as well as alternative plots for those whose current plots lie along the proposed 3km railway line spur on the Zambian side. Sensitization of the construction workers about the potential risk of human/animal conflict and the importance of conserving natural resources such as trees of conservation importance and mature trees in the project area will be done.

The ESMP will also include measures to deal with communicable diseases such as HIV/AIDS/STI among project workers and through interaction with the communities in the project area. This will be dealt with in collaboration with the National Aids authorities in both Botswana and Zambia, and district authorities, traditional leaders, and relevant NGOs and CBOs operating in the project's zone of influence. The key organizations responsible for implementation of the ESMP are the Contractor, as well as the Environmental Control Office (ECO) who will be appointed by the Project proponents (the governments of Botswana and Zambia), the Department of Environmental Affairs of Botswana and the Environmental

Council of Zambia, as well as the Department of Roads (Botswana) and the Roads Development Agency (Zambia), the latter entities mainly in the operational phase.

The Contractor will be responsible for implementation of the ESMP and compliance with recommendations and conditions of the ESMP, and will be expected to appoint a dedicated person as the Contractor's Environmental Control Office (CECO) to work with Environmental Control Office (ECO) who will be responsible for Implementation of ESMP and liaison between management, contractors and labourers and monitoring of all environmental mitigation under the contractor's responsibility. The ECO will also be responsible for ensuring that the contractor fully meets contractual and E&S management obligations.

The Environmental Control Office will report to Contracts Manager who will in turn report to the Project Director, and work in close cooperation with other government departments as necessary. The contractor will be responsible for implementing measures to avoid or minimize environmental, social and health impacts during construction. The contractor will also be required to apply international standard quality assurance procedures and an environmental management system in full compliance with International Organization of Standardization. The ESIA and ESMP will form part of the contract documents for the project.

## **8. Monitoring Program & Cost**

Construction monitoring based on a four year period and excluding resettlement issues is estimated to cost USD\$1,085,000.00 with an additional USD500,000.00 provisional sum. Monitored parameters will be detailed in the ESMP. These include Occupational health and safety; social impacts, river ecology; air quality; waste management; landscape and visual amenity; noise; traffic; public safety; ecology; archaeology; natural resources; soil; sanitary facilities; human environment; damage to infrastructure; resettlement; loss of land/property; employment creation; poaching; public health & occupational safety; sites of cultural, historical & traditional value; socio-economic status; land use;

The monitoring programme will be done at three levels: (i) At community level the key staff to be involved in monitoring will be key extension staff of the concerned sectors including police, forestry, water, parks and wildlife, health, agriculture, public works, fisheries and others; (ii) At district level, the local authority system will lead the monitoring process in liaison with ECO; and (iii) At national level, the key departments will include Department of Environmental Affairs (Botswana), Environmental Council of Zambia, Roads Departments (Botswana) and the Roads Development Agency (Zambia), Botswana National Museum, and the National Heritage and Conservation Commission (Zambia). These will work closely in monitoring the project in liaison with district and community level stakeholders.

The Department of Environmental Affairs (Botswana), and Environmental Council of Zambia particularly in conjunction with the Environment Unit in the Roads Development Agency (Zambia), will be responsible for overseeing the implementation of the Environment management and social action plan. The local authority (Zambian side) will monitor the compensation process, while the Department of Roads (Botswana) and the Roads Development Agency (Zambia) will monitor the technical and environmental design aspects of the bridge, border facilities, and ancillary works. The joint Botswana/Zambia national

level Joint Steering Committee and Joint Technical Committee in collaboration with the SADIC Secretariat will provide accurate feedback to the AfDB on the overall project implementation and environmental accountability.

The overall responsibility for supervision of implementation of mitigating measures is by a Project Manager/Director appointed by the project proponents. Regular reports will be prepared by the Project Manager/Director and will be circulated to the following institutions:

- a. Department of Roads (Botswana)/Roads Development Agency (Zambia)
- b. Department of Environmental Affairs (Botswana)/Environmental Council of Zambia
- c. Local authorities (either side of the border)
- d. AfDB will receive an annual report from the Project Manager/Director on compliance with ESMP requirements

## **9. Public Consultations**

Various stakeholders were consulted during the preparation of the ESIA. These included local communities (Project Affect Persons, men, women, elders and elected persons and traditional leaders), Department of Environmental Affairs (Botswana), Environmental Council of Zambia, district authorities and others. During appraisal mission it was confirmed that all authorities with a role in terms of the ESMP monitoring have the knowledge and capacity to conduct the expected tasks.

Key concerns included; property loss compensation issues, employment, influx of persons and therefore stress on social amenities, business opportunities, pedestrian safety, interruption of ferry operations during construction, spread of communicable diseases such as HIV/AIDS and STI, and poaching. The bridge project received a high degree of acceptability due to the anticipated improved border crossing arrangement, boosting of tourism potential in the area, and the local economy due to increased traffic and therefore trading opportunities. Communities also indicated that road safety will improve as the ferry crossing is seen as slow and somewhat unsafe.

Some concerns were however raised, and these included the following:

- Government should compensate those who will lose property and land including business premises.
- Road accidents should be prevented during construction by use of signs and public sensitizations, and safe crossing points.
- The contractor should employ people from surrounding communities.
- The alignment of the railway line through the floodplain on the Botswana side was seen as negative, but considered acceptable. The construction must take account of the need for animal safety as the area has a significant wildlife population.
- The impact of the construction on the power-line crossing the river at the site.

## **10. Complementary Initiatives**

The project has included several complementary initiatives that will benefit the road users and the communities living in the project zone of influence. These include:

- *Safety enhancement:* While the bridge will improve the safety issue from ferryboat use to a reliable bridge, the project will also conduct road safety campaigns and education

for all road users between Kasane (Botswana) and Livingstone (Zambia) towns through the bridge.

- *HIV/AIDS/STI*: The area has high potential for increased spread of HIV/AIDS/STI hence the project will include HIV/AIDS/STI awareness and prevention campaigns aimed at construction workers, communities especially girls and young women and truck drivers. This will supplement the on-going programs which are underway by NGOs.
- *Economic enhancement*: The project will offer employment opportunities to communities living around the area with priority to the communities negatively affected by the project. Other economic activities such as vending, restaurant operations, etc. shall be facilitated through the project.
- *Resettlement Plan*: The project shall be resettling a sizeable community from Lumbo village which will benefit from a housing program to improve their wellbeing. In addition, the project shall provide a community school and reticulated water system for the village and others in the vicinity.

## 11. Conclusion

The Kazungula Bridge project will benefit the population in the project area by providing an improved border crossing facility, between Botswana and Zambia across the Zambezi river, which will reduce crossing time and cost, by eliminating the current ferry arrangement. It is expected that the bridge will create employment opportunities in the area. Employment opportunities during the construction period will certainly be created, but opening the bridge is expected to also create long-term employment in the area, due to the anticipated development of local businesses, encouraged by the more efficient and much easier river crossing, and concomitant increased traffic between the countries.

At a higher level, the proposed infrastructure is of strategic importance to enhance transport links and operations between the two countries and other SADC member States. The project is expected to ease movement of goods and people and reduce the transit times considerably, thereby strengthen regional integration, trade facilitation and economic growth and development. The project also incorporates two one-stop border posts replacing existing border facilities in Zambia and Botswana. It will serve as an alternative to the existing road crossing at Chirundu linking Zambia and Zimbabwe. The new bridge replaces the existing ferry which is under-capacity and currently limits cross-border traffic flow. Negative impacts will occur such as an increase in road accidents as a result of increased road traffic, high population growth leading to increased demand for land and other natural resources, and increased prevalence rates of HIV/AIDS/STI. Overall, the project positive benefits outweigh the negative impacts, of this important infrastructure intervention.

## 12. References and Contacts

- 1) African Development Bank's Public & Private Sector Operations 2001, Environmental and Social Assessment Procedure.
- 2) Final ESIA Report 09EIA027EB RP04 by EGIS; Vol.2 Appendices and Vol. 3 RAP.
- 3) The Environmental Protection and Pollution Control Act (1990), and Environmental Impact Assessment Regulations (1997), Zambia
- 4) Resettlement Policy 2010 (Draft), Zambia

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## **ESIA SUMMARY ANNEX**

### **SUMMARY ABBREVIATED RESETTLEMENT ACTION PLAN**

**Project Name: Kazungula Bridge Project**

**Country: Botswana and Zambia**

**Project Number: P-Z1-DBO-031**

#### **1.0 DESCRIPTION OF PROJECT AND AREA OF INFLUENCE**

The Governments of Botswana and Zambia intend to construct a road / rail bridge over the Zambezi River at the Kazungula/Kasane crossing to link the two countries. The project design is funded by the African Development Bank (AfDB) and coordinated by the Southern African Development Co-ordination (SADC) Secretariat.

The infrastructure will comprise a curved bridge with a seven span configuration for a length of 923 m. One Stop Border Post (OSBP) facilities will be constructed on each side of the bridge. The proposed bridge will be constructed in very close proximity to the current ferryboat crossing. OSBP facility will, on the Zambian side be located northward from the current facility, about 110 m northwest of the Zamtel communication mast. This facility will occupy a site of 360 m wide and 550 m long. Additionally, a railway line corridor will be included in the preliminary designs, at a length of 3 km from the centre point of the bridge. On the Zambian side, the proposed line leads eastwards towards Livingstone proposing to join the Livingstone – Mulobezi line at Simonga siding. The railway line, however, is not part of the detailed design and construction scope of the bridge, as it is subject to completion of feasibility studies for the overall railway connection to Livingstone for the future, and so is not subject of this Abbreviated Resettlement Action Plan (ARAP). On the Botswana side, the bridge and associated road will follow the current alignment with OSBP extending approximately 70 meters less into the conservation area.

The proposed infrastructure is of strategic importance to enhance transport links and operations between the two countries and other SADC member States. The objective is to ease movement of goods and people and reduce the transit times considerably thereby strengthen regional integration, trade facilitation and economic growth and development.

#### **2.0 POTENTIAL IMPACTS**

It is envisaged that the Kazungula bridge project will have significant impacts on the biophysical and social environments within the zone of influence. While there will be no resettlement on the Botswana side, on the Zambia side, the project will affect Lumbo village and some commercial and residential plots offered by the Local Council which lie within the proposed railway spur. However, only impacts on Lumbo Village will be considered in the current ARAP as the latter are a subject for future railway investments. In any case these plots are not developed and what the Council has done is to identify alternative plots for re-allocation. Lumbo village on the other hand is a settlement of more 38 households, representing 117 project affected persons. This settlement is directly affected by the development and therefore, a resettlement action plan had to be prepared to guide the resettlement actions and compensation. This is consistent with policies of the two countries and also in accordance with the AfDB's Involuntary Resettlement Policy and Environmental and Social Assessment Procedures (ESAP), this Abbreviated Resettlement Action Plan (ARAP) has been prepared to ensure adequate care is taken for the affected households.

Another source of resettlement and triggering compensation will be material source areas and access roads. While it is a prerequisite of the Decision Letter issued by Zambia

Environmental Management Agency (ZEMA) the then Environmental Council of Zambia (ECZ) to fully and adequately compensate the affected persons, the project proponent (RDA) has taken it upon itself to enforce this through the contract document, thus: in accordance with the provisions of the Roads Act of 2002 compensation for any property to be expropriated because of diversion roads construction shall be subject to provisions in the Act. The Roads Act provides for compensation for persons whose land is accessed for the extraction of materials including borrow sites and quarries.

Indirectly, there will be other cumulative impacts accruing due to population influx of construction workers, service providers and suppliers, increased cross border traffic, tourists and business people in general due to more efficient border crossing arrangements, and therefore improved access to the area. This will result in pressure on social services and land. The risk of exacerbating the spread of HIV/AIDS & STI will be high especially at the border crossing during construction due to truck drivers and construction workers. The Kazungula District Council has already prepared a physical plan which includes the development of social infrastructure and land demarcation. Contractor will provide for water, clinic and other services for workers. In addition the project shall provide HIV/AIDS & STI awareness and prevention programs for workers and communities during construction. Once the bridge is open to traffic, it will eliminate the need for truck drivers for spending long times at the border hence reduce risk of contracting HIV/AIDS and STI.

Among the positive impacts emanating from the bridge project are the creation of job opportunities both during construction and operation. The PAPs will be given priority during the recruitment process especially for the construction program of the OSBP and dwelling houses for them (PAPs). In addition, the project will provide piped water for the PAPs in the new village location and will also provide other facilities such as a community school and mosquito nets for all PAPs. Improvement in the border crossing facility itself will be a major benefit to the two neighbouring countries and enhance the operations of the North-South corridor which is part of the Trans-African Highway network traversing the continent.

In addition to the increased direct employment opportunities the project will give avenues for increased income generating opportunities from emerging demand for services such as restaurants, small shops and allied activities which tend to favour women. There will also be opportunities for trading with salaried project workers, and provisions of roadside services to subsequent road users, especially truck drivers -- activities dominated by women. Special provisions for pedestrian on the bridge and border facilities in general, will improve road safety. Further, the risks associated with heavy vehicle congestion at the border posts will also be minimised in the long term.

### **3.0 LEGAL FRAMEWORK**

The following Laws of Zambia guide land repossession and property acquisition for various reasons including development activities:

*Constitution:* Article 16 of the constitution of the Republic of Zambia provides for the fundamental right to property. It states that a person cannot be deprived of property compulsorily except under the Authority of an Act of Parliament, which provides for adequate payment of compensation.

*The Land Act of 1995 and Land Acquisition Act (Cap 18) No. 13 of 1984:* Section three of the Lands Acquisitions Act empowers the President of the Republic to compulsorily acquire property. The principles of compensation are pivoted on the basis that the value of property for the purpose of compensation shall be the value of the amount which the property might

be expected to realize if sold on the open market by a willing seller at the time of the publication of notice to yield possession of the property.

*The Public Roads Act of 2002:* Section 18(3) gives authority to the Road Development Agency to enter upon any land for the purpose of extraction of material for road function. It further provides for compensation to be paid to the affected if such land owner / occupier of such land is on title. Further, the Environmental Management Unit in the then Department of Roads (now Roads Development Agency - RDA) in 2003 developed an "Involuntary Resettlement Framework and Road Sector". This guideline elaborates the institutional framework for responding to involuntary resettlement in Zambia. It specifies that the RDA will play a leading role in the District roads, the Agency will be the lead agency and will play the role of carrying out social survey and related assessments and ensuring the participation of other stakeholders such as the project affected communities, individuals and non-governmental organizations. The Agency will also be responsible for overseeing the implementation process and ensuring the compensation and rehabilitation mechanism is implemented adequately". The Agency also notes livelihood assessments and enumeration of affected persons. (Environmental Management Unit, 2003: 8-9).

*Department of Resettlement:* The Department of Resettlement is responsible for the actual resettlement process, with the following functions.

- Identification and acquisition of land for resettlement.
- Demarcation of farm plots.
- Processing applications for resettlement.
- Allocation of settlement farm plots to suitable applicants.
- Recommending deserving settlers to acquire certificate of titles to their farm plots from the Ministry of Lands.
- Co-coordinating provision of infrastructure in resettlement programme schemes and resettlement schemes.

*The Environmental Protection and Pollution Control Act 1990:* The Environmental Council of Zambia plays an oversight function. Regulation II of Environmental Impact Assessment Regulation No 28 of 1998, provides for the contents of Environmental Impact Assessment to include:

- The social economic impact of the project such as resettlement of the affected people.
- Social, economic and cultural considerations such as effects on generation or resettlement, local economic impact.
- Effects on land uses and land potential in the project area and surrounding area.

*The Arbitration Act:* provides for arbitration in cases where the land owner/occupier does not agree with the amount of compensation being offered. Under section 12 (2) of the Act, the parties to arbitration are free to determine the procedure for appointing the arbitrator or arbitrators. Under section 12 (3) (b), if the parties are unable to agree on the arbitration, the arbitrator shall be appointed, upon request of a party, by an arbitration institution. The provisions of Arbitration Act shall apply in grievance redress.

The ARAP is also guided by the African Development Bank's Involuntary Resettlement Policy, 2003. According to this Policy, an Abbreviated Resettlement Plan (ARAP) applies to projects whereby:

The number of people to be displaced with loss of assets or restrictions of access to assets is "Small". "Small" is defined as: "less than 200 persons who will experience resettlement effects"

In this case there are about 117 directly affected persons. This number excludes those in the Diaspora.

#### **4.0 INSTITUTIONAL RESPONSIBILITY FOR IMPLEMENTATION AND MONITORING OF ARAP**

**The Roads Development Agency (RDA)** will play a leading role in the resettlement process. RDA will play the role of carrying out social surveys and related assessments and ensuring participation of other stakeholders such as the project affected persons and non-governmental organisations. RDA will be responsible for overseeing the implementation process and ensuring that compensation and rehabilitation mechanisms are implemented adequately. Together with other stakeholders, the Agency will also be responsible for monitoring evaluation of the project's environmental and social impacts.

**The Zambia Environmental Management Agency (ZEMA)** is a lead agency on all matters of environment in Zambia. ECZ also manages the EIA process, making decisions and ensuring that project management occurs in accordance with decisions made. In this regard, key responsibilities include:

- Monitoring of the social economic impact of the project, such as the envisaged resettlement of the affected households;
- Monitoring the socio-economic and cultural effects on generation or reduction of employment in the area, social cohesion or resettlement, and local economic impacts;
- Monitoring effects on land uses and land potential in new site of resettlement.

**The Department of Infrastructure and Support Services** is responsible for infrastructure development and is supposed to improve co-ordination between the Ministry of Local Government and Housing, Local Authorities, Donors, NGOs and other Agencies. In this regard the Department will:

- Render support to the Local Authority on the development of roads at the new site of resettlement;
- Render Institutional support in designing new infrastructure and housing at the new site of resettlement.

**Chief Sekute and Traditional Council:** The Chief is the custodian of traditional land with absolute authority over the land. The Chief shall therefore provide alternative land of approximately 100 hectares where the PAPs shall be resettled. The Chief and his Council will therefore ensure that:

- Land is allocated to the PAPs,
- Together with the Local Authority, land is demarcated and boundaries are made clear to all involved,
- Ensure through the representatives of the PAPs that fields are made available to the PAPs.

The name of the area is Chamunga or Kamunga, derived from a stream that drains the area.

**The Government Valuation Department** is responsible for carrying out valuation of land, houses and any other services or resources (natural/social) that are likely to be lost by the affected households. Housed in the Ministry of Local Government and Housing, it is established to deal with assessment of values of assets on behalf of the Government of the Republic of Zambia and to make the same regarding policy formulation. The Department is

critical in the evaluation of lost assets including properties or crops of various types. The evaluation of properties, in this ARAP was undertaken by a private company. However, the Department can also carry out the following:

- Further property evaluation;
- Crop and field evaluation;
- Personal effects evaluation

This can be done to have a comparison vantage with the evaluations done by a private company.

## **5.0 Public and Stakeholder Consultations**

In addition to consultations and discussions held with various interested parties including NGOs, border officials, and boat operators and clearing agents; a plenary meeting (Public Hearing) was held on November 24, 2010 with stakeholders and affected communities at Lumbo Village in Kazungula district, the site of the project. Among the attendees were His Royal Highness Herbert Muknde of Tulye Tonje, representatives from Government, RDA, ECZ, District Council, Lumbo Village Headman, other community members and affected persons of Lumbo Village. The meeting was organized in such a way that officials RDA and ECZ officials presented the objectives of the project, its components and activities and potential impacts, both negative and positive. Most importantly, the affected persons were informed about the requirement to move the entire Lumbo village to a new site. Among the two alternatives were to ask the Kazungula District Council to allocate plots, or to move to a traditional land area west of the current village location where His Royal Highness Chief Sekute could provide the land for new Lumbo Village.

During the briefing, specific points were highlighted (i) an examination of project alternatives; (ii) identification of potential impacts and mitigation measures; (iii) identification of affected households and persons; and establishing an environmental monitoring and evaluation plan. Following this briefing, the meeting was open to questions and answers from the people present. A list of people who attended and issues and questions asked and responses is attached in Annex 4 of the ARAP.

The issues and questions asked centred around the following:

- i) Full information about the financiers and when the project would commence;
- ii) The need to fully identify potentially affected persons to ensure all affected are compensated;
- iii) Timely and fair compensation with comprehensive property evaluation;
- iv) Ensuring that mitigation measures in the EIA report are adequate;
- v) The need for adequate space at new site to ensure peoples' continuity with activities;
- vi) The need for continued consultations to ensure that the people are kept informed;
- vii) Project should source supplies from the area where feasible including offering unskilled jobs to local people;

viii) Ensure adequate intervention to curb the spread of HIV/AIDS

ix) Village preferred that village be moved as a whole to avoid fragmentation and that a coordination committee be formed;

## 6.0 NOTIFICATION PROCEDURES FOR LAND ACQUISITION

Chief Sekute has provided 100ha of Land which will be let for the PAPs. This will have to be done in line with the provisions of the Lands Act (1995), especially if the land has to be converted into titled land from its current traditional land status. In this case this will require the land to be 'created' through the local District Council system, and the title finally issued by the Ministry of Lands Headquarters.

## 7.0 ELIGIBILITY CRITERIA AND ENTITLEMENTS

The procedures, for determining eligibility to compensation, resettlement assistance and rehabilitation assistance measures, and the actual entitlements shall consider the following factors:-

CATEGORY OF PAP	ENTITLEMENT
Displaced persons having formal legal rights to land or assets.	Full compensation for loss of land or other assets.
Displaced persons who can prove entitlement under the country's customary laws. Displaced persons with no recognizable legal right or claim to the land they are occupying.	Resettlement assistance in lieu of compensation for land.
All the adversely affected persons including indigenous groups, ethnic, religious, linguistic minorities, and pastoralists who may have surface rights to the land or other resources taken for the project.	Land, housing, and infrastructure so long as it is not a contradiction to the borrower's Legislation.

Payment of compensation shall strictly be based on results of the census conducted. Displaced Persons who encroach on the Project area after the Cut-off date shall not be entitled to Compensation, or any Resettlement Assistance or any other form of Rehabilitation Assistance. The cut-off date for developments to be compensated under this ARAP is 1st January 2011.

## 8.0 PROPERTY VALUATION METHODS

The ARAP recognises the fact that there is a legislative framework in Zambia that deals with property valuation, and in particular that the Government Valuation Department of the Ministry of Lands is responsible for carrying out valuation of land, houses and any other services or resources (natural/social) that are likely to be lost by the affected households, on behalf of the Government. Nevertheless, this particular valuation was undertaken by a private consulting firm. The valuation procedure used was in accordance with the Practice Statements and Guidance Notes published by the International Valuation Standards Committee (IVSC), adopted and recognized by international accounting standards and risk management professionals.

The basis of valuation was “open market”, which is defined as “An opinion of the best price at which the sale of an interest in property would have been completed unconditionally for cash consideration on the date of valuation assuming:

- a willing seller;
- that prior to the date of valuation, there had been a reasonable period (having regard to the nature of the property and the state of the market) for the proper marketing of the interest, for the agreement of the price and terms;
- that the state of the market, level of values and other circumstances were, on any earlier assumed date of exchange of contracts, the same as on the date of valuation;
- that no account is taken of any additional bid by a prospective purchaser with a special interest; and
- that both parties to the transaction had acted knowledgeably, prudently and without compulsion.”

The methodology used involves making direct comparisons with other similar available transactions in the vicinity and considerations are made with reference to locations, accessibility, demand/supply etc., and the prevailing economic and property market trends. Sales are analysed and processed to form units of value per square meter. These are then compared with the subject property on the same basis to arrive at an adjusted unit of value and applied the same to the subject property whilst allowing for similarities and dissimilarities accordingly.

## **9.0 COMPLAINTS AND GRIEVANCES REDRESS MECHANISMS**

Grievances are a common phenomenon in involuntary resettlement, which if not carefully handled, amicably and timely resolved inevitably lead to local resistance, political tension and unnecessary delays in executing a project. Litigation into the courts of Law is one of the options of grievance redress; however, using formal channels takes longer disadvantaging the common people and may affect the pace of implementation of the project.

To avoid the unnecessary, encumbrances, the following process is proposed for addressing grievances which may arise in the implementation of this ARAP:

- Allow the aggrieved party to launch a complaint or claim to the Resettlement and Compensation Committee on the ground. The Committee should in consultation with the complainant clearly define the claim, advise the complainant and make recommendation to the Coordinating Committee.
- The Coordinating Committee should then consider claims and the merits aimed at making rotational judgment. The Committee will then forward the grievance to the developer recommending a course of action. Upon studying the matter, the developer in consulting with the Committee will make a decision either to honour their recommendation or not.
- If the aggrieved person is not satisfied with the decision of the developer, and where grievances are pertinent, recourse should be sought through the Local Steering Committee or the legal provisions referred in the ARAP.

## **10.0 COSTS AND BUDGET**

The compensation cost for relocations related to the One Stop Border Post and railway line corridor, as included in the Kazungula Bridge project scope, includes land compensation, permanent structure (houses, pit latrines, church buildings), fruit trees compensation, undeveloped commercial and residential plots and loss of income compensation. The estimated cost is Zambian Kwacha K18,464,308,275 (Eighteen billion, four hundred and sixty four million, three hundred and eighty thousand, and two hundred and seventy five

Kwacha) or equivalent of approximately US\$3,768,226. The cut-off date for developments compensated is recommended to be 1st January 2011. Any development on the plots after this date is not subject to compensation.

## **11.0 MONITORING AND EVALUATION**

Monitoring and evaluation is to be done at two levels, namely internal and external. Internal monitoring will mainly assess whether the implementation of the ARAP is in accordance with the approved plans. This will therefore involve reviews of the actual implementation process, including preparatory phase, against the planned timeline and budget, assessing how the operational channels are working, whether compensation due to affected households are met and assessing the adherence and disbursement of resource for compensation and other allowances. The Coordinating team will be responsible for the internal monitoring.

External monitoring and evaluation will mainly assess the attainment of the overall objectives of the ARAP and as such will focus on the post resettlement. External monitoring and evaluation will therefore assess whether after the resettlement exercise is complete, the standards of living of those affected households is improved, their livelihood restored and sustained. The overall efficiency, effectiveness, impact and sustainability of the ARAP are then measured. The developer, in collaboration with Financer and traditional leadership will take up the responsibility of external monitoring. This should be undertaken annually for at least a two year period.

Further, to effectively monitor the progress of the resettlement/compensation program two types of monitoring are being recommended to be employed as:

- Performance monitoring through which the physical progress of the ARAP can be measured;
- Impact monitoring, which assesses the effectiveness of the ARAP and its implementation with respect to meeting the needs of the affected people?

Overall this monitoring plan will have indicators and milestones, and has indicated the required resources including responsible persons and institutions necessary to carry out the monitoring activities. Project affected persons or their representatives will play a role in monitoring. A number of objectively verifiable indicators (OVI's) shall be used to monitor the performance, impacts and outcomes of the compensation and resettlement activities. These indicators will be targeted at measuring the physical and socio-economic status of the PAPs, to determine and guide improvement in their social wellbeing.

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