

**The United Republic of Tanzania**  
**Ministry of Infrastructure Development**  
**Tanzania Airports Authority**



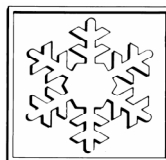
**Feasibility Study and Detailed Design for**  
**The Rehabilitation and Upgrading of**  
**Sumbawanga Airport**

**Final Design Report**  
**Environmental Impact Assessment**

**March 2009**

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# **The United Republic of Tanzania**

Ministry of Infrastructure Development  
Tanzania Airports Authority

## **Feasibility Study and Detailed Design for the Rehabilitation and Upgrading of Sumbawanga Airport**

### **Final Design Report Environmental Impact Assessment**

**Prepared by**

**Sir Frederick Snow and Partners Limited in  
association with Belva Consult Limited**

#### **Issue and Revision Record**

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0	July 08	Belva	KC		Preliminary Submission
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## **EXECUTIVE SUMMARY**

### **1 Introduction**

The Government of Tanzania through the Tanzania Airports Authority is undertaking a feasibility study and detailed engineering design for the rehabilitation and upgrading of the Sumbawanga airport, located in Sumbawanga Municipality, Rukwa region. The project is part of a larger project being undertaken by TAA involving rehabilitation and upgrading of high priority commercial airports across the country. TAA has commissioned two companies M/S Sir Frederick Snow & Partners Limited of UK in association with Belva Consult Limited of Tanzania to undertake Feasibility Study, Detail Engineering Design, Preparation of Tender Documents and Environmental and Social Impact Assessments of seven airports namely Arusha, Bukoba, Kigoma, Tabora, Mafia Island, Shinyanga and Sumbawanga.

This report presents the Environmental Impact Assessment (EIA) of the Rehabilitation and construction of Sumbawanga airport, to be implemented in Sumbawanga municipality in Rukwa region. The Objectives of the EIA are to identify and investigate in detail the most significant environmental impacts resulting from rehabilitation and construction and use of Sumbawanga airport.

### **2 Approach and Methodology**

The EIA is to be undertaken following the Tanzania environmental assessment procedures. EIA and Audit Regulations, 2005, First Schedule, categories construction, expansion or rehabilitation of airports and airstrips and their ancillary facilities as projects to which a full EIA is mandatory. Field visits were conducted and public consultations were held with representatives of communities around the project area from 3<sup>rd</sup> to 10<sup>th</sup> January 2008.

### **3 Description of the Project**

Sumbawanga airport is located between 31°36' 15" – 31°37' 15" East and 7°57' 00" - 7°56' 45"South. The airport is within Sumbawanga Municipality about 4 kilometres from the town centre at the old Sumbawanga (Asilia) area. A half kilometre access earth track to the airport branches from the Sumbawanga – Mpanda road. The project site can be reached mainly by way of the Tunduma - Sumbawanga road (gravelled and in very poor condition) or the Mpanda - Sumbawanga road. Other possibilities are by air, railway or boat: the Tabora – Kigoma central railway line up to Mpanda, or TAZARA up to Tunduma then by road or from Mpanda by boat over Lake Tanganyika

to the Kasanga port then by road to Sumbawanga. Sumbawanga airport is about 1250 km from Dar es Salaam and 250 km from Tunduma.

Currently Sumbawanga airport has a single 1200m x 23m gravel surfaced runway, a taxiway and a small apron both gravelled. The project will involve upgrading the airport (runway, taxiway and apron) to bitumen surface and the design aircraft is ATR 72.

#### **4 Legal Framework**

National policies and legislations relevant to the environment in relation to airport rehabilitation and construction have been considered.

#### **5 Public Consultations**

Communities around the project were involved from preliminary studies through organised stakeholders meeting with community representatives. The representatives were very eager to know when the construction of the airport works will start. Many issues were raised, the following being the main concerns:

- ◆ Effects of vibrations from heavy aircrafts on nearby buildings.
- ◆ Delay in compensation payments after valuation
- ◆ Consideration for the widows and vulnerable groups during resettlement
- ◆ Higher value of buildings as compared to value of land
- ◆ Disturbances during and after relocation.
- ◆ Whether people should continue with developments / improvements on their land.
- ◆ Lack of outer boundary fence
- ◆ Noise pollution
- ◆ Effects of interactions
- ◆ Inadequate wages paid to labourers on airport improvement works
- ◆ Illegal traffics

## **6 Environmental Impacts and Recommended Mitigation Measures**

Rehabilitation and upgrading of Sumbawanga airport is viewed as a positive contribution to regional development. However, there is also the risk of negative impacts on the local community which should be at least minimized to acceptable levels, or avoided altogether where possible.

Positive impacts likely to result from the rehabilitation and upgrading of the airport have been identified. These include biological and socio-economic effects and the impact on the physical environment.

Other positive impacts include improved regional transport, tourism and socio-economy of the project area.

Negative impacts to be considered could include, among others:

- i. Depletion of natural resources for materials to be used in the Works
- ii. Risk of contamination and impairment of watercourses and landfill sites
- iii. Risk of damage to structures because of surface water drainage of runway improvements
- iv. Possibility of adverse visual impact
- v. Possible public health hazards
- vi. Disturbance and nuisance to offsite receptors due to traffic movements for construction operations
- vii. Destruction of vegetation cover and loss of local biodiversity due to clearance of vegetation
- viii. Loss of local employment due to relocation

Many of the negative impacts can be avoided or minimised to acceptable levels while positive impacts or benefits derived from the project can be enhanced by adopting good engineering practices and appropriate mitigation measures during design, construction and use of the airport. Therefore mitigation measures are presented in this report.

## **7 Environmental Management Plan**

The objectives of the Environmental Management Plan (EMP) are to describe the legislative and administrative frameworks in the country on Environmental Impact Assessment Management, implementation arrangements for the EMP, environmental monitoring programme and reporting arrangements. The executing agency of the

airport project is Tanzania Airport Authority (TAA) who are assisted by the Consultants in the implementation of the project. To minimize the potential adverse environmental impacts, the project will require the support of various institutions as outlined in the actions of the EMP.

An Environmental Management Plan (EMP) has been developed to implement the proposed environmental protection measures during construction, operation and commissioning of the project. (The current consultancy will, however, terminate on completion of the Works tender, and this EMP will therefore need to be reviewed and updated at the later implementation stages.)

An Environmental Monitoring System (EMS) has been developed to monitor the efficacy of the environmental protection measures and socio-economic initiatives specified in the EMP. It supports the EMP by maintaining a record of environmental performance and enabling adjustments to be made to mitigate environmental and socio-economic impacts during the lifetime of the project.

## **8 Conclusions and Recommendations**

Reconstruction of Sumbawanga is essential for the development of the economy of Sumbawanga municipal and Rukwa region in general. It is the consultants' (Belva Consult Limited and Sir Frederick Snow & Partners Limited) opinion that the environmental impacts identified should be mitigated. The proposed environmental management plan and environmental monitoring plan if implemented will safeguard the integrity of the environment.

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## **ABBREVIATIONS**

AIDS	Acquired Immune Deficiency Syndrome
AMSL	Average Mean Sea Level
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
HIV	Human Immunodeficiency Virus
ICAO	International Civil Aviation Organization
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SIDO	Small Industry Development Organization
STD	Sexual Transmission Diseases
RESA	Runway End Safety Area
TAA	Tanzania Airport Authority
TANESCO	Tanzania Electric Supply Company
TTCL	Tanzania Telecommunication Company Limited
WHO	World Health Organizations

# 1 INTRODUCTION

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Sumbawanga airport has a single 1200m x 23m gravel surfaced runway, a taxiway and a small apron both gravelled. The project will involve upgrading the airport (runaway, taxiway and apron) to bitumen surface and the design aircraft is ATR 72.

The Environmental Impact Assessment (EIA) has been undertaken following the Tanzania environmental assessment procedures. Environmental Impact Assessment and Audit Regulations, 2005, First Schedule, categories construction, expansion or rehabilitation of airports and airstrips and their ancillary facilities as projects for which a full Environmental Impact Assessment is mandatory.

## 1.1 SCOPING

Objectives of scoping were to ascertain key issues that are likely to be important during Environmental Impact Assessment; to identify and involve all stakeholders in the Environmental Impact Assessment process by expressing their views and concerns; and specifically to identify project alternatives; Environmental Impact Assessment study boundaries; and to define the Terms of Reference for the Environmental Impact Assessment study. Method for Stakeholders involvement included: one-to-one discussions, stakeholders consultation meeting and public meetings. Notices were posted at strategic points, mainly at Tanzania Airport Authority offices, Regional Secretariat offices, DC, DED etc. Field activities were undertaken from 3<sup>rd</sup> to 10<sup>th</sup> January, 2008. Various stakeholders and communities

around the project site were involved in the preliminary studies. The many issues raised are detailed under chapter 5.

## **1.2 OBJECTIVES OF THE ENVIRONMENTAL IMPACT STUDY**

Airport Construction and Rehabilitation are included in the mandatory list of projects that are required by the Environmental Management Act No. 20 of 2004, to develop Environment Impact Assessment Part IV of the Environment Impact Assessment Regulations of 2005 provides the general objectives for carrying Environment Impact Assessment, among others a list comprise the following:

- To ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process
- To anticipate and avoid, minimise or offset the adverse significant biophysical, social and relevant effects of developmental proposal
- To protect the productivity and capacity of natural systems and ecological processes which maintain their functions
- To promote development that is sustainable and optimises resources use and management opportunities.
- To establish impacts that are likely to affect the environment before a decision is made to authorise the project;
- To enable information exchange, notification and consultations between stakeholders;

## **1.3 METHODOLOGY OF THE STUDY**

The study followed the guidelines provided in the Environment Impact Assessment and Audit Regulations, G.N. No. 349, 2005 for Identifying, collecting and analysing information which included:

### **▪ Baseline Data and Stakeholders Involvement**

Extending the activities that were started by the scoping study including involvement of key stakeholders and collecting baseline data on both natural and built environment including socio-economic conditions of the proposed project area, mainly from secondary sources including:

- Project documents: 1996, M/S M-Konsult (T) Ltd & M/S Scott Wilson of United Kingdom, 20 Airports Study; and Terms of reference provided by Tanzania Airport Authority.
- Tanzania policies, laws and regulation (chapter 3 of this report)
- ICAO regulations & other safeguarding documents: Minimum distance requirements, etc.
- Environmental characteristics Sumbawanga District and Rukwa Region environmental and socio-economic profiles, demographics (population data and household survey data) from the Bureau of Statistics, Planning Commission etc.
- Climate and meteorological data from Met stations,
- Maps: land use, topographical maps, etc

Site visit activities involved making physical observations and taking measurement of the existing structures and determine their functions in relation to the airport.

#### ▪ **Impact Assessment**

Impact Assessment was done by superimposing project facilities onto the existing environmental conditions of the project site. This involved analysis of data for identification, prediction and evaluation of foreseeable impacts, both beneficial and adverse, of the proposed investment using checklists, simple matrices and expert judgement; and reference to standards and guidelines.

The impacts identification methodology used consider all the potential impacts using a standard matrix approach which takes into account impacts on the physical environment (e.g. air quality, soil and ground water quality), impacts on the ecology (e.g. flora and fauna) and, impact on the human socio-economic setting, as shown in Table 1. The assessment considers contribution to local and national environmental and socio-economic issues as well as global environmental issues of air quality.

**Table 1.1: Matrix of Impact Identification**

Project Activity								
	Physical Environment		Ecological Environment			Socio-Economic Setting		
	e.g. Air quality	Fresh water quality	Flora	Fauna	Other ecosystem components	Social	Economic	Cultural
Project Phase								
Activity I								
Activity II								
etc.								

The Consultant used the general criteria, listed below, to evaluate significance of the identified impacts.

- a) Magnitude and likelihood of impact to occur
- b) Spatial and temporal extent
- c) Potential to implement mitigation measures and controls
- d) Likelihood and degree/timescale of environmental recovery
- e) Value of the affected environment/social component
- f) Level of public concerns
- g) Political repercussions of the project

The scales of negative and positive impacts that are likely to occur were determined using a range of low, medium and high:

- a) L+ = Low positive
- b) M+ = Medium/moderate positive
- c) H+ = High positive
- d) L- = Low negative
- e) M- = Medium/moderate negative
- f) H- = High negative
- g) O = No apparent impact

▪ **Mitigation Measures and Management Controls**

Identifying and proposing mitigation measures that aim at eliminating or minimising the potential negative impacts and promote positive ones using expert judgement.

- **Environmental Management Plan and Environmental Monitoring Plan**

Preparing the Management and Monitoring Plans for ease of reference and follow ups during project implementation.

- **Environmental Impact Statement**

Presenting the information which involved writing the Environmental Impact Statement (EIS).



## **2. PROJECT BACKGROUND AND DESCRIPTION**

### **2.1 PROJECT BACKGROUND**

#### **2.1.1 Previous Works**

- Initial construction of the airport was carried out during the early 1950s
- Previous upgrading of the runway was performed during 2003 years with approximately 200m being rehabilitated.

#### **2.1.2 Size/Capacity**

Table 2.1 shows the airport's key features. At present Sumbawanga airport is occasionally used only by aircraft of general aviation, including agricultural aviation (International Red Locust Control Organization). The largest aircraft at present is Fokker 50; the airport is Operational all year but accommodates daytime flights only. There are no scheduled flights. Precision Air very briefly attempted scheduled flights in 1995 but stopped due to bad runway condition. A few charter companies and Government planes use the airport infrequently. The airport generally caters for domestic traffic - business-people and population and also serves tourist traffic to game reserves such as Katavi etc. Table 2.2 shows traffic levels during the last three years.

#### **2.1.3. Runway and Taxiway Condition**

Sumbawanga airport has a single 1460m x 23m runway which is supposedly gravel-surfaced. However, due to under utilization and old age the runway is indistinctive and extensively covered with grass. Similarly, the taxiway and apron cannot be discerned.

#### **2.1.4 Buildings and Facilities**

The administrative and technical areas of the airport are all constituted in one building. The airport lacks the usual ancillary airport facilities such as fuel servicing, control tower and fire tender truck.

**Table 2.1: Airport Capacity Features**

Total airport area	47.6 ha
Runway	Single, gravel: 1200m x 23m
Taxiway	No tax way
Apron	Single, gravel :
Main air traffic	Chartered services
One administrative building containing:	Area: 38 m <sup>2</sup>
Airport manager office	2 rooms: area 12.5 m <sup>2</sup>
Car parking + fire equipment	1 open shed: area 12 m <sup>2</sup>
Terminal building (departure/arrivals)	1 small room: area 6 m <sup>2</sup>
Emergence and rescue service	2 tiny co-joined rooms: area 3m <sup>2</sup>
Store	1 small room: area 4 m <sup>2</sup>
Fence outer perimeter	None
Inner fence	Disjointed
Fuel servicing points for aircraft	None
Hangers	None
Security control	None
Airport catering kitchen	None
Other facilities: shops, Restaurant etc	None
Airport staff	Five ( 2008)

**Source:** Sumbawanga Airport Manager's Office

**Table 2.2: Volumes of Sumbawanga Airport Air Traffic**

Year	Aircraft movements		
	2004	2005	2006
No. of aircraft	58	122	126

**Source:** Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank

## **2.2 MAJOR PROJECT COMPONENTS**

The project will involve upgrading the gravel airport to bitumen surface and the design aircraft is ATR 72. To meet requirements of the upgrading programme, some of the existing structures may be just rehabilitated, some expanded and others may require new construction. According to current design plan, main components under the upgrading program will include:

### **2.2.1 Runway**

Rehabilitation works will depend on preliminary investigations and testing of soil around the airport. Since the airport is predominantly a grass strip the existing runway will be not considered for rehabilitation and instead a new sub grade and base course will be designed and constructed.

The existing runway will need to be extended from 1200m x 23m to 1750m x 30m and the whole surface is to be of tarmac level. The extension will be to the north/south of the existing runway.

### **2.2.2 Taxiway**

The proposed taxiway will provide a link between the extended runway and new apron. The taxiway will be of similar construction to the runway

### **2.2.3 Apron**

Apron will be constructed similarly to the runway and taxiway, but with different dimensions.

### **2.2.4 Terminal Building, Meteorological Building and Control Tower**

In the future a terminal building will be constructed, of which will comprise an arrivals area, departure lounge, security facilities, toilets and other necessary airport facilities such as in-house shops and restaurant.

### **2.2.4 Other Support Facilities and Services**

The project will include the upgrading of the existing facilities such as car park, security, and access work.

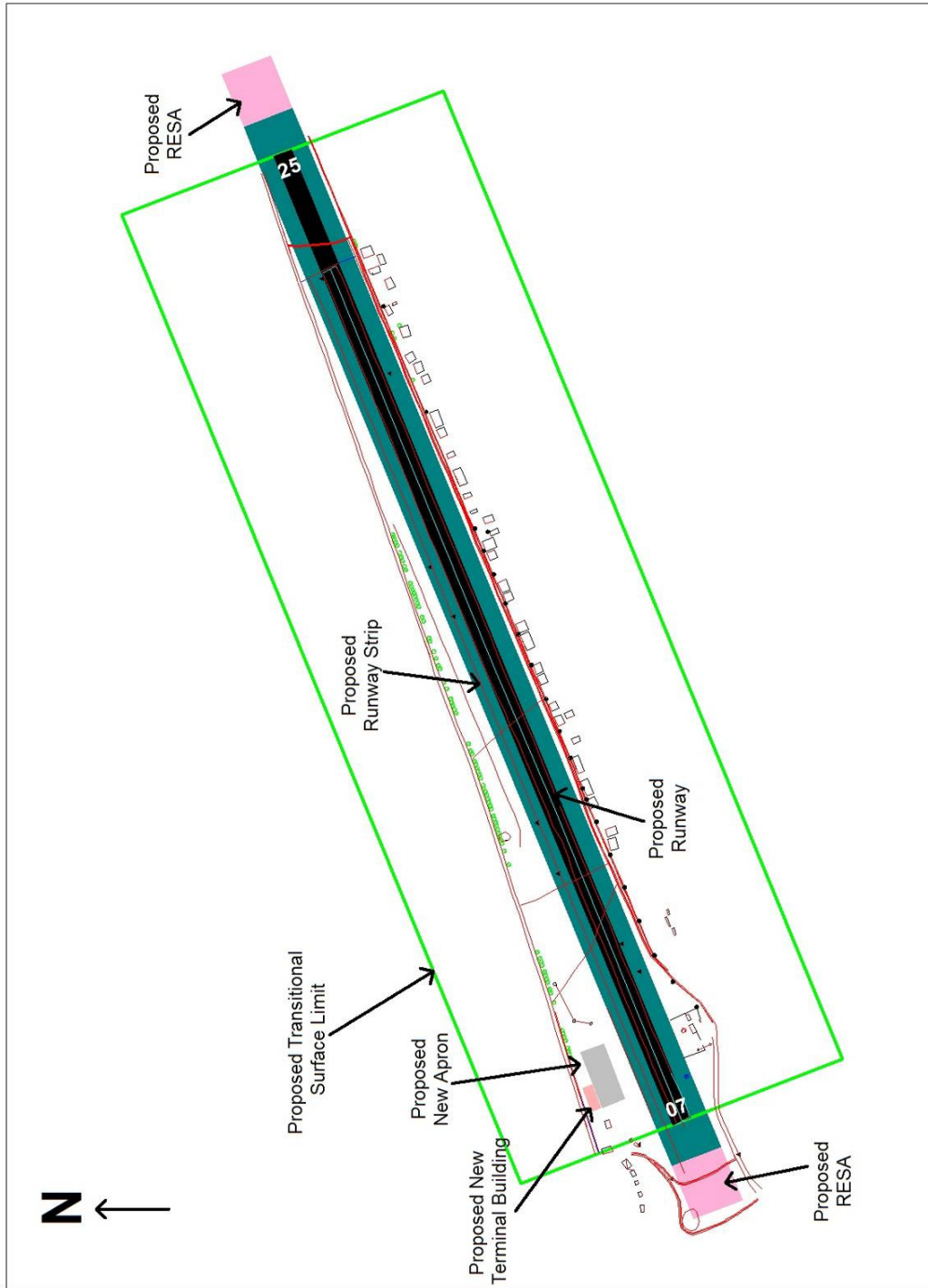


Figure 2.1: Proposed Upgraded Airport Location Plan

## **2.3. PROJECT ACTIVITIES**

The rehabilitation and upgrading activities will be according to conventional engineering scheduling, procedures and practices.

### **2.3.1 Site Selection Phase**

#### **2.3.1.1 Rehabilitation of existing structures**

Activities will be confined only to the runway, apron and taxiway, while other areas and structures within the airport will be retained in their current state.

Thus the project will continue to use existing airport facilities including outer buildings, car park, security, fire services and metrological station. The airport will remain open throughout the duration of the rehabilitation works which are estimated to take twenty-four months. To achieve this, construction will be phased in a way to ensure that sufficient runway length is available to accommodate the aircraft types currently using the airport.

#### **2.3.1.2 Land takes for new extensions**

If the project is implemented as per current designs, the runway will be lengthened by 550m. But according to the design aircraft, more clearance is required which is 40m from the centre line of the runway on both sides. This means the airport will be extended to include land beyond the ownership of the TAA. The existing fence will need to be shifted to accommodate the new extensions, make the upgraded airport to occupy the total of 45.8 ha. Existing land uses that may be affected include:

- ◆ East part of the airport two plots will be acquired, this plot is an empty plot but is allocated to one Mr. Malik, and it is an industrial plot.
- ◆ West south of the airport about 24 families will be resettled of which that land is squatter not surveyed plots and is within Old Sumbawanga area.

### **2.3.2 Mobilization Phase**

#### **2.3.2.1 Site preparation activities**

Site preparation at existing structures will involve shifting of the exiting terminal building and Apron to the new proposed area.

At the extension portions, the following activities will take place:

- Clearance of vegetation and removal of top soil by using motor grader machine.

- Disposal of overburden (cleared vegetation and topsoil) and rubble at Makutano area.
- Construction of outer new fence

### 2.3.2.2 Mobilization of construction materials and equipments

#### 1. Sources of materials

The project will require various standard construction materials including gravel, aggregates, sand, bitumen and water. An estimated 31,400 m<sup>3</sup> of course aggregate will be required up to completion of the project. They will be obtained from public open quarry Kanda Hill area along Kasesha road which is about 3.5 Km from the airport. Gravel, 144,000 m<sup>3</sup> will be obtained from the public owned Kasweswepe burrow pit about 5 km from the airport. Sand, 150 m<sup>3</sup> will be obtained from Rukwa river valley, located 15 km from the airport.

Bitumen 515 tones will be purchased in Dar es Salaam or imported from South Africa and transported by road through Zambia border. Water 2,000,000 litres will be obtained from the nearby streams around the airport area. At the quarry site and burrow pits, the materials will be excavated by excavator and wheel loader machine and loaded into trucks.

#### 2. Equipment and machinery

The project will employ various standard construction equipments

**Table 2.3: Major Equipment to be used for Implementation of Project**

S/N	Type	Quantity (m <sup>3</sup> )	Function	Duration (Month)	Source (Hire, Contractor etc.)
1	Excavator		Mobilization	3	Contractor
2	Wheel loader		Mobilization	3	Contractor
3	Trucks		Mobilization	3	Contractor
4	Motor grader		Mobilization	3	Contractor
5	Excavator		Construction	21	Contractor
6	Wheel loader		Construction	21	Contractor
7	Trucks		Construction	21	Contractor
8	Motor grader		Construction	21	Contractor
9	Compactor		Construction	21	Contractor

S/N	Type	Quantity (m <sup>3</sup> )	Function	Duration (Month)	Source (Hire, Contractor etc.)
10	Asphalt plant		Construction	21	Contractor
11	Crusher		Construction	21	Contractor
12	Asphalt Paver		Construction	21	Contractor

### 3 Transportation

The materials from the local borrow pits will be transported by trucks. Most construction equipments are available locally and some will be shipped from further Dar es Salaam or abroad.

### 4 Storage

In most instances materials will be used immediately after delivery. An on-site workshop will be provided within the airport area to undertake service, repair and maintenance activities together with facilities for the storage of other non-perishable materials and goods to be used for construction.

### 5 Construction crew

This will include a total of 20 skilled and semi-skilled personnel and about 120 labourers who will be hired locally. There shall be temporary construction camp adjacent to the airport. Accommodation for the senior staff and most of junior staff will be in appropriate accommodation addresses within Arusha town, with few on-duty staff and security staff based on camp site. Local labourers and other unskilled staff will be accommodated within their normal residences in Arusha.

### 6. Local supplies and services (food, medicals, fuel, water etc.)

Food and other domestic essentials will be provided by local suppliers. Medical facilities will be provided from local registered medical practitioner. Fuel will be supplied from local Sumbawanga fuel station and water will be from river stream near the airport area (Mazitwise stream)

### **2.3.3. Construction Phase**

#### **1. Construction of sub-base**

The works will be phased in a manner to allow the existing runway to remain in use. Initially the sub base will be constructed to the new extended part of the runway. When the extension is completed then phased working will be applied to the existing runway in a manner to ensure that sufficient operating length of runway is available for aircraft at all times. During this process some temporary turning heads and planned extended closure periods of 36 to 48 hours maybe required in order completing critical sections of the works.

- Site preparation ( clearance of vegetation and top soil)
- Shaping to the required shape and size
- Importation of gravel material and spreading
- Watering and compaction of imported gravel material

#### **2. Construction of base course**

The same procedure used for sub-base construction shall also be applied to the construction of the base course. Base-course layer installation shall be carefully coordinated and scheduled with other runway construction activities.

#### **3. Construction of wearing course**

The construction of the wearing course will be by using bitumen concrete, which is the mixture of aggregate and bitumen in a specified ratio. The mixing process will be undertaken using asphalt mixing plant which may be located either at the quarry site or at the construction site. The asphalt surfacing materials will be laid using specialist asphalt paver equipment.

#### **4. Associated works and finishing**

Other works such as new markings shall be carried out at night whilst the runway is not in operation. Fencing and some other works can which do not inhibit airport operations can proceed during hours of normal airport operation and undertaken in parallel with other construction activities to suit the contractor's programme of activities.



#### **2.3.4 Operation Phase**

Upon completion, airport operations will resume and main activities related to the upgraded areas will only involve monitoring, periodic maintenance of the runway and associated areas. The Tanzania Airport Authority has an airport Maintenance Unit which is under Directorate of Technical services, lead by director and assisted by engineers.

#### **2.3.5 Decommissioning phase**

After decommissioning there are two possible scenarios for the development of airport facilities in Sumbawanga: -

1. Major rehabilitation and/or upgrading of the existing airport which could involve dismantling and erection of new runway, parallel taxiway and/or outer buildings.
2. Development of a completely new airport at a new site.

### **3. POLICIES, LEGAL AND INSITUTIONAL FRAMEWORK FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT OF THE PROJECT**

Location, deign, mobilization, construction/installation, operation and decommissioning of the proposed project components and its associated support services will have both positive and negative impact on the ecological and social environment. On one hand, Tanzania Airport Authority needs to ensure that during the entire life cycle of the project it complies with relevant national polices, legislations and standards in Tanzania. On the other hand, there are international agreements and/or conventions to which Tanzania is a Party. These also need to be considered during project construction and operation.

#### **3.1 NEED FOR ENVIRONMENTAL IMPACT ASSESSMENT**

Environmental Impact Assessment is one of the planning tools which are used to facilitate and promote sustainable development by integrating environmental consideration in the decision making process and ensuring that unnecessary damage to the environment is avoided and optimises resources use and management opportunities. Due to the importance of Environment Impact Assessment, most sector policies and legislation have incorporated the requirement of undertaking EIA prior to the implementation of development projects.

The following sections will discuss relevant sector policies and legislation to the proposed project:

#### **3.2 POLICIES**

The following are relevant sectoral and cross-sectoral policies which provide directives on how projects should be implemented in relation to concerned environmental and socio-economic settings. The project proponent will consult these policies in the course of designing and implementing the proposed project activities.

##### **3.2.1 National Environmental Policy (1997)**

National Environmental policy highlights sustainable development as its core concept. National Environmental policy states that Tanzania is committed to sustainable development in the short-, medium- and long-term. Chapter 4, Paragraph 64 of the NEP states that *"It is in the context of an EIA regime that policy guidance on choices to maximise long-term benefits of development and environmental objectives can be revealed and decided upon.* Environment Impact Assessment as a

*planning tool shall be used to integrate environmental considerations in the decision making process in order to ensure unnecessary damage to the environment is avoided*". The policy also advocates public consultation in carrying out Environment Impact Assessment. Specifically paragraph 66 states that "One of the cornerstones of the Environment Impact Assessment process will be the institution of public consultations and public hearing in the Environment Impact Assessment procedures". The policy recognises the importance of promoting use of environmentally sound technologies that protect environment based on careful assessment of the carrying capacity of the environment. By carrying out this Environmental Impact Assessment, Tanzania Airport Authority has complied with the policy.

### **3.2.2 National Investment Promotion Policy (1996)**

The National Investment Promotion Policy encourages protection of environment in line with the countries socio-economic policies. Under the policy, investors are required to undertake activities in a manner that best contributes to consumer and environmental protection. The investors are also encouraged to use local raw materials/components where possible. This Environment Impact Assessment is undertaken to ensure that Tanzania Airport Authority will abide to the relevant provisions of the policy to ensure compliance with the development.

### **3.2.3 The Tanzania Development Vision (2025)**

The National Vision 2025 foresees the alleviation of widespread poverty through improved socio-economic opportunities, good governance, transparency and improved public sector performance. These objectives not only deal with economic issues, but also include social challenges such as education, health, the environment and increasing involvement of the people in working for their own development. The thrust of these objectives is to attain a sustainable development of the people. Rehabilitation of Sumbawanga Airport will contribute towards realisation of the Vision's objectives.

### **3.2.4 National Policy on HIV/AIDS (2001)**

National HIV/AIDS policy provides the general frame work for collective and individual response to HIV/AIDS pandemic. It clear outlines the pertinent issues in struggle. These include among others, roles of various sectors, roles in the preventions, care and supports in HIV/AIDS.

### **3.2.5 National Transport Policy (2003)**

National transport policy, aims at enhancing transport safety and environmental protection, through taking steps to review and update national legislation in transport operations and safety requirements.

### **3.2.6 National Land Policy (1996)**

The National Land Policy advocates the protection of land resources from degradation for sustainable development. Among other things the policy requires that project development should take due consideration the land capability, ensures proper management of the land to prevent erosion, contamination and other forms of degradation. Environmental Impact Assessment for this project is intended to identify if there is potential for the adverse impact and to propose means for mitigating them.

### **3.2.7 The National Poverty Eradication Strategy (2000)**

The strategy is viewed as an instrument for channelling national efforts towards broadly agreed objectives and specific inputs and outputs. The poverty reduction strategy is to large extent, an integral part of ongoing macro-economic and structural reforms. Achieving the target of accelerated growth will require significant efforts by different stakeholders to enhance productivity and increase investment in both human and physical capital.

## **3.3 LEGISLATIONS AND REGULATIONS**

The following are relevant legislations and regulations which provide directives on how projects should be implemented in relation to concerned environmental and socio-economic settings. The project proponent will consult these legislations and regulations in the course of designing and implementing the proposed project activities.

### **3.3.1 Environment Management Act, No. 20 of 2004**

The Environmental Management Act (2004) introduces a concept of right of Tanzanians to clean, safe and health environment and right of Tanzanians to access various segment of environment for recreational, educational, health, spiritual, cultural and economic purposes (Article 4 (1) and (2)). The Act imposes an obligation on developers to conduct an Environmental Impact Assessment prior to the commencement of the project to determine whether the project may/or is likely to

have, or will have a significant impact on the environment. Article 81 makes EIA mandatory to all projects that fall under the EIA mandatory list (Schedule 3) into which this project falls. The Act also requires that project developers undertake regular environmental audits of their facility.

### **3.3.2 EIA and Audit regulations, 2005.**

First schedule of this regulation, lists rehabilitation of an airport among types of projects requiring a mandatory Environmental Impact Assessment. Since such project is likely to have significant adverse environmental impacts, an in-depth study is required to determine the scale, extent and significance of the impacts and to identify appropriate mitigation measures. Furthermore, the regulation specifically provide for procedures and guidelines for carrying out Environmental Impact Assessment in Tanzania. This EIA review has been carried out in accordance with these regulations.

### **3.3.3 The National Land Act (1999) and its Amendment (2004)**

The Land Act of 1999 provides for the basic law in relation to land other than the village land, the management of land, settlement of disputes and related matters. Act lays down key fundamental principles for occupying and using the land. Among them, is the principle that any land user shall ensure that land is used productively and that any such use complies with the principles of sustainable development. This principle applies to categories of land.

### **3.3.4 The Village Land Act (1999)**

The Village Land Act of 1999 confers the management and administration of village lands to Village Councils, under the approval of the Village Assemblies, although the Minister of Lands is entitled to decide on the amount of land which can be owned by a single person or commercial entity. Any person who wrongfully obstructs or encroaches on the public right of way and who does not within the time specified in any notice served on him remove that obstruction or cease that encroachment commits an offence and upon conviction is liable to a fine.

### **3.3.5 Land Acquisition Act (1967)**

The Act gives the power to the President to acquire any land for any estate or term where such land is acquired for any public purpose. The Act goes on to define the circumstances in which public interest could be invoked, e.g. for exclusive government use, public use, for or in connection with sanitary improvement of any

kind; for or in connection with laying out any new city, municipality, township or minor settlement or extension or improvement of any existing city.

Other purposes are in connection with development of any airfield, port or harbour; mining for minerals or oils; for use by the community or corporation within community; for use by any person or group of persons as the President may decide to grant them such land. The acquisition of the land for the right of way as well as for the resettlement sites is within the provision of this Act. Further the Act specifies other requirements prior to the acquisition of the land such as investigation for the land to be taken, issuing notice of intention to take land and mode in which notices will be served. It further defines the requirements for and restrictions on compensation.

### **3.3.6 The Mining Act No. 5 (1998)**

This act provides for prospecting of minerals, mining and dealing in minerals. It also provides for building materials including all forms of rock, stones, gravel, sand, clay, volcanic ash or cinder or other minerals being used for the construction of buildings, roads, dams, and aerodromes or similar works. The Legislation makes Environmental Impact Assessment mandatory as a precondition for granting various categories of mining licences.

Rehabilitation of Sumbawanga airport will require materials from borrows pits and quarries. Acquisition of these construction materials are all covered by this Environmental Impact Assessment study and respective licences will be acquired by the Contractors on behalf of Tanzania Airport Authority.

### **3.3.7 The Land Disputes Court Act. No.2 (2002)**

Every dispute or complainant concerning land shall be instituted in the Court having jurisdiction to determine land dispute in the given area (Section 3). The Courts of jurisdiction include:-

- (i) The Village Land Council
- (ii) The ward Tribunal
- (iii) District Land and Housing Tribunal
- (iv) The High Court (Land Division)
- (v) The Court of Appeal of Tanzania.

The Act gives the ward tribunals powers to resolve land disputes involving lands. If the ward tribunal fails to resolve the dispute, the matter can be referred to the District land

and housing tribunal as established by the Land Act (1999). If any dispute will arise as a result of this project, the provision of this Act shall be observed.

### **3.3.8 Occupation Health and Safety Act No. 5 of 2003**

This Act makes provisions for the safety; health and welfare of persons at work in factories and all other places of work. Also provides for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work. Relevant sections of the ordinance to the project activities include Part IV Section 43 (1) - Safe means of access and safe working place; Prevention of fire; and Part V on health and welfare provisions, which includes provision of supply of clean and safe to workers, sanitary convenience, washing facilities and first aid facility. Section 50, which is dealing with fire prevention issues.

Section 15 gives powers to the Registrar of factories and workplace to enter any factory or workplace to perform his duties as provided by the Act. Section 16 requires that factories and workplace should register with Registrar of factories and workplaces before commencing operations. Part VI is dealing with special safety provisions for working places involving handling hazardous chemicals, hazardous processes or hazardous equipment.

### **3.3.9 The Water Utilisation (Control and Regulation) Act No. 42 of 1974**

The main Legislation to control the extraction of water for different use is that of Water Utilisation and Regulation Act No. 42 of 1974, which is a principle Act, repealing cap 410 of 1959. The Act has been amended by Act No 10 of 1981, written laws (miscellaneous amendment) Act No 17 of 1989 and the Water Utilisation (miscellaneous amendment) Act No 8 of 1997. Both the principle Act and its amendments are for the protection of the water resources and the user so that there is a balance between different uses.

Relevant provision of this act is that the water *“Shall not be polluted with any matter derived from such use to such extent as to be likely to cause injury either directly or indirectly to public health to livestock, or fish, to crops, orchards or garden, which are irrigated by such water or to any product in the processing of which such water is used”*.

Section 11 of the Act provides right to owner of a plot to sink or enlarge any well or borehole thereon and abstract water there from, not exceeding 22,700 litres in any one day. However, this section provides distances to be observed before construction of borehole is made.

### 3.4 INSTITUTIONAL ASPECTS

The Environment management Act, No. 20 of 2004, sets out the institutional arrangement for management of environmental issues in Tanzania. The Environment Impact Assessment for the Sumbawanga airport will be undertaken following procedures laid down in the Environment Impact Assessment and Audit regulations, 2005.

**Table 3.1: Institutional aspects Frame work**

S/N	Level	Institution	Role and Responsibility
1	<b>Central Government</b>	Vice President's office ( Division of Environment)	<ul style="list-style-type: none"> <li>▪ Coordinate the implementation of the National Environmental Policy</li> <li>▪ Approval of EIS and issuing of certificates</li> <li>▪ Coordinate environmental management activities within the country</li> </ul>
		National Environment Management Council(NEMC)	<ul style="list-style-type: none"> <li>▪ Registration of project, screening and assigning the level of impact assessment</li> <li>▪ Review of scoping report and approval of terms of reference,</li> <li>• Review of EIS and recommendation to the government.</li> <li>• Monitoring the proposed measures</li> <li>• Carry out environmental auditing</li> </ul>



		Ministry of Infrastructure Development (Environmental Management Unit)	<ul style="list-style-type: none"> <li>▪ Issuing policy guidance</li> <li>▪ Providing legal frame works</li> <li>▪ Carry out project environmental monitoring</li> <li>▪ Carry out project environmental auditing</li> </ul>
		Tanzania Airport Authority (Environmental Management Unit)	<ul style="list-style-type: none"> <li>▪ EIA Study</li> <li>▪ Oversee overall project Implementation</li> <li>▪ Environmental project Monitoring</li> <li>▪ Environmental project auditing</li> </ul>
2	<b>Regional</b>	Rukwa Regional Secretariat Office	<ul style="list-style-type: none"> <li>▪ Oversee enforcement of laws and regulations</li> <li>▪ Advice on implementation of development project activities</li> <li>▪ Oversee and advice on implementation of relevant national policies</li> </ul>
3	<b>Sumbawanga Municipal Council</b>	District Commissioner's office	<ul style="list-style-type: none"> <li>▪ Oversee enforcement of laws and regulations</li> <li>▪ Advice on implementation of development project activities</li> <li>▪ Oversee and advice on implementation of relevant national policies</li> </ul>
		District Executive Director's Office	<ul style="list-style-type: none"> <li>▪ Incharge of all development within the Sumbawanga municipal</li> <li>▪ Coordinator of all departments within the municipal.</li> </ul>

		District Environmental, Natural Resources, Community Development and Related offices	<ul style="list-style-type: none"> <li>▪ Baseline data on social and economic</li> <li>▪ Enforcement of laws and regulations</li> </ul>
		District Environmental Committee	<ul style="list-style-type: none"> <li>▪ Coordinate the environmental matters within the District</li> </ul>

## **4 ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE**

### **4.1 INTRODUCTION**

This chapter provides relevant environmental, economic and social characteristics of the project core area (site specific), and areas in the immediate vicinity of the airport (Sumbawanga and Izia Wards) as well as broad description of the area of influence i.e. Sumbawanga Municipality and Rukwa Region. The level of details in the various sections depends on the interactions between the project activities and the particular environmental or socio-economic aspect. Information provided in this chapter will be superimposed on to the project concept and components for impact identification, evaluation and development of mitigation measures.

### **4.2 SITE DESCRIPTION (Project Core Area)**

The topography of the airport environs and developments within the airport and outside its boundary, especially under the aircraft landing and take-off paths may have considerable influence on the effective utilization of an aerodrome.

#### **4.2.1. Location and accessibility**

Sumbawanga airport is located between 31°36' 15" – 31°37' 15" East and 7°57' 00" - 7°56' 45"South. The airport is within Sumbawanga Municipality about 4 kilometers from the town centre at the old Sumbawanga (Asilia) area. A half km access earth track to the airport branches from the Sumbawanga – Mpanda road. The project site can be reached mainly by way of the Tunduma - Sumbawanga road (graveled and in very poor condition) or Mpanda - Sumbawanga road. Other possibilities are by air, railway or boat: the Tabora – Kigoma central railway line up to Mpanda, or TAZARA up to Tunduma then by road or from Mpanda by boat over Lake Tanganyika to the Kasanga port then by road to Sumbawanga. Sumbawanga airport is about 1250 km distance from Dar es Salaam and 250 km from Tunduma.

#### **4.2.2 Biophysical features**

##### **1. Climate**

Sumbawanga airport experiences climatic conditions typical of the Sumbawanga Municipal. The project area climate is dry and sub-humid for the great part of the year alternating with semi-arid conditions. It has a distinct wet and dry season and a tropical temperature regime. The mean temperatures is 21.6 °C, with dry cool

temperatures during May-October and the coolest season June-July (ranging between 16°C and 5°C). The long wet season starts in November and end in April and the dry season from June to October. On an average the Sumbawanga Municipal gets moderate rainfall of between 900mm-1000mm per year. This is an average of 646.8mm annually. Frequently, the rain is usually accompanied with lightning.

## **2. Topography**

Sumbawanga average altitude is about 1768m. The absolute mark of the Sumbawanga airport checkpoint (AMSL) is 5920 ft. The general airport area has an even topography. In the far-east and west, the airport is surrounded by hilly terrain of Mafulala hills and Malangali hills respectively. On airport land there are a number of human-induced features that significantly interrupt the even terrain including storm water drains /trenches, and pits of various sizes scattered over the place dug by local people for dumping solid waste, laying water pipes, borrow pits for earthen-bricks and pits for trapping termites. Some parts have been excavated by burrowing rodents. There is a marked south to north gradient with drainage running into the valley of Manzitiswe stream.

## **3. Soils**

Generally, the Rukwa region and its adjoining area is a vast peneplain with occasional hills and mountain masses characterized by quaternary deposits. The soils, probably of Neogene age, are covered with deep, reddened earth (lateritic) typical of these high-level plains in East Africa. It is also a clay-rich area with poor drainage properties and road passability has always been problematic during wet seasons. Alluvium is also found in several locations and it is from river terraces of the area.

## **4. Hydrology**

There is no permanent or temporary water course that crosses the airport grounds. The main hydrological feature close to the site is the Manzitiswe stream to the north. The flat terrain is an impediment to efficient surface drainage, thus storm water stagnates on the airport field during heavy rains.

## **5. Biological characteristics**

Main vegetation cover on the site, (and immediate landing and takeoff paths) is characterized by grass and secondary vegetation that has been evened out by constant mowing, livestock grazing and cutting for fodder. Some areas are

completely bare due to trampling by people and animals: several bare footpaths crisscross the airport and there are bare patches used as playground. Main fauna are domesticated animals – cattle, goats that illegally graze on airport land. The presences of trees, livestock and nearby Manzitwise stream have attracted appreciable numbers of birds including white-chested crows and white egret. Airport staff report snakes, burrowing rodents and various insects including grasshoppers and seasonal swarms of termites and ants.

## **6. Air quality**

No data is available with respect to ambient air quality in Sumbawanga region. However, is generally believed to be good, since there are no major sources of pollution and that the area is not likely to be affected by long range transport of pollutants.



**Fig 4.1: Vegetation covers on the airport runway**

### **4.2.3 Land Uses**

The airport area is strictly designated for its particular purposes. Section 2.1 describes the sizes and conditions of the various facilities found on the airport field. TAA is responsible for planning for land use, management and enforcement of laws pertaining to land within the airport area. Site assessments and information from stakeholders reveal several activities which are carried out on the airport grounds

albeit illegally. These include farming, grazing livestock, footpaths and car tracks, playground and pits of various sizes for dumping solid wastes, excavating earth for brick – making, trapping of edible rodents and termite-rich etc.



**Fig 4.2: Livestock Inside the airport area**

#### **4.2.4 PLANNED FUTURE DEVELOPMENTS**

Changes anticipated before and after the project commences is rehabilitation of roads and Kasanga port. Currently the government is pumping more funds on road rehabilitation and maintenance, Tunduma- Sumbawanga road which is about 250km will upgraded to bitumen standard under Millennium Challenge Corporation project financed by United State of America. Sumbawanga- Kasanga Port road also will be improved to gravel standard to make the road passable in all year.

### 4.3 SOCIO-ECONOMIC CHARACTERISTICS OF IMMEDIATE VICINITY OF AIRPORT

#### 4.3.1 Land Ownership and Major Land Uses

##### 1. East

On the approach area there is an open grassed space of about 500m that runs up to the SIDO road. Part of the area is purportedly to belong to the Municipal council and private owned plots which for a long time the Airport management contends should be relocated. Beyond the road is an industrial area (SIDO workshop), then the Eden settlement and further on are the Maflala hills.



**Fig 4.3: East Part of the Airport**

##### 2. West

Immediately after end of runway there is an open grassed space (half acre) that runs up to the Mpanda main road. The area is crossed by a track/footpath, and is cultivated with small gardens of cassava and legumes, banana, and a few indigenous trees. Beyond the main road is the Lwiche river valley characterized by wetland vegetation and planted trees mainly eucalyptus (8-10m high). Further away, on higher grounds is a low density settlement with prominent telecommunication mast and a church mast that could pose as obstacles in the approach / takeoff path. Malangali hills are in the far horizon.





**Fig 4.4: Runway 07 on West Part of the Airport**

### **3. South**

To the north-west the airport is neighbored by the Bangwe settlement without a separating fence. A line of about 50 houses very closely about the airport area. A stone-lined storm water drain that runs east to west from the SIDO workshop, (circumventing the airport terminal and emptying into the Manzitwise stream) forms the immediate boundary between the airport area and the settlement. North west, approx. 30m open space separates the airport and the Izia and Manzitwise co-joined primary schools; similarly an open space lies between the airport terminal and Manzitwise stream. Izia settlement is found beyond the stream.



**Fig 4.5: Stone Linen Drainage which is border between the airport and Bangwe Settlement.**



#### **4. North**

North West is the Old Sumbawanga settlement separated from the airport area by an intrusive area of small gardens and a few built structures (houses, pit latrine, brick furnace and a market). South east, the airport area widens and the tree-lined SIDO road forms its boundary with the Old Sumbawanga settlement.



**Fig 4.6: Old Sumbawanga settlement on Northwest of the Airport**

### **4.4 SOCIO-ECONOMIC CHARACTERISTICS OF AREA OF INFLUENCE**

#### **4.4.1 Demographic Profile**

The distribution of the population in the project area of influence (Rukwa Region, Sumbawanga Municipal and other districts) from the 2002 Population and Housing Census is as shown in table 4.1 The estimated intercensal growth rate of the region is 3.6%; (projected population for the Municipal was 167,596 and 179,872 in 2005 and 2007 respectively). The data show a strong 1:1 male/female ratio and more people in the rural districts. About 90% of the population in the region earns their living from agriculture.

**Table 4.1: Rukwa Region Census Counts, 2002 and Intercensal Growth Rates**

District/Ward	Population (Number) Total	Population (by Gender)		Household		Population Density 2002	Growth Rate (1988 – 2002)
		Male	Female	Number	Average Size		
Rukwa Region	1,141,743	559,120	582,623	222,868	5.1	17	3.6
Sumbawanga Urban	147,483	71,552	75,931	30,470	4.8		
Mpanda District	412,683	202,466	210,217	74,221	5.6		
Sumbawanga Rural	373,080	182,312	190,768	76,701	4.9		
Nkasi District	208,497	102,790	105,707	41,476	5.0		

**Source: The 2002 Population and Housing Census, Government of Tanzania, 2004**

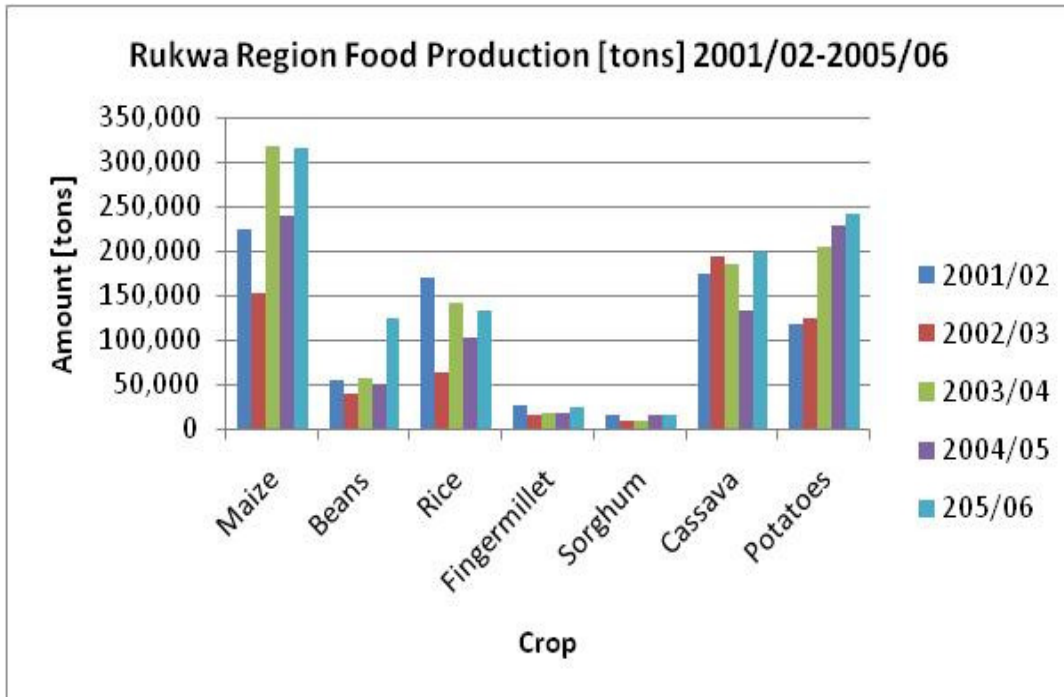
#### **4.4.2 Economic Activities**

Economic activities in the project area of influence that could have a direct bearing to the upgraded airport are briefly described below:

##### **4.4.2.1 Agriculture**

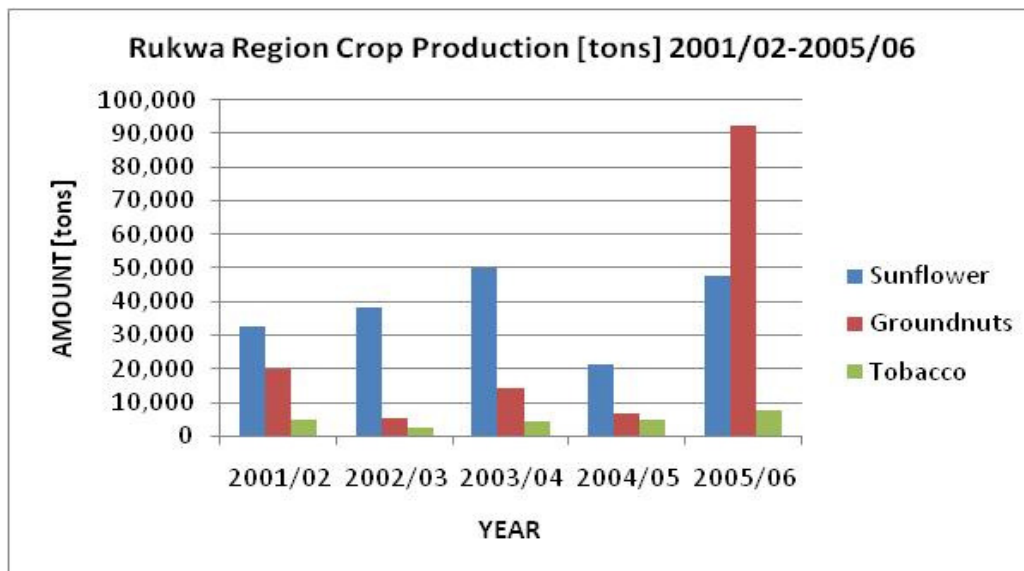
The economy of Rukwa region in both urban and rural areas is very much dependent on the agricultural sector. About 64% of total arable land (56,921 ha) in the Sumbawanga Municipal is under cultivation. Most of the production in the region is by small scale holders. The main crops grown in the region include maize, beans, paddy and finger millet as the main subsistence crops. Others are sweet potatoes, cassava, sunflower and groundnuts. Wheat, tobacco and coffee are relatively minor crops. Production in Rukwa Region is as shown in figures 4.8 and 4.9.

A sizeable proportions of main crops are marketed, thus, the upgrade of the airport is expected to increase communications and open new marketing channels and possibly stimulate investments in commercial large scale agriculture.



Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006

Figure 4.7: Rukwa Region Food Production in 2001/02-2005/06



Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006

Figure 4.8: Rukwa Region Cash Crop Production in 2001/02-2005/06..

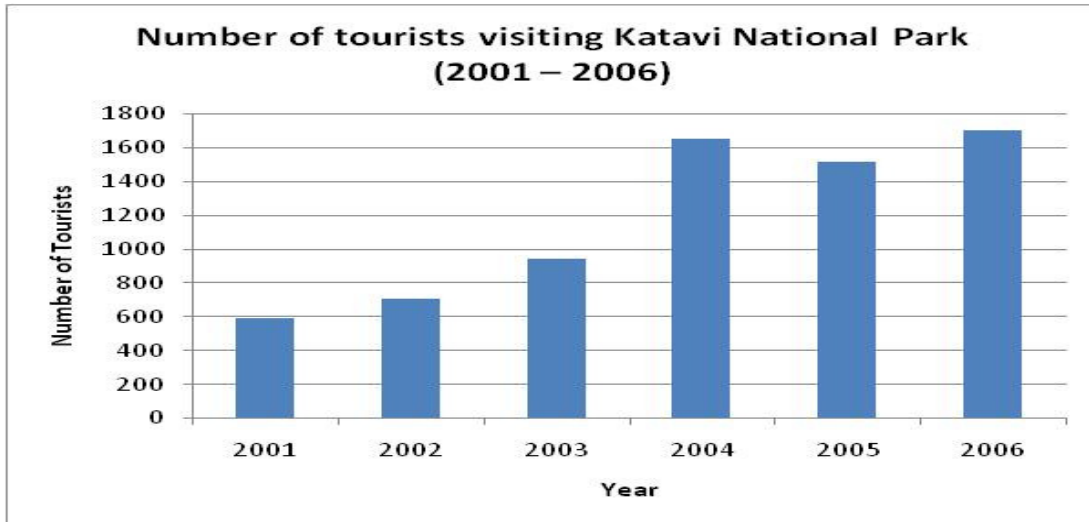
#### 4.4.2.2 Tourism

Tourism in the Rukwa Region though currently underdeveloped, has great potential for tourism investments and growth. Touristic attractions in Rukwa region are as shown in table 4.2 below. Katavi National Park is the third largest national park in Tanzania (4,471 sq km). There has been gradual increase in the number of tourists visiting the park (Table 4.3). The game reserves and game controlled areas have a big variety of wildlife species including Chimpanzees found in Mkwamba game reserve. The region has well preserved history and lakes with gravel to sandy beaches and nearby islands which provide unique beautiful sceneries. Upgrading of the airport is likely to stimulate a large number of tourists to visit the areas thereby improving tourism and at the same time contributing to regional and national income.

**Table 4.2: Tourist Attractions and Locations in Rukwa Region**

S/N	Tourist Attraction	Location /District
1	Katavi National Park	Southwest in Mpanda within a truncated arm of the Rift Valley
2	Germany Old Bismark Fort	Kasanga, Nkasi
3	Kalumbaleza and Kalambo falls	Nkasi
	Mvimwa Benedictine Fathers Convent (on slopes of Kate Mountains)	
4	Usevya hot springs	Usevya, Sumbawanga Rural
5	Lake Rukwa scenery (viewed from Ufipa escarpment)	Sumbawanga Rural / Nkasi
6	Lake Tanganyika - Kipili area (gentle slopes of the mountains overlooking the estuary)	Nkasi / Mpanda
7	Mbizi forest (Red Colubus, other monkey species, small animals, and various bird species)	10km from Sumbawanga Municipality
	Milanzi Village Cultural Site	
9	Game reserves (Mkwamba, Uwanda, Ugalla river, and Lwafi)	Mpanda, Nkasi
10	Game controlled areas (Msima, Inyonga, Mlele North, Lake Kwale)	

**Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006**



Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006

Fig 4.9: Number of tourists visiting Katavi National Park (2001 – 2006)

#### 4.4.4.3 Fisheries

Rukwa region can produce an average of 1,400 metric tons of fish per annum. Fishing is mainly conducted in Lake Tanganyika (sardines, Nile perch and tilapia species), Rukwa (tilapia species) and Sitakile and Ugalla rivers. Other variety of fish includes mud fish, English fish, *Luciolates strapessil* "Migebuka" and various decorative fish. Crocodile farming and crocodile harvesting is mainly practiced in Lake Rukwa, Muze village. The fish industry is active with notable fish business within and outside Rukwa Region to as far as Zambia and DRC. Main hindrance to fully exploit the fish industry is lack of reliable transportation infrastructure to other regions and neighbouring countries. The upgrading of the Sumbawanga airport will enhance investment and improve fishing business in the region.

#### 4.4.4.4 Mining

The Rukwa Region is rich in mineral deposits of different kinds including precious metals, base metals, other metals, gemstones, industrial minerals, and building materials. The most significant of all these minerals are coal and gold (table 4.5). Enormous amounts of gold exist in Mpanda District and coal estimated at 20 million tons at Muze and Namwele coalfield on the Ufipa plateau in the Sumbawanga District, and at Nkomolo in Nkasi District). Other minerals include silver, limestone, iron, mica and small amounts of lead, nickel, chromium, copper and cobalt, kaolin, uranium, limonite etc. Currently small-scale miners exploit most of these minerals with poor machinery and hence very low yield. The expansion of the airport will facilitate

the growth of mining sector in the region and transportation of explored minerals from Sumbawanga to other destinations.

**Table 4.3: Significant Minerals of Rukwa and their locations**

Mineral	Location	District
Gold	Mkwamba, Chemchem, Uruwira, Sikitiko, Kapapa, Singililwa, Ibindi, Magomamoto, Maisope, Njiapanda, Kapanda, Mwenge, Society-Mgamba, D-Reef, Katuma, Katisunga, Kanyega, Twamba, Simbwesa and Karema.	Mpanda
Coal	Namwele, Muze and Mkomolo areas	Sumbawanga Municipal, Sumbawanga Rural, Nkasi

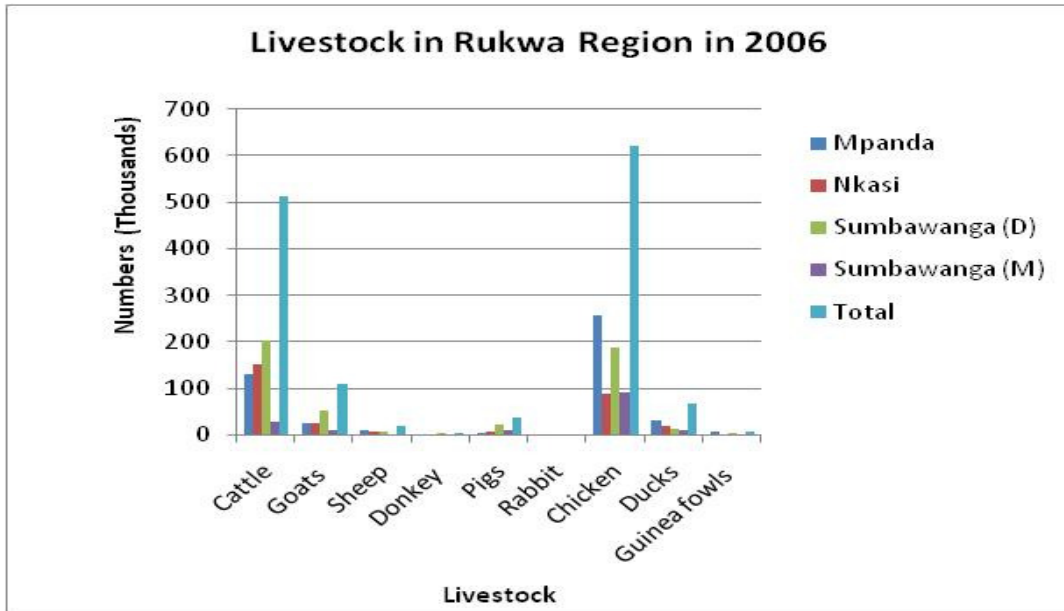
**Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006**

#### **4.4.4.5 Wildlife**

Rukwa Region has abundant wildlife and many varieties of species including popular species: lions, wildebeests, hippos, crocodiles, giraffes (including white colours). These are both found in the national Park, game reserves and the game controlled areas mentioned under section 4.4.4.2. There are five hunting blocks set aside in the region and rented to hunting companies through which the region earn some foreign exchange. Between 1997 and 2002 an estimated 1426 animals of different species were hunted earning a total of TShs 105,558,210; and 6520 animals hunted through local hunting agreements. Expansion of the Sumbawanga airport may encourage development of tourism infrastructures in the wildlife area as well as promote marketing wildlife resources. As a result the country may earn more foreign exchange.

#### **4.4.4.6 Livestock Keeping**

Livestock keeping is the other important form of livelihood in Rukwa region next to agriculture (Figure 4.11). There are three ranches in the region i.e. Malonje ranch located in Sumbawanga Municipal, Nkundi ranch and Nkalambo ranch (Nkasi District).



Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006

Figure 4.10: Livestock in Rukwa Region in 2006

With the establishment of a modern meat processing factory the Sumbawanga Agricultural and Animal Feeds Industry (SAAFI) at the Sumbawanga Municipal with the capacity of slaughtering 150 animals per day producing 'prime cuts' carcasses and sausages; the upgrading of the airport will facilitate the transportation of such products from Sumbawanga to potential markets targeted by the factory which includes cities of Dar es Salaam and Zanzibar, the tourist hotels in Bagamoyo, the countries bordering the region i.e. Zambia and DRC. Other countries include Burundi, Rwanda, Comoro and the Gulf Countries.

#### 4.4.4.7 Other Activities

##### Industry

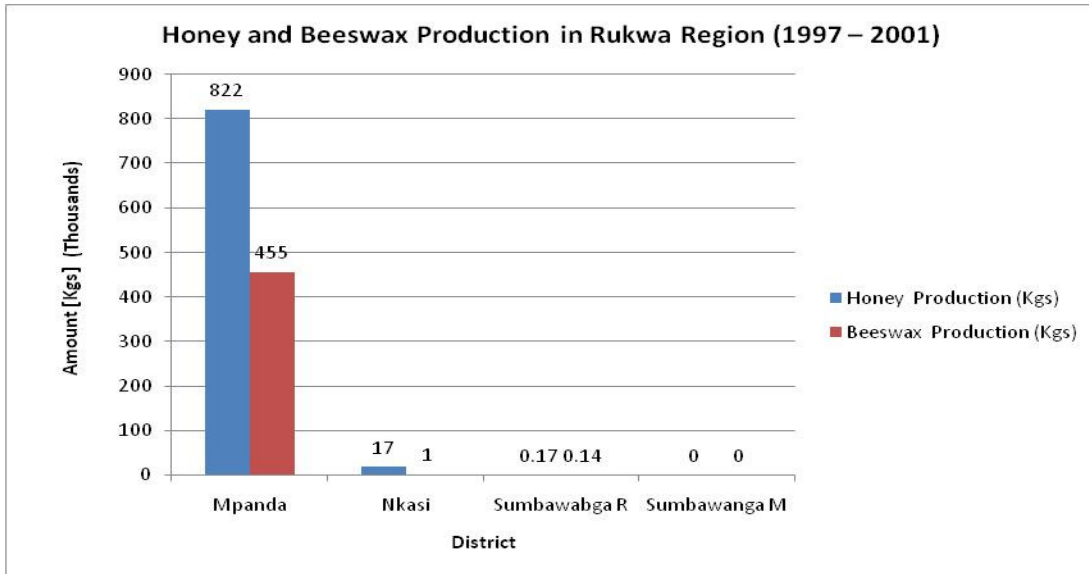
The Rukwa Region has a number of industries including meat processing factory, oil seed processing factory, grain milling, gold, emeralds mining, and beekeeping for hone and wax fishery and lumbering. Expansion of the airport will stimulate growth of industrial sector in the region.

##### Forestry

The Region has a natural forest that covers 2,827,204 ha, which constitutes more than 1/3 of the total area of the region. The forest is home for bees that produce honey and beeswax. Also other products such as timber, fuel wood and charcoal obtained from the reserve.

## Beekeeping

In Rukwa region honey and beeswax have for a long time been produced by traditional beekeepers especially in Mpanda District. Figure 4.12 below provides information available on total production for the period of five years from 1997 to 2001.



Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006

Figure 4.11: Honey and Beeswax Production in Rukwa Region (1997 – 2001)

There is a big potential for increased production of honey and beeswax by both traditional and modern beekeeping techniques such as beehives and protective gears. The expansion of the Sumbawanga airport can facilitate the realization of the potential and easy marketing of the honey and beeswax to other part of the country and neighbouring countries.

### 4.4.5 Economic Infrastructure

#### 4.4.5.1 Roads

The Region has a total of 4,333km of roads. Sumbawanga Municipality has the highest road density (23.9 Km per 100 sq. Km) in the region. Regional roads include the Tunduma-Sumbawanga road (graveled and in very poor condition), connect the district headquarters with rest of Tanzania mainland and agricultural producing areas of the region including connection to the shore of Lakes. The District roads include the



Sumbawanga-Mpanda and Sumbawanga-Nkasi truck roads. In the entire network, the roads are either gravel or earth surfaced, with the exception of bitumen sections in Sumbawanga town. Most of these roads are impassable during the rainy season. The expansion of the airport will facilitate easy access of the Sumbawanga Municipal and hence promoting the trade, tourism and foreign investment in the Region.

#### **4.4.5.2 Marine Transport**

Lake Tanganyika has regular ship transport that links Rukwa Region with Kigoma Region. Also the marine service linked the Region with neighbouring countries of the Democratic Republic of Congo (DRC), Zambia and Burundi. Apart from ships, there are also boats privately owned which ply the lake.

#### **4.4.5.3 Air Transport**

There are three public airports and more than 10 private airstrips in Rukwa Region. The public airports located in Sumbawanga (the project site), Mpanda and Inyonga. The airports of Sumbawanga and Mpanda can be used for commercial purposes (passenger and cargo) using the small aircrafts. The status of the Sumbawanga airport is described under section 2.1 above). There are private aircrafts which fly to Sumbawanga, Mpanda, Inyonga and Katavi National Park on charter basis. The expansion of the Sumbawanga airport will attract the commercial airlines and increase the accessibility of the Sumbawanga Municipal and other areas of Rukwa region.

#### **4.4.5.4 Railway**

Railway services are provided by Tanzania Railway Corporation (TRC) of 210 Km rail line that linked Rukwa Region and Tabora Region from Mpanda in which a three weekly passenger cum cargo train serves the Region from Tabora. There is no railway connecting the Sumbawanga Municipal with other District or region.

#### **4.4.5.5 Communication Networks**

Sumbawanga Municipal and other areas in the Region are served by TTCL which provides landline telephone and internet services. Other cellular telephone company services include Celtel, Tigo and Vodacom are available mostly in Sumbawanga Urban. Almost all newspapers except Daily News and Sunday News are available

after one day in Rukwa Region. The availability of the telecommunication network will facilitate the running of the airport. Further more the upgrading of the airport may help to improve the Region communication infrastructure.

#### **4.4.5.6 Energy**

The electricity supplied by TANESCO is available in Sumbawanga Municipal. Only 4% of the Region's households in 2002 were supplied with electricity. The source of electricity in the municipality is a hydropower supplied from Zambia. The airport is currently connected with electricity from the national grid.

#### **4.4.6 PLANNED FUTURE DEVELOPMENTS**

Major changes anticipated before and after the project are rehabilitation and upgrading of roads and Kasanga port. Tunduma-Sumbawanga road will be upgraded to Bitumen standard and Sumbawanga-Katanga port road will be upgraded to gravel standard so that can passable all the year. Kasanga port will be upgraded and rehabilitated to accommodate more ships, passengers and cargo.

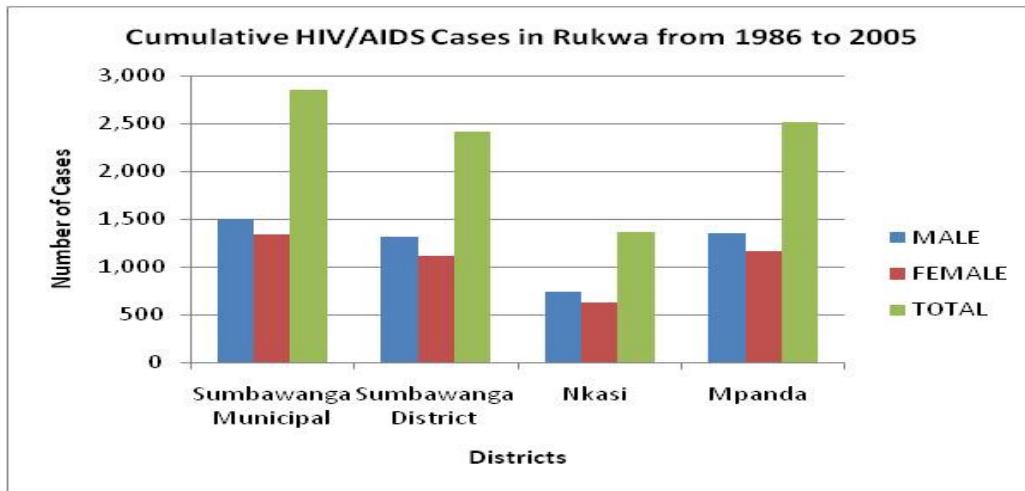
#### **4.5 HIV/AIDS STATUS IN THE AREA OF INFLUENCE**

HIV/AIDS infection in the Rukwa region has been rising steadily since 1994. On the whole the region's number of AIDS cases diagnosed rose from 323 cases in 1995 to 807 in 2000. This represents a 150 percent increase for both sexes. Women cases rose by 165 percent while those of men rose by 136 percent. The districts with the most risk was Sumbawanga Municipal where the increase in male cases was 356 percent while those of females increased by 417 percent giving a total for the two sexes of 386 percent. Nkasi district, on other hand was safest by showing declined of 1 percent for both sexes (Regional Social economic profile, 2003).

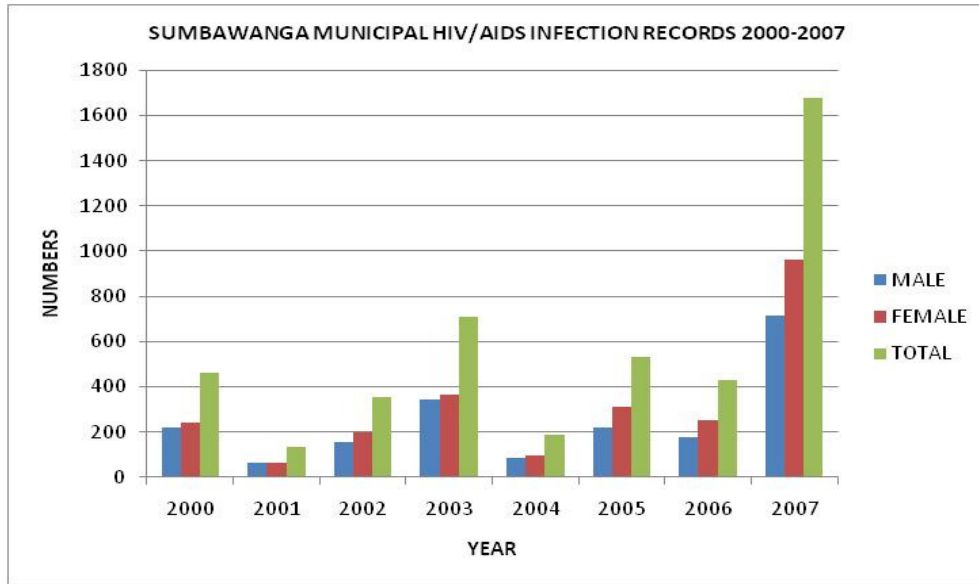
#### **Current Status Of HIV/AIDS Care and Treatment**

- Cumulative AIDS cases for the past 20 years since the first report AIDS case in 1986 amount to over 9,000
- Due to under reporting, it is estimated that only one case in five cases is reported. This means that a cumulative total of 40,000 cases are likely to have occurred up to December, 2005

- The overall prevalence HIV infection among blood donors was 18.1 percent (in 2005 a total of 3931 donated blood and out of them 713 were positive). Mpanda district with 23 percent, Nkasi district with 18 percent and Sumbawanga municipal was 10.2 percent prevalence. In 2006/07 the overall prevalence is around 9 – 10 percent
- The overall prevalence of syphilis in ANC was 5.7 percent. Nkasi District had the highest prevalence of 12.6 percent. The lowest was Mpanda district with prevalence of 3.3 percent and Sumbawanga Municipal had 4.0 percent as well as Sumbawanga districts was 8.5 percent
- In 2005 a total of 15,000 Episodes of STI were reported. The common reported STD syndromes were GDS, GUD, PID and UTI
- Major determinants of HIV/AIDS in Rukwa Region includes, wife inheritance, alcoholism, polygamy, early marriage, illiteracy, unsafe traditional healers practice, mobile population groups and poverty especially among girls and women



Source: Study of Regional Growth Prospects for Rukwa Region, Tanzania, World Bank, 2006  
**Figure 4.12: Cumulative HIV/AIDS Cases from 1986 to 2005 by Districts**



Source: Sumbawanga Municipal Council, 2008

Figure 4.13: Sumbawanga Municipal HIV/AIDS Infection Records 2000-2005

## **5 PUBLIC PARTICIPATIONS**

One of the objectives of the scoping study for the proposed rehabilitation and expansion of Sumbawanga airport was to identify and involve key stakeholders in the Environmental Impact Assessment process. The process afforded opportunity to the stakeholders to express their views and concerns to be included in the Environmental Impact Assessment study.

The Consultants and Tanzania Airport Authority identified organizations, groups and individuals considered to be key stakeholders that might be impacted by the project components or have influence on the project. These stakeholders include government sectors, e.g. Ministries/Departments/Agencies; District, Ward and village governments; environment committees and experts.

The Consultants held consultations with different stakeholder listed in Annex IV In the meetings, the Environmental Impact Assessment team explained the scope of the project and solicited views from the stakeholders. In all cases Stakeholders' views were sought on their acceptance of the project.

The consultant advertised a public assembly in all project areas by placing posters at strategic public points inviting people to attend. The objectives were to explain the project and solicit opinions about the project's positive and negative effect.

### **5.1 THE STAKEHOLDERS**

The assessment team held interviews and meetings with officials from government ministries, departments and agencies, district authorities, public and private organizations and NGOs. The consultants also organized public consultation meetings in Bangwe settlements and publication of advertisements soliciting public opinions. The following emerged as the key stakeholders for the Sumbawanga Airport Rehabilitation Project:

- ◆ Central Government: Ministries, Departments and Agencies. These include Vice President's Office (Division of Environment, NEMC), Ministry of Lands, Housing and Human Settlements Development and, Ministry of Energy and Minerals.
- ◆ Project Proponent – Tanzania Airport Authority: Sumbawanga airport manager, Fire rescue team commander and design and planning manager.

- ◆ Sumbawanga Regional Secretariat and Sumbawanga District Commissioner's Office.
- ◆ Local Government Authorities: Sumbawanga Municipal Council: Municipal Director, and Municipal Management Team (Planning, Land, Community Development, Engineers, and Agriculture Departments).
- ◆ Sumbawanga Member of Parliament, Municipal Mayor and Regional Commissioner
- ◆ Local stakeholders included Old Sumbawanga and Izia Wards (Ward Development Committee consisting of Ward Councillors, Ward Executive Officers).



**Fig 5.1: Stakeholders Meeting at Roman Catholic Hall in Sumbawanga Municipal**

Details about the stakeholders (name of organization, person contacted, etc.) are presented as Annex IV of this report

## 5.2 ISSUES RAISED BY STAKEHOLDERS

### 5.2.1 Use of the Project Area

Although airport areas are strictly designated for particular purposes, stakeholders in Sumbawanga mentioned several activities which are carried out on the airport grounds albeit illegally.

These include:

- ◆ Grazing livestock
- ◆ Access footpaths and car tracks crisscrossing across the airport field. Many people pass through airport from to old Sumbawanga the next settlement.
- ◆ Playground - where patches of the airport are used by youths and school children for football
- ◆ Open solid waste dumping pits.
- ◆ Borrow pits for making earth/burned bricks
- ◆ Trapping of edible rodents burrowing in the termite-rich soils
- ◆ Harvesting termites
- ◆ Gardening - mainly vegetable plots, legumes, banana, cassava, sweet potato.
- ◆ Petty businesses
- ◆ Traditional medicinal herbs
- ◆ Driving lessons
- ◆ Other social misconducts such as mugging and sex behaviours

### 5.2.2 Social and Economic Benefits

1. **Air transportation** (including cargo and parcels) and communication enhanced between Sumbawanga and other parts of the country/world. This will boost other sectors and sub-sectors including:

- ◆ Economic sectors at Municipal, Districts, Region and neighboring countries. (Zambia & Congo) in terms of commerce and trade, tourism, new investments.
- ◆ Several prospects and new investments highlighted in the Investors Forum held in 2006.
- ◆ Administration and management
- ◆ Social services: emergencies access to medicine and medical care; breached security with neighboring countries.
- ◆ Information and news - Sumbawanga gets 2-days old newspapers.

## 2. Employment opportunities

- ◆ Unskilled and semi-skilled and skilled labour available in Sumbawanga needed during both airport construction and operation e.g. drivers, labourers, security, cleaners, etc.
  - ◆ Services and businesses - shops (general goods and souvenirs), passenger and cargo delivery, food and refreshments etc.
3. **Status of Sumbawanga region enhanced:** Long time misconception about the region remoteness and inaccessibility dissipated. The airport will be catalyst to stimulate interest for employments, holidays, visits and meetings to the region etc.
4. **Extra services:** Possibilities for Contractor commissioned to undertake the airport upgrading may be extended to undertake outstanding construction projects/works in the region
5. **Exposure:** Local people exposed to new ideas and outlook.

## 5.2.3 Challenges and Negative Impacts

### 5.2.3.1 Social

#### 1. Effects of project on neighboring settlements

This issue stimulated a lot of discussions revolving around issues of land-take, compensation and resettlement of people and properties:

- ◆ Effects of vibrations from heavy aircrafts to nearby buildings.
- ◆ Delay in compensation payments after valuation
- ◆ Consideration for the widows and the vulnerable groups during resettlement
- ◆ Higher value of buildings as compared to value of land
- ◆ Disturbances during and after relocation.
- ◆ Whether people should continue with developments / improvements on their land.

#### 2. Lack of outer boundary fence

This has allowed trespassing and a multitude of activities on airport land mentioned above (section 5.2.1). Thus the advent of a well fenced airport will result in blocked access, loss of income etc. However, the omission of a fence as part of the upgrading programme has the consequent potential to result in accidents during airport operations especially to children/people trespassing on the airport grounds.



### **3. Noise pollution**

A consequence of increased airport traffic will be increased noise and disturbance to residents and institutions especially in the approach and takeoff paths.

### **4. Effects of interactions:** Between locals and newcomers (Construction crew)

Negative impacts include HIV transmissions, security of construction equipments etc.

### **5. Inadequate wages paid to laborers**

Contractors have tendencies of paying low wages and low prices for services and supplies as compared to other parts of the country.

### **6. Illegal traffics**

The airport, being close to boarder with Congo and Zambia may stimulate illegal traffic across the boarders including drugs, animal trophies and hunting especially if airport security is slack.

#### **5.2.3.2 Economic**

1. Ineffective utilization of airport: if people are not mobilized so as to utilize opportunities that comes with upgraded airport.
2. Effects on local infrastructure: destruction of roads by heavy construction equipments and vehicles
3. Depletion of local water resources (Luiche river dries during dry season), energy/electricity resources, and construction materials

#### **5.2.3.3 Environmental**

1. Degradation at points of sources of construction materials: most burrow pits are found in communal land planted with natural forests and woodlands which may be cleared/disturbed e.g. Kaswepepe Community Forest Reserve and nearby water supply scheme located within the wetland of Lwiche river
2. Effects of haphazard disposal of construction waste. There is possibility for waste from construction camp damped/washed into the local water supply system and pollution of local water resources e.g. Manzitwise stream a tributary of the Lwiche river wetland where 4 boreholes have been constructed under urban water supply project.

#### **5.2.3.4 Technical**

1. Survey and defining airport boundaries (officially). This has been a contention issue where by the Airport authority has maintained its claim on land outside its boundaries but not willing to meet compensation costs. Hence the need for defining land beyond the existing boundaries required for runway extension and auxiliary structure.
2. Low quality of work (experience with previous road projects in the regions).
3. Considerations for airport terminal and facilities that benefits the upgraded runway.
4. Consideration for alternative airport site at Kisumba
5. Limited space and capacity at Sumbawanga airport Kisumba area already earmarked by government (not yet officially allocated to Airport Authority) has no contentions land use - just farms on village land and hence low cost compensation only for land.
6. Participation of stakeholders: Community Development Department and Councilors in awareness to Rising: HIV/AIDS, utilization of several Constructions material etc.

#### **5.2.4 Administration and Management Responsibilities and Capacities**

In terms of roles and responsibilities and available capacities for managing environmental and social issues pertaining to the proposed project, the following were highlighted:

- ◆ Currently the Municipal Natural Resources Office is responsible for all non – sector environmental issues. An Environmental Management Officer will be hired before end of 2008.
- ◆ Environmental committees at Municipal, Ward and Sub- Ward ("Mtaa") levels have been formed but not fully active.
- ◆ Departments and sections at the Municipal Council and Committees at Municipal Ward and Mtaa levels responsible for Works, HIV/AIDS, Lands
- ◆ Ward Land and Housing Tribunal have been formed and are functioning.

## 6. ENVIRONMENTAL IMPACTS ASSESSMENT

### 6.1 IMPACTS IDENTIFICATION AND SIGNIFICANCE

This section determines likely sources and quantification of both negative and positive environmental impacts.

#### 6.1.1 SITE SELECTION PHASE

Site selection phase presents the overarching impacts of the presence of the project on the general natural settings at the project area. The impacts are further analysed in subsequent phases and sections. In upgrading projects such aspects as land take that are normally considered for new projects do not apply. Within the land required for extensions there are no natural features of ecological value that will be disturbed/cleared, thus main impacts sources relate to natural factors and processes.

##### 6.1.1.1 Effects of natural factors and processes

- Potential Impact: **Damage to airport buildings/erected structures and disruption of operations**

This relates to possibilities of natural factors e.g. climatic elements and earthquakes etc. to have effects on the project components. Sumbawanga is known to often experience extreme climatic conditions in the months of December – January with heavy rains, accompanied by lightning and sometimes storms that damage buildings, tall trees and built structures (phenomena witnessed during this Environmental Impact Assessment study, Jan. 2008). There are several recorded earthquakes in Rukwa region<sup>1</sup>. However, the immediate areas surrounding the airport are not greatly affected by seismic activity. Impacts associated considered as: **negative, long -term and moderate significance.**

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<sup>1</sup> Since June 1992, a seismic network of five digital stations has been operating in south-western Tanzania, with the aim of investigating the seismic activity in the area between Lake Rukwa and Lake Nyasa. Over the past twelve years, over 1,000 earthquakes have been recorded. Many of the earthquakes are located in the south-eastern part of the Rukwa basin, along its eastern border in a 20 km narrow zone centered on the Lupa fault. An earthquake occurred in 1985 northwest of Madagascar; it measured 6.4 on the Richter scale and was experienced at Mtwara and Newala<sup>1</sup>. The recent one occurred at Comoros and measured 5 on the Richter scale.

## 6.1.2 DESIGN PHASE

Main impact sources for the design phase relate to:

- Choice of Best Available Techniques (BAT), technologies, and practices (to meet both Tanzania and international Health, Safety and Environmental (HSE) standards);
- Setting management procedures for handling and disposal of wastes, health & safety procedure;
- Planning for availability of adequate resources

### 6.1.2.1 Storm water drainage and overflows

- Potential Impact: **Ineffective Utilization of the Airport Drainage/ Damage to Rehabilitated Structures.**

Due to the flat terrain, storm water tends to remain stagnant on the airport grounds especially during the heavy rains. This may affect effective utilization of the airport and also cause damage to rehabilitated structures. However, for the case of Sumbawanga airport there exist well built drainage channels on the perimeters of the airport as well as a good slope towards the Manzitwise stream which can be utilized to design and build efficient drainage channels. This should be done with due consideration and mitigation of potential loads stressed under section 6.1.2.3 Impacts associated considered as: **negative, long -term and moderate significance.**



**Fig 6.1: Storm Water Stone Pitched Channel.**

### 6.1.2.2 Exploitation of Borrow pits/Quarries and Other Natural Resources

- Potential Impact: **Degradation at Points of Source of Construction Materials**

Project construction main materials requirements are indicated in table 6.1 below

**Table 6.1 Materials requirement for construction works.**

Materials	Quantity	Potential Source
Granular Material	12,000 m <sup>3</sup>	Kanda-B Hill
Aggregates	10,400 m <sup>3</sup>	Kanda-B Hill
Sand	1,500 m <sup>3</sup>	Rukwa river valley
Water	2,000 m <sup>3</sup>	Manzitwise and Luiche river stream
Bitumen	1,600Tones	Dar es salaam

Extractions of construction materials from both authorized borrow pits and quarries on government land, communal land and on private-owned land are associated with rampant degradation at points of source with no efforts of restoration/re-vegetation. Most exploited borrow pits are found on communal land of natural forests and woodlands or planted trees which have been cleared/disturbed. Some borrow pits are on / close to sensitive ecosystems such as rivers, hilly terrain etc. Pollution risks include sediment overload to water bodies during rains and contamination by oils from excavators/loaders.

The gravel-rich borrow pit at Kaswepepe area had to be closed due to rampant and haphazard exploitation methods that posed pollution risks to the nearby Lwiche river/wetland and the contained Municipality water supply scheme. The area was declared a conservation area by local NGOs, and is now protected as a Community Forest Reserve under the Municipal by – laws. The active gravel borrow pit at Kanda-B hill has rich gravel material.

The Kanda-A hill of granite stones have been left bare, with scary deep gullies (2 – 3 m depth) and no plans for restoration.



**Fig 6.2: Deep Gullies at Kanda-A Hill**

However on the other side (Kanda-B Hill) gravel materials are available and it is the current authorized borrow pit which supplies all Sumbawanga municipal construction activities. The area is like all other borrow pits in the country and since it is still in use no restoration program is yet available.

Over-exploitation of local water resources may lead to depletion and consequent ecological impacts down the stream. Most tributaries of the main river - Lwiche river dries up during dry season. Although Rukwa region has excesses of electricity tapped from Zambia, most accessible areas of the region have already been depleted of wood resources. Resources extraction is open to all Contractors / users, thus, the project will be adding on to existing problems (cumulative impacts). Impacts associated with resource extraction from off-site locations are considered as: **Secondary or indirect negative impacts, cumulative, short to medium -term but of high significance.**



**Fig 6.3: Two pumping Station (Borehole) at Lwiche valley**

#### **6.1.2.3 Haphazard Disposal of Wastes**

- Potential Impact: **Contamination and /Impaired Quality of Receiving Body – Land and Water.**

Main sources of construction waste are cleared vegetation and top soil (overburden), rubble from demolished buildings, and domestic waste from construction crews. During operation of the upgraded airport, various type of wastes will be generated including solid and liquid wastes from food and refreshment centers, offices and business centers; fuel and oils from maintenance workshops/hangar and aircraft fueling points. Designs should take due consideration for prevention of haphazard waste disposal. The wastes may contaminate land or be washed into local surface and ground water resources and impair the quality of these receiving bodies. Other impacts include increased bird population (attracted by food waste).

The airport is very close to a main river system – the Lwiche river that eventually empties in Lake Tanganyika. There is possibility for waste from the various construction activities to be damped/washed into local water resources and pollution of water supply system. Manzitwise stream which is about 100 m from the project site is a tributary of the Lwiche River in whose wetland 4 boreholes have been constructed under the urban water supply project.

However, the area which will be cleared for the rehabilitation and expansion of airport is not significant, only 120,000 m<sup>2</sup> which is expected to be cleared of which will produce 4,800 m<sup>3</sup> of cleared vegetation that will need to be disposed of at the Makutano damp site. It is expected a total of 8,000m<sup>3</sup> of soil waste will be produced from excavation works.

The project is expected to employ 20 skilled and semi-skilled personnel and about 120 labourers who will be hired locally. There shall be temporary construction camp site adjacent to the airport which will accommodate junior and semi skilled staffs. Accommodation of senior staff will be in Sumbawanga town and for labourers will be from their homes, since will be residence of Sumbawanga municipal. An average 0.5Kg waste will be produced per person per day. It expected that about 36.5tons of domestic solid waste will be produced for the 2 years duration of the project construction. Impacts associated are considered as: **Negative, cumulative, short-term but of high significance.**

#### 6.1.2.4 Atmospheric Emissions Generating Equipments

- Potential Impact: **Deteriorated / Impairment of Local Air Quality**

Air pollution by gaseous emissions from various sources is an issue for consideration during design stage particularly in the choice of technologies and practices to be used under the project. Sources of air pollution during construction and operation phases of the airport will be gaseous emissions such as CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, particulate matters and hydrocarbons from fuel powered equipments and vehicles. Main impact is impairment of local air quality, the extent of which will depend on quantities emitted, duration and prevailing atmospheric conditions. Table 6.2 below shows the various construction emissions generating equipments.

**Table 6.2 Construction Emissions Generating Equipments.**

S/N	Type	Function	Number
1	Excavator	Excavation of land	3
2	Wheel loader	Loading truck	2
3	Trucks	Haul	15
4	Motor grader	Clearing and Grading	4
5	Compactor	Compaction	5
6	Asphalt plant	Asphalt producer	1
7	Crusher	Aggregate crusher	1
8	Asphalt Paver	Laying Asphalt	1



Due to the number of the equipments involved, the emissions may affect local air quality but will have no significant impact on global air quality issues. Therefore impacts associated are considered as: **negative, short-term, low significance.**

#### **6.1.2.5 Base Camp for Junior Staffs and Laboures**

Site(s) will be required, though temporarily at both the airport site and at borrow pits for storage of equipments and materials and for an office for construction crew. At the airport area will be temporary building with all facilities like water, electricity and sanitation system, while at the borrow pit there will be camp for supporting staffs like security guard and drivers.

Impact sources for consideration during design phase:

- Land requirements: impacts similar to section 6.1.1.1 above
- Waste disposal: impacts similar to section 6.1.2.3 above

#### **6.1.3 MOBILIZATION PHASE / CONSTRUCTION PHASE**

Main impact sources under this phase include:

- Clearance of extension portions and if necessary access routes and sites for support facilities (storage, crew)
- Transportation of construction equipments, materials and labour
- Setting up and operation of base camp
- Construction works

##### **6.1.3.1 Vegetation Clearance**

- Potential Impact: **Damage Local Vegetation Cover and Potentially Loss of Local Biodiversity.**

Clearance of vegetation – especially bulldozing to ground level - has tendency to damage local vegetation cover and potentially damage/ loss of habitats and local biodiversity and increase risks to erosion. Permanent clearance will be confined only to the existing graveled runway, apron and taxiway which constitute a small portion of the grassed airport. Vegetation on the extension portions mainly heavily mowed grass, crops, a few planted trees and other secondary vegetation which are important in the stabilization of soil, these vegetation will be replaced by grass capable of the same functions. Thus, on the overall vegetation clearance will

constitutes no significant ecological loss. Impacts associated are considered as: **Low significant**

### 6.1.3.2 Air Pollution from Transportation and construction Works

- Potential Impact: **Impairment of Local Air Quality**

Equipments capable of generating air emissions are elaborated above (section 6.1.2.4.) where technologies and practices for reduction / elimination of emissions are considered. However, even with the best available technologies, most of the equipments and vehicles emit gases such as CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, particulate matters and hydrocarbons - regarded as residual air pollution. Congruent to these are pollutions from fugitive dusts emitted during clearing / excavation works and from vehicles running on loose-surface roadways.

Construction equipments and some of the construction materials will be transported using trucks from as far as Dar es Salaam about 1250 Km; gravel will be obtained from Kanda-B hill other materials e.g. sand will be procured locally in Sumbawanga and transported by trucks to the airport site. Table 6.3 shows anticipated number of truck journeys required to mobilize construction materials from off-site locations to the airport construction site.

**Table 6.3 Number of truck journeys to mobilize construction materials**

Type of material	Quantity (m <sup>3</sup> /Tonnes)	Distance from Source (km)	Truck Journeys (Number)
Gravel	12,000 m <sup>3</sup>	5	1,500
Aggregates	10,400 m <sup>3</sup>	3.5	1,300
Sand	1,500 m <sup>3</sup>	15	190
Bitumen	1,600 tonnes	1,250	80
Water	2,000 m <sup>3</sup>	0.1	340

The distances to be covered, frequency of movement and corresponding emissions are quite considerable and could have deteriorating effects on local air quality. But, these impacts are short term and could have no impacts on global air quality. Congruent to transportation emissions from are pollutions from fugitive dusts emitted during clearing / excavation works and from vehicles running on loose-surface roadways. Impacts associated are considered as: **Negative, short-term, Low significance.**

#### 6.1.3.3 Fuel, Oils, Lubricants Spillages/Leakages

- Potential impact: **Contamination / Impairment of Quality of Receiving Bodies**

Incidental spillage of fuels and oils may occur during refuelling and minor equipment repairs or leak from equipments that are not well maintained. These may contaminate land or be washed into local surface and ground water resources and impair the quality of these receiving bodies as elaborated under section 6.1.2.3. Impacts associated are considered as: **negative, short-term, but of high significance.**

#### 6.1.3.4 Excavation

- Potential Impact: **Damage/Disturbance to Sub-surface Organisms.**

Trenching (for drainage channel, new fence etc.) and construction of sub-base and base course especially on the extension portion of the runway may cause damage/disturbance to any sub-surface organisms found in the project area. Sumbawanga airport is rife with termites, ants and burrowing rodents that may be affected as well as the usual subsoil microorganisms, arthropods and earthworms etc. However, these are not unique or rare organisms and found in the general project area. Impacts associated are considered as: **localized, short term and moderate significance.**

#### 6.1.3.5 Inadequacies in Compaction and Resurfacing

- Potential impact: **Damage /Erosion of Exposed Surfaces**

Inadequate compaction and resurfacing compounded by rain, trampling etc. may cause damage to rehabilitated structures and soil erosion and consequent sediment load in runoffs (section 6.1.2.3 above). This is mostly likely to happen if construction is undertaken during the months of November - January when Sumbawanga experience heavy rains. Impacts associated are considered as: **Impacts localized, short term and moderate significance.**

#### 6.1.3 OPERATION PHASE

Once the airport is upgraded, there is anticipated increase in traffic - passengers, aircrafts, cargo, etc. Main anticipated impacts that may occur during operation of

upgraded airport are considered during design phase so that mitigations and appropriate procedures are put in place before the airport is operational. Thus impact sources for this phase relate to inadequacies in maintenance and monitoring, unforeseen or accidental events and residual impacts.

#### **6.1.3.1 Air Emissions from Increased Aircrafts**

- Potential impact: **Deteriorate/Impaired Air Quality**

A consequence of expanded capacity of the airport will be increased air emissions from increased numbers of aircrafts including gases such as CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, particulate matters and hydrocarbons. However initially frequency of aircraft anticipated will be low, thus the emissions will have no significant impacts on local or global air qualities. Impacts associated are considered as: **long term and Low significance.**

#### **6.1.3.2 Inadequacies in Operation and Maintenance**

Even with a well designed and rehabilitated airport that has take environmental impacts consideration , inadequacies in operations, maintenance and monitoring could result in adverse post- construction impacts including but not limited to:

- **Contamination and /Impaired Quality of Receiving Body – Air, Land and Water from wastes**
- **Damage to Facilities / Disrupted Airport Operations**
- **Depletion of Natural Resources**

These impacts could be a result of one or a combination of several factors all related to how eventually the upgraded airport will be operated and the various environmental concerns managed. Main aspects of concern include:

##### **(i) Storm Water Runoff Management**

Lack of routine and periodic maintenance of the runway, storm water drainage, buildings and other airport facilities may in future result in storm water overflows and damage to rehabilitated/new structures as expounded under design section 6.1.2 above. Flooded airport is the main cause of frequent closure of airports, disrupted airport operations and boycott by some of the operators.

**(ii) Management of Point – Source Pollutions (Air Emissions and Liquid Waste Management)**

Lack of procedure for replacement and repair of worn out / outdated equipments (e.g. air emissions - generating equipments, vehicles etc), leakages and discharges from sewerage, waste water and fresh water supply systems into the surroundings.

**(iii) Management of Waste (Non-Hazardous and Hazardous Materials)**

Lack of enforcement of procedures put in place for collection and disposal of non-hazardous solid wastes; transportation, use, storage and disposal of hazardous materials; management of fuels and hydrocarbons (oils, petroleum, lubricants) including accidental spillage of harmful substances and waste cleaned from storage area etc. Waste disposal hazards are expounded under design section 6.1.2 above.

**(iv) Availability of Resources – Financial, Human and Natural Resources**

Lack of resources required maintaining the airport facilities e.g. sustained water supply and power supply, trained and motivated staff etc. are the main cause of negative impacts experienced during airport operations. Impacts associated are considered as: **Negative, long term and high significance.**

#### **6.1.4 DECOMMISSIONING**

##### **6.1.4.1 Disposal of Waste from Demolished Structures**

▪ Potential Impact: **Contamination/Impaired Quality of Receiving Body**

In the event of future rehabilitations and upgrading, the runway and associated facilities may need to be demolished necessitating disposal of demolished waste. Haphazard disposal may cause contamination/impaired quality of receiving body – especially land, and water resources. Impacts associated are considered as: **Negative, short term and moderate significance.**

## **6.2 IMPACTS MITIGATION**

Section 6.1 above has identified potential environmental impacts and their significance. This section provides a summary of mitigation measures of those impacts which are considered to be of moderate to high significance.

### **6.2.1 SITE SELECTION PHASE**

#### **(I) Damage to Airport Building/Erected Structures and Disruption of Operations**

To mitigate this impact, the buildings and other structures within the airport area will be designed to the appropriate structural and civil engineering codes and practices. Building foundations, columns and frames shall be reinforced with high tensile strength steel bars to achieve the structural ability to withstand climatic elements anticipated in this locality.

### **6.2.2 DESIGN PHASE**

#### **(I) Damage to Rehabilitated Structures Due to Ineffective Storm Water drainage and Overflows**

Normally during the design of airport storm water impact is given a high priority, with the limitation of gradient (slope) required for the runway, taxiway and apron. Storm water effect have been mitigate successfully in almost all airport design. Therefore to mitigate this impact a proper hydrology analysis will be carried out, considering the airport topographical features, amount of rainfall and catchments area as the major factors of design of storm water channel. Also storm water drainage design will take into consideration the existing channel along the airport area, if amount of storm water produced will be higher than the existing channel can accommodate, another channel will be provided either one the opposite side of the existing one or expansion of the latter to make sure that all storm water produced will be accommodated.

#### **(II) Exploitation of Borrow Pits/Quarries and Other Natural Resources**

Effects of exploitation of borrow pits/quarries and other natural resources will be mitigated as follows:

- Exploitation of construction materials will be from the authorized source only as indicated in table 6.1

- Restoration of the borrow pits/quarries after use constituting levelling the area and seeding or planting of trees and/or grasses will be done in association with local government (natural resources department) and local environmental NGOs. If appropriate the levelled area will be left for natural re-vegetation.
- Maintain construction equipments in good running condition and refuel restriction at the workshop/base camp.
- Extraction time for water from Manzitwise stream and/or Luiche River when levels are high (during wet season).
- NB: The demand for water of about 2 million litres for two years does not constitute application for water rights from Rukwa Water Basin as directed by The Water Utilisation Act No. 4 of 1974.

### **(III) Contamination and Impaired Quality of Receiving Body- Land and Water**

To mitigate the impacts of wastes an efficient collection and disposal system based on the principles of reduction, re-use and recycling of materials, shall be instituted at the airport.

- To reduce the cost of the project, much of the excavated soil and rubble materials will be reused as initial filling materials where levelling of runway, taxiway and apron is required.
- Cleared vegetation, top soil and rubble from demolished buildings at the airport area will be used to cover haphazardly disposed municipal waste at Makutano damp site. Alternatively in consultation with municipal council, the waste will be used to fill up any other infrastructures (roads, pits etc) that needs filling.
- Introduction of waste disposal bins, warning notices, "DOs & DoNTs" etc posted at strategic points, through the airport area.
- No, on site burial or open burning of solid waste shall be permitted at the airport. Tanzania Airport Authority will make use of the existing municipal council solid waste disposal and collection system.
- Wastes not suitable for incinerations and general municipal waste dumping (e.g. Batteries, plastics, rubbers, tyres, etc) shall be removed from the airport for recycling, treatment, and/or disposal by licensed contractor as appropriate.
- Instructions to contractor to put on his/her methodologies for handling hazardous waste such as oils, lubricants and non combustible waste during bidding process.

- Waste management training for all personnel, operators and services providers at the airport.
- Liquid waste will be collected using a cesspit tanks system at the airport area. When full Tanzania Airport Authority will make use of the existing municipal council/urban water supply and sewerage authority cesspit emptying services.

**(IV) Deteriorated / Impairment of Local Air Quality due to Emission Generated from Construction Equipments**

To mitigate this impact measure of control of exhaust emissions shall take place during project implementation which includes:

- Maintain equipment in good running condition, no equipment to be used that generates excessive black smoke.
- Enforce vehicle road restrictions to avoid excess emissions from engine overloading, where practical switch off engines when not in use.
- Routine Inspection of equipments

**6.2.3 MOBILIZATION /CONSTRUCTION PHASE**

**(I) Destruction of vegetation cover / Loss Local Biodiversity from Vegetation Clearance**

To mitigate the impact the contractor and Tanzania Airport Authority during construction shall ensure that:

- Indigenous vegetation in areas that will not be impacted by the project shall not be disturbed.
- Rehabilitation by seeding or planting grasses to all areas that will not be occupied by runway, taxiway, apron, buildings and other airport facilities on the project site.
- Avoid planting non-native and exotic species on the site as well as those that constitute obstacles according to the airport regulations.

**(II) Deteriorated / Impairment of Local Air Quality due to Emission Generated from Construction Equipments**

Mitigation measures similar as in section 6.2.2 (IV)



**(III) Contamination/Impairment of Quality of Receiving Bodies from Fuel, Oils, Lubricates Spillages/Leakages**

To mitigate the impacts of wastes during construction and operation of the airport clearly understood and agreed methods of dealing with waste shall be in place prior to the start of the works or airport operations. A Waste management Plan shall be a requirement in the instructions to Contractor during bidding process and an efficient collection and disposal system (based on the principles of reduction, re-use and recycling of materials), shall be instituted at the airport as part of the airport Environmental Management Plan (EMP).

▪ **Construction waste**

- To reduce the cost of the project, much of the excavated soil and rubble materials will be reused as initial filling materials where leveling of runway, taxiway and apron is required.
- Cleared vegetation, top soil and rubble from demolished buildings at the airport area will be used to cover haphazardly disposed municipal waste at Masanga damp site. Alternatively in consultation with municipal council, the waste will be used to fill up any other infrastructures (roads, pits etc) that needs filling.
- Instructions to contractor to put on his/her methodologies/ waste management plan for proper handling hazardous waste such as oils, lubricants and non combustible waste during bidding process.

▪ **Airport Operation Wastes**

- Introduction of waste disposal bins, warning notices, "DO's & DON'TS" etc posted at strategic points, through the airport area.
- No, on site burial or open burning of solid waste shall be permitted at the airport. If extremely necessary – done under strict control. Tanzania Airport Authority will make use of the existing municipal council solid waste disposal and collection system.
- Wastes not suitable for incinerations and general municipal waste dumping (e.g. Batteries, plastics, rubbers, tyres, etc) shall be removed from the airport for recycling, treatment, and/or disposal by licensed contractor as appropriate.
- Liquid waste will be collected using a cesspit tanks system at the airport area. When full Tanzania Airport Authority will make use of the existing municipal council/urban water supply and sewerage authority cesspit emptying services.

- Institute Spill Prevention and Control Plan / Response and Contingency Plan for spills/accidental blowouts
- Fuels, lubricants and other contaminants stored in areas with containment systems seal, bund). Refueling activities limited to designated areas.
- Waste management training for all personnel, operators and services providers at the airport. Training of relevant personnel in proper handling, storage and clean up of contaminating sites
- Institute procedures for monitoring and reporting for routine maintenance, repairs, replacements, of all environmental sensitive areas e.g. storm water channels, waste collections and storage.
- Put in place procedures and institutional responsibilities for enforcements of all regulations instituted by the airport e.g. warning notice

#### **(IV) Damage/Disturbance to Sub-surface Organisms Due to Excavation**

To mitigate the impact the contractor and Tanzania Airport authority during construction shall ensure that only those areas needed to be excavated are ones excavated and backfilled after construction.

#### **(V) Damage/Erosion of Exposed Surfaces**

To mitigate the impact the contractor and Tanzania Airport Authority during construction shall ensure the following:

- That construction will be as per engineering design and procedure of which a minimum requirement of compaction strength is achieved during the construction. That is maximum dry density (MDD) specified in the design manual by consultant.
- Divert runway water away from structures
- Maintain gravel fill and/or re-vegetate around the structures

#### **(VI) Impairment of Air quality Due to Dust**

In order to mitigate dust impacts it is recommended that the contractor shall do the following:

- Protect stockpiles of friable material subject to wind through wetting.
- Cover loads with of friable material during transportation.
- Restrict speed on loose surface roads to 30Km/hr during dry or dusty conditions.
- Douse with water of roadways and work sites to reduce dust when necessary.

## **6.2.4 OPERATION PHASE**

### **(I) Impaired Air Quality from Increased Aircrafts /Services**

- TAA implement ICAO standards on reducing emissions from operation of aircrafts (being implemented worldwide since 1981).
- Work with Sumbawanga Municipal Council (Departments responsible for land use planning and management) to limit overdevelopment and overcrowding around the airport especially in the flight paths.
- Inform community living within the project vicinity of airport activities and flight schedules.

### **(II) Impacts from Inadequacies in Operation and Maintenances.**

- Disrupted Airport Operations
- Contamination and/Impaired Quality of Receiving Body (air, land and water)
- Depletion of resources

Fundamentally, most of anticipated airport operations impacts e.g. from storm water drainage, air emissions, disposal of wastes, use of natural resources (water, energy) are elaborated / mitigated under the design phase.

#### **(i) Storm Water Runoff Management**

TAA institute procedure for cleaning / de-silting and routine and periodic maintenance of the runway, storm water drainage, buildings, services supply systems and other airport facilities.

#### **(ii) Management of Point – Source Pollutions**

TAA Institute procedures and include in recurrent budgets for replacement and repair of worn out / outdated equipments, leakages and discharges from sewerage, waste water and fresh water supply systems

#### **(iii) Management of Waste (Non-Hazardous and Hazardous Materials)**

TAA to enforce procedures to implement mitigation measures expounded under design section 6.2.2 (iii) for management of non-hazardous solid wastes; transportation, use, storage and disposal of hazardous materials; alien species control; and management of fuels and hydrocarbons (oils, petroleum, lubricants) including Spill Prevention and Control Plan / Response and Contingency Plan.

**(iv) Availability of Resources – Financial, Human and Natural Resources**

TAA include in both recurrent and development budgets resources required to maintain the airport facilities e.g. sustained water supply and power supply.

Develop and implement in-house and training programmers for staff and out of office opportunities in relevant environmental management aspects.

In order to effectively mitigate the above impacts due to inadequacies in operations procedures and monitoring, the Tanzania Airport Authority shall support the implementation of Environmental Management Plan specific for the Sumbawanga airport. The aims of the EMP among others are to translate the recommended mitigation measures into actions on the ground. The EMP will provide a site management tool for the airport Manager and staff. Table 8.1 illustrates a general outline of EMP for the airport that will be improved upon completion of the airport upgrading activities.

**6.2.5 DECOMMISSIONING PHASE**

**(I) Contamination/Impaired Quality of Receiving Body**

Mitigation measure similar as explained in section 6.2.3 (II) above.

## 7. SOCIAL IMPACTS ASSESSMENT

### 7.1 IMPACTS IDENTIFICATION AND SIGNIFICANCE

#### 7.1.1 SITE SELECTION

Site selection phase determines the overarching impacts of the presence of the project on the general socio-economic settings at the project area. The impacts are further analysed in subsequent phases and sections. In upgrading projects, aspects that are normally considered for new projects do not apply, thus main impacts sources relate to land take at extension portions and effects of neighbouring activities and developments.

##### 7.1.1.1 Land Takes for Extension of Existing Runway

- Potential Impact: **Cost of compensation and relocation disturbances**

The design plane for the upgrading programme, ATR 42 requires land space of about 40 m either side from the centre line of the runway. The main socio-economic effects of the project will revolve around issues of land take and consequent resettlement of people and properties. The extension land contains about 24 households that will need to be demolished. Though not happy about the issue, the affected people and their leaders understand and accept the inevitability of moving – as directed by the Land and Airports Acts - to give way to the airport expansion plan (see sections 5 peoples participation). Main constraints drawn from experience from other projects in the region include delays in compensation payments after valuation and inconsideration for the widows and the vulnerable groups during resettlement.

Main developments on the extensions of socio-economic value that will need to be relocated / cleared include:

- (i) Houses of various sizes and values
- (ii) Trees and various food/cash crops owned by local people including various legumes cassava, sweet potatoes and
- (iii) Electricity transmission and Telephone poles

Main impacts to the owners/users will be permanent loss of land taken, temporary disruption of water and electricity supplies; loss of income and food from cleared crops and general disruption of economic/social activities and services and

disturbances during relocation. On the part of the project –Tanzania Airport Authority, main impacts are costs of compensation of land and developments.

Impacts associated are considered as: **negative, short/medium term, high significance**

#### **7.1.1.2 Abolition of Activities Prohibited within Airport Boundary**

- Potential Impact: **Disruption of Economic and Social Activities and Services**

Lack of outer boundary fence has allowed trespassing and a multitude of activities on airport land mentioned above (section 5.2.1). From the user's point of view, the advent of a well fenced airport will result in disruption of economic and social activities and services including blocked access, loss of income etc. However, the activities are illegal, constituting trespassing and against both the Tanzania law and international laws and airport practices. Their abolishment will increase airport effectiveness and security. Furthermore, when the airport is fully operational, omission of a fence as part of the upgrading programme could cause fatal accidents especially to children/people trespasses the airport grounds. Impacts associated are considered as: **positive from airport operational perspective but negative to the trespassers. Short/medium term and of moderate significance**

#### **7.1.2 DESIGN PHASE**

Main impact sources for the design phase relate to:

- Choice of Best Available Techniques (BAT), technologies, and practices (to meet both Tanzania and international Health, Safety and Environmental (HSE) standards);
- Setting management procedures for handling and disposal of wastes, health & safety procedure;
- Planning for availability of adequate resources

##### **7.1.2.1 Exploitation of Borrow pits/Quarries and Other Natural Resource**

- Potential Impact: **Depletion of Resources/Conflicts with Land Owners and Resource Users**

There are signs of over exploitation of the commonly used construction materials from areas within economic distance from the Sumbawanga Municipal center.

Kaswepepe gravel site – about 5 km is closed; the Kanda –A hill, (locally known as “krasha” area) - a source of gravel about 3.5 km away is completely depleted. The airport project will be adding on to this already perilous situation. This means in the future contractors/builders will be forced to go further and further to obtain the construction material. Condition of Kanda-B hill is not much depleted but with the current construction activities going on in Sumbawanga municipal later the place will be like that of Kanda-A hill if proper mitigation measures not applied.

Increased water demand, during construction activities there will be increase in water consumption in compare to the current. Manzitwise river stream will be used as near by water source. Impacts associated are considered as: **negative, secondary (indirect), cumulative but of high significance.**

#### **7.1.2.2 Haphazard Disposal of Construction and Operations Wastes**

- Potential Impact: **Visual impacts / Public health hazards**

Overburden, rubble, domestic waste produced by construction activities and during airport operations if dumped haphazardly becomes an eyesore, cause bad smells and reduces the aesthetic value of an area. Food waste attracts insects (houseflies, ants) and scavengers (rodents, birds, dogs, cats) some of which are potential vectors of diseases including cholera, diarrhoea etc and may create nuisance to airport users. Birds strikes cause damage to aircrafts. Some waste are non-biodegradable and/or poisonous (plastic, batteries, oils etc.) and may seep into under ground/surface water resources. Groundwater depth throughout the core study area typically ranges from 8 m to 15 m below the ground surface. Wells are the main source of potable water for most of the inhabitants of the airport general area. Boreholes that supplies Sumbawanga area are downstream to the airport.

Current measures to manage waste (collection and disposal of solid, liquid and excreta waste) and maintain the sanitation and hygiene at the airport are barely sufficient for current traffic and staffs. The area around the project site lack management of solid waste.



**Fig 7.1: Open Pit inside the Airport Land**

Approximately 185 workers will be needed to carry out the upgrading program. Assuming that the per capita waste generation is about 0.5 kg per day. About 68 tonnes of solid waste will be generated during construction. Also sewage will be generated from the occupants of the camp. Assuming that each person will use 20 litres of water and 80% of this amount is discharged as waste the amount of domestic wastewater that will be generated is about 2,160,800 litres. Impacts associated are considered as: **negative, short term, high significance.**

### **7.1.2.3 Hazards to Workers**

- Potential Impact: **Occupation Health and Safety**

Inadequacies in provisions for working conditions - safe working environment is normally assured when code of practices in the working place are instituted. Failure during the design to provide for and integrate health and safety (e.g. proper personal protective gear) and ensure there is a distribution of responsibility and accountability for health and safety to all employees at all levels may lead to accidents, injuries to workers, loss of lives and/or of property. Mobilization and construction activities are rife with activities that may cause risk of serious injuries, fatalities to workers these include motored / sharp edged equipments, explosives (where required to blast rocks) etc. Construction works use various noise-emitting heavy power equipments and tools and engines including compressors, generator and mixing machinery. Noise is expected to be generated from vehicles and trucks transporting construction equipment and from crew and if applicable from blasting.



Noise levels from vehicles are about 65 dB. Also fire risk at base camps made of tents or thatch-roofed. Occupational health hazards may also be promoted by lack of procedures that mitigate negligence at work, fatigue due to understaffing and long working hours, employing wrong people on particular jobs (e.g. employing an unskilled person to handle dynamite explosives), lack of protective gear, low morale, etc. Impacts associated are considered as:

**Impacts negative, short term, of high significance**

#### **7.1.2.4. Public Health Hazard from Construction Works**

- Potential Impact: **Health Hazards/Disturbance and Nuisance**

Transportation and construction hazards to public could emanate from vehicles causing accidents, congested traffic, material spillage etc; air pollution from emissions of exhausts of trucks, equipments and dust from loose earth roads; and noise generated from vehicles and trucks transporting construction equipment and from crew. Construction works use various noise-emitting heavy power equipments and tools and engines including, compressors, generator and mixing machinery and if applicable from blasting. Impacts associated are considered as: **negative, short term, of high significance**

#### **7.1.2.5 Social Interactions**

- Potential Impact: **Public Health Hazards/Safety**

Construction works and increased business opportunities at the airport will be associated with availability of employment opportunities and hasty generation of income. Therefore people with different social background will immigrate in the project area to access opportunities created. This influx of people in the project area and resultant social interactions among workers and locals is inevitable especially on the construction areas, transportation routes etc. The obvious relative wealth of the project workers may lead to exploitative behaviour on the hosts' side. Consequence of these interactions could be increased incidences of health impacts such as spread of STDs, HIV/AIDS, breached security as well as attitudes and behaviour change to indigenous people. HIV infection rate in Sumbawanga Municipality is at 7%. Impacts associated are considered as: **negative, short term, of high significant.**

- Potential Impact: **Compromised Security**

Construction activities are associated with incidences of vandalism and theft of equipments and materials such as cement, Reinforcement, fuel, explosives and other portable items that have ready-made market or for home use. Construction activities will be conducted on airport grounds that lack an outer fence this provides opportunities for people residing in nearby settlements to have easy access to construction equipment and other materials. Impacts associated are considered as: **negative, cumulative, short-term, and of moderate significance.**

### **7.1.3 MOBILIZATION / CONSTRUCTION PHASE**

Main impact sources:

- Clearance of extension portions and if necessary access routes and sites for support facilities (storage, crew).
- Transportation of construction equipments, materials and labour.
- Setting up and operation of base camp
- Construction works

#### **7.1.3.1 Vegetation Clearance**

- Potential Impact: **Loss of Crops and Impairment of Landscape Aesthetics**

Clearance of vegetation will entail removal of food crops - cassava and various legumes found on the extension portion. The farms are small backyard gardens mainly used for home consumption. Clearance usually affects the natural aesthetic attraction of an area; however the portion that will be cleared will be confined to runway dimensions in an already cleared area. Impacts associated are considered as: **negative, of low significant.**

#### **7.1.3.2 Exploitation of Local Resources and Manpower.**

- Potential Impact: **Income to Local Suppliers and Service Providers**

The borrow pits and quarries either belong to private individuals, villages or are owned by the Municipal Council. The below are current prices for the various construction materials and the amounts of cash expected to gained by the suppliers of the materials.

**Table 7.1: Income Expected from Exploitation of Local Resources**

Type of material	Quantity Required by Project	Unit price	Total
Granular Material	12,000 m <sup>3</sup>	7,000.00	84,000,000.00
Aggregates	10,400 m <sup>3</sup>	15,000.00	156,000,000.00
Sand	1,500 m <sup>3</sup>	4,300.00	6,450,000.00

The Contractor and crew will also depend on other local supplies and services (food, accommodation, medicals) and employment of casual and semi-skilled labour. This will increase revenue to local councils and individuals. Impacts associated are considered as: **positive, cumulative, short-term, and of moderate significance.**

#### 7.1.4 OPERATION PHASE

##### 7.1.4.1 Increased Aircraft Traffic

- Potential Impact: **Increased Commercial and social activities (Induced Development)**

Environmental impacts related to depletion of resources in the advent of the airport rehabilitation programme are highlighted under section 7.1.2.1 above. Table-A1 in the annex, indicates sectors and related resource demand which the rehabilitated airport is expected to stimulate including tourism, natural resources (fisheries, forestry, wildlife), energy, agriculture, industry, and urban development.

The project will have tremendous positive impact by stimulating various commercial and social activities. The regional government has prepared a strategy to stimulate investment in Rukwa region with the airport as one of the key entry point. The region has unexploited natural resources to match increase in the investments. However, mitigation measures are required taking cognizant that the gravelled Tunduma – Sumbawanga road will also open the region to the outside. The open access mode of resource utilizations, the inability of government to restrict their use and other underlying factors, provide inadequate assurance of continued supplies of the resources for the various sectors in the longer –term. Impacts associated are considered as: **Positive, long term, high significant.**

#### 7.1.4.2 Air Emissions and Noise Pollution

- Potential Impact: **Disturbance and nuisance to receptors**

Consequence of increased airport traffic is increased noise and disturbance to residents and institutions in the approach and takeoff paths of aircrafts. Even with the best available technologies, most of the other equipments (generators) and vehicles emit gases such as CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, particulate matters and hydrocarbons - regarded as residual air pollution.

Effects of vibrations from heavy aircrafts to nearby buildings, any building which will be away from the clearance distance will not be affected by the vibration if it was constructed by following the best available construction technology and had met required standards. Since the maximum aircraft which will be allowed to land to Sumbawanga airport will be a design aircraft which is ATR42, of which it is not heavy aircraft. Impacts associated are considered as: **negative, long term, Low significant**

#### 7.1.4.3 Inadequacies in Operation & Maintenance

- Potential Impact: **Deterioration of Public Health and Sanitary Conditions**

Inadequate resources to maintain the airport facilities and services e.g. storm water channels and haphazard disposal of wastes as well as inadequate support structures and services not part of upgrading project e.g. lack of sustained water supply, power supply - may in future result in health hazards to workers and airport users and loss of aesthetics and disrupt airport operations. Water will be required for maintaining the sanitary conditions at the upgraded airport. Estimates are 20 litres / person/day. Inadequate supply has consequent health hazards from communicable diseases. Impacts associated are considered as: **negative, secondary (indirect), cumulative, of high significance.**

#### 7.1.5 DECOMMISSIONING PHASE

##### 7.1.5.1 Disposal of Demolished Waste

- Potential Impact: **Contamination and Impaired of receiving body (Water and Land)**

In the event of future rehabilitations and upgrading, the runway and associated facilities may need to be demolished necessitating disposal of demolition waste.

Haphazard disposal may cause contamination/impaired quality of receiving body – especially land, and water resources. Impacts associated are considered as: **negative, short term of high significance.**

#### **7.1.5.2. Job loss**

- Potential Impact: **Loss of revenue**

In the event of future rehabilitations and upgrading, the runway and associated facilities may need to be demolished or closer of an airport, there will be loss of job for those who are employed by various organizations within the airport and for business owner. Impacts associated are considered as: **negative, short term of high significance.**

## **7.2 IMPACTS MITIGATION**

Section 7.1 above has identified potential social impacts and their significance. This section provides a summary of mitigation measures of those impacts which are considered to be of moderate to high significance.

### **7.2.1 SITE SELECTION PHASE**

#### **(I) Cost of Compensation and Relocation Disturbances**

To mitigate this Tanzania Airport Authority shall:

- Determine project affected people(PAP) with land rights or properties or crops
- Compensation calculation and payment shall be guided by Land Acquisition and Compensation plan/Resettlement action plan (RAP) that takes into considerations of applicable laws of land acquisition and compensation refer section 3.3
- To keep piece and harmony, compensation should be done before the commencement of the project.

#### **(II) Disruption of Economic and Social Activities and Services**

Those activities which are going on at the airport premises are illegal and are against national and international laws; also against civil aviation safety regulations. To mitigate this impact the following shall be done:

- Tanzania Airport Authority shall strive to obtain legal rights to its land (Land right of Occupancy-Title Deed)
- Construction of outer boundary wall as part of this upgrading program
- Enforcement of national and international laws
- Awareness rising to community within the project core area
- Inclusion of local leaders (Ward/sub-ward chairpersons/executive officers or /and councilors in the airport security and safety committee.
- Relocation of electricity and telephones poles within the extension portions of the airport in collaboration with local utilities services providers (TANESCO and TTCL).

## **7.2.2 DESIGN PHASE**

### **(I) Depletion of Resources/Conflicts with Land Owners and Resource Users**

To mitigate this impact the following shall be done:

- Exploitation of construction materials shall be from the authorized source only as indicated in table 6.1.
- Re-use of the excavated soils and demolition rubbles as part of the sub base material.
- Use of water conservatively by instituting technologies (e.g. self lock water tape) and awareness raising notices to users , etc
- Construction of under ground water reserve tank and introducing rainwater harvest system.
- Extraction of underground water resources.

### **(II) Visual Impacts / Public Health Hazards from Waste**

To mitigate the impacts of wastes an efficient collection and disposal system based on the principles of reduction, re-use and recycling of materials, shall be instituted at the airport. The measures are elaborated in section 6.2.2 (III).

Also Tanzania Airport Authority shall practice the following:

- Introduction of waste disposal bins, warning notices, "DOs & DoNTs" etc posted at strategic points, through the airport area.
- No, on site burial or open burning of solid waste shall be permitted at the airport. Tanzania Airport Authority will make use of the existing municipal council solid waste disposal and collection system.
- Waste management training for all personnel, operators and services providers at the airport.

### **(III) Health Hazards / Disturbances and Nuisance from Construction Works**

To mitigate this impact Tanzania Airport Authority and the Contractor shall:

- Institute good site practices including prevent public access to the construction site by securing equipment and demarcate excavate, using warning signs with appropriate text (local language) and graphics programs in schools and communities.
- Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transpiration law and standards.

- Inform community of airport construction activities and schedules.
- Noise generating equipments, operational for short periods or during the times which they will cause less disturbances.

**(IV) Public Health Hazards and Safety from Social Interactions**

To mitigate this impact Tanzania airport Authority shall develop AID/HIV control program. Collaborate and support municipal public health offices (Community Development and Health Departments) and Civil Society Organization (CSOs) in awareness/education programs to workers and public.

**(V) Occupation Health and Safety**

To mitigate this impact, Tanzania Airport Authority and contractor shall comply with relevant Tanzania (OSHA, 2003) and International Finance Cooperation's Performance Standards and regulations on health and safety requirements.

- Personal Protective Equipments (PPE), reasonable working hours and good working conditions and facilities.
- Develop and implement in-house manual/ guard lines on Health and Safety (H&S)

**(V) Compromised Security due to Social Interaction**

To mitigate the impact of the security Tanzania airport authority shall ensure the following:

- Outer boundary fence shall be constructed as part of this upgrading project and shall be scheduled as one of the first activities during the implementation of the project.
- Only key construction personnel (Junior and semi skilled) accommodated at the site
- Enforcement of site security
- Screening of security personnel
- Prohibition of alcohol and drugs within the site



### **7.2.3 MOBILIZATION/CONSTRUCTION PHASE**

#### **(I) Loss of Crops and Impairment of Landscape Aesthetics**

To mitigate this impact, compensation for crops will be part of the Tanzania Airport Authority Land Acquisition and Compensation Plan elaborated under section 7.2.1 above.

#### **(II) Income to Local Suppliers and Service Providers**

Measures for enhancement of this positive impact shall be:

- Optimization of local employment (allocate jobs fairly among the locals through involvement of local leaders) and sourcing of other supplies and services.
- Deliver skills and training
- Ensure monitoring of labour standards among contractors, sub-contractors, workers and service providers
- Municipal council in collaboration with Tanzania Airport Authority institute good revenue collection system from the Airport.

### **7.2.4 OPERATION PHASE**

#### **(I) Increased Commercial and Social Activities (Induced Development)**

To enhance this positive impact to the community living in the vicinity and area of influence; Tanzania Airport Authority and Rukwa region shall ensure:

- Efficient airport operation
- Good security within the airport area and area of influence
- Undertakes Strategic Environmental Assessment (SEA) and include in the region investment strategies and plans

#### **(II) Disturbance and Nuisance to Receptor due to Increase of Air Traffic.**

To mitigate this impact Tanzania Airport Authority shall inform community living within the project vicinity of airport activities and freight schedules.

**(III) Deterioration of Public Health and Sanitary Conditions due to Inadequacy Operation and Maintenance**

To mitigate this impact Tanzania Airport Authority shall ensure the following:

- Availability of adequate resource particularly money for maintenance
- Regular maintenance schedule of structures should be put in place
- Proper operational and monitoring procedures should be put in place

**7.2.5 DECOMMISSIONING PHASE**

**(I) Contamination and Impaired of Receiving Body (Water and Land)**

Mitigation measure similar as explained in section 6.2.3 (II)

**(II) Loss of Revenue**

To mitigate this impact Tanzania Airport authority and other organizations employee should ensure:

- Extensive training and preparations for workers for new /self employment.
- Membership to Social Security Fund.

## **8. POTENTIAL ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN**

The Environmental Management Plan provides way forward for implementation of the identified mitigation measures. Tanzania Airport Authority shall be responsible for overall implementation of the Environmental and Social Management Plan. The Contractor shall implement components relevant to mobilization and construction. Tanzania Airport Authority environmental control officer shall be designated to make day to day follow ups (e.g. supervision and liaising with stakeholders). The estimated costs for implementing the mitigation measures are shown, and should be accommodated on bills of quantities as an item. The summary of the key issues of the Sumbawanga airport rehabilitation programme and their management are shown in Table 8.1

**Table 8.1: Environmental and Social Management Plan**

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
<b>SITE SELECTION</b>	Damage to airport building/erected structures and disruption of operations	<ul style="list-style-type: none"> <li>• Provision of Reinforcement to the foundation/Base of the building</li> <li>• Use of column as structure support</li> </ul>	Engineering Standards	Tanzania Airport Authority, consultant & contractor	Project Cost
	Cost of compensation and relocation disturbances	<ul style="list-style-type: none"> <li>• Evaluation to be as applicable laws</li> <li>• Payment to be made promptly after evaluation</li> <li>• No project commencement prior payment of evaluation.</li> </ul>	Level of complains	Tanzania Airport Authority	As per Evaluation
	Disruption of economic and social activities and services	<ul style="list-style-type: none"> <li>• Construct of outer boundary wall.</li> <li>• Awareness rising to community</li> <li>• TAA obtain Title Deed</li> <li>• Inclusion of local leader in Airport security and safety committee</li> <li>• Enforcement of National &amp; International laws</li> <li>• Relocation of electrical and telephone poles</li> </ul>	ICAO standards Aerodromes act	Tanzania Airport Authority , Consultant and Contractor	Project Cost

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
<b>DESIGN</b>	Depletion of resources/conflicts with land owners and resource users	<ul style="list-style-type: none"> <li>• Exploitation from the authorized source only</li> <li>• Restoration of the borrow pits/quarries after use in association with local government and environmental NGOs</li> <li>• Levelling the area and Plantation of trees and grasses.</li> <li>• Apply for water right from Rukwa Water Basin</li> </ul>	None	Tanzania Airport Authority & contractor	<ul style="list-style-type: none"> <li>• Exploitation : part of the project cost</li> <li>• Restoration of borrow pits: 30,000.00</li> <li>• Levelling and Plantation of trees and grasses: part of the project costs:</li> </ul>
	Damage to rehabilitated structures due to ineffective storm water drainage and overflows.	<ul style="list-style-type: none"> <li>• Proper hydrology analysis</li> <li>• Proper design</li> </ul>	Engineering standards	Tanzania Airport Authority, Consultant and Contractor	Project costs

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Exploitation of Borrow pits/Quarries and other nature resources	<ul style="list-style-type: none"> <li>• Exploitation of construction materials from authorized sources only.</li> <li>• Restoration of borrow pits/ quarries after use by levelling, seeding and or planting of trees and/or grasses.</li> <li>• Maintenance of construction equipments in good running conditions.</li> <li>• Refuelling restriction at the workshop/base camp</li> <li>• Extraction water at Manzitswe stream and/or Luiche River when level is high.</li> </ul>	None	Tanzania Airport Authority, Contractor and Municipal council	Restoration cost: 10,000.00

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Contamination and Impaired Quality of Receiving Body-Land and Water	<ul style="list-style-type: none"> <li>• Use excavated soil and rubbles to fill openings and to cover haphazard disposed municipal waste.</li> <li>• Introduce of waste disposal bins, warning notices.</li> <li>• Training to personnel, operators and services providers about waste management.</li> <li>• Liquid waste will be collected initially in cesspit tanks at the airport area and later disposed through municipal waste management system.</li> <li>• Introduction of regular monitoring system for waste collections and disposal.</li> </ul>	None	Tanzania Airport Authority, Contractor and Sumbawanga municipal council for monitoring	<ul style="list-style-type: none"> <li>• Monitoring and Training cost: 10,000.00</li> </ul>
	Deteriorated/Impaired of Local Air quality due to Emission Generated from Construction Equipment	<ul style="list-style-type: none"> <li>• Maintain Equipment in good running condition</li> <li>• Enforce vehicle road restrictions</li> <li>• Routine inspection of equipments</li> </ul>	None	Tanzania Airport Authority and Contractor	Project costs

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Depletion of Resources/Conflict with Land owners and Resource Users	<ul style="list-style-type: none"> <li>• Exploitation from authorized areas only</li> <li>• Re-use of excavated soils and rubbles</li> <li>• Use of water conservatively</li> <li>• Introduction of rain harvest system</li> <li>• Extraction of underground water resources</li> </ul>	None	Tanzania Airport Authority, Contractor and Sumbawanga municipal council	
	Visual impacts / Public health hazards	<ul style="list-style-type: none"> <li>• Introduce of waste disposal bins, warning notices.</li> <li>• Training to personnel, operators and services providers about waste management.</li> </ul>	None	Tanzania Airport Authority and Sumbawanga Municipal Council	TAA budget and municipal budget



Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Health Hazard/Disturbance and Nuisance from Construction Works	<ul style="list-style-type: none"> <li>Prevent public access to the construction site</li> <li>Institute traffic management and safety programme</li> <li>Inform community of on going airport construction activities and schedule</li> <li>Scheduled Noise generated equipments</li> </ul>	Tanzania Ministry of Health and WHO standards	Tanzania Airport Authority, Contractor and Sumbawanga Municipal council	Project cost
<b>DESIGN</b>	Public Health Hazard and Safety from Social Interaction	<ul style="list-style-type: none"> <li>Develop HIV/AIDS program</li> </ul>	Tanzania AIDS/HIV Policy	Tanzania Airport Authority, Sumbawanga Municipal Council and Local Civil Society Organizations	Cost as presented on HIV/AIDS Program

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Occupation health and safety	<ul style="list-style-type: none"> <li>Comply with relevant Tanzania (OSHA, 2003) and International Finance Cooperation's Performance Standards and regulations on health and safety requirements.</li> <li>Develop and Implement in- house manual/guard lines on Health and Safety</li> </ul>	None	Tanzania Airport Authority and Contractor	Project costs
	Compromised Security due to Social Interactions	<ul style="list-style-type: none"> <li>Construction of outer boundary</li> <li>Only key personnel accommodated to the camp site</li> <li>Enforcement of site security</li> <li>Screening of security personnel</li> <li>Prohibit of alcohol and drugs at the camp site</li> </ul>	None	Tanzania Airport Authority and Contractor	Project costs

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
<b>Mobilization/Construction</b>	Destruction of vegetation cover / loss local biodiversity from vegetation clearance	<ul style="list-style-type: none"> <li>Indigenous vegetation in areas that will not be impacted by the project shall not be disturbed</li> <li>Rehabilitation by planting grasses to all areas that will not be occupied by runway, taxiway, apron, buildings and other airport facilities on the project site</li> <li>Avoid planting non-native and exotic species on the sit</li> </ul>	None	Tanzania Airport Authority and Contractor	Project cost
	Deteriorated/Impaired of Local Air Quality due to Emission Generated from Construction Equipments	Mitigation similar as in Design Part 6.2.2 (IV)	None	Tanzania Airport Authority and Contractor	Project cost

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Contamination/Impairment of Quality of Receiving Bodies from Fuel, Oils, Lubricate Spillages/Leakage	<ul style="list-style-type: none"> <li>• Routine maintenance and checks of contractor's equipments.</li> <li>• Training of personnel in proper storage, handling and clean up of contaminating materials into the environment</li> <li>• Storage and routine handling of fuel, lubricants, oils and other potentially contaminating materials to occur in weather protected areas equipped with secondary contaminant system for spills as appropriate. .</li> </ul>	None	Tanzania Airport Authority, Contractor and Sumbawanga municipal council for monitoring	Monitoring cost:
	Damage/Disturbance to Sub-surface organisms	Contractor and Tanzania Airport authority during construction should make sure that only those areas need to be excavated are ones excavated and backfilled after construction.	None	Tanzania Airport Authority and Contractor	Project cost

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Damage/Erosion of exposed Surfaces	<ul style="list-style-type: none"> <li>Contractor and Tanzania Airport authority during construction should make sure that construction will be as per engineering design and procedure; of which a minimum requirement of compaction strength is achieved during the construction. That is maximum dry density (MDD) specified in the design manual by consultant.</li> <li>Divert runway water away from structures</li> <li>Maintain gravel fill and/or re-vegetation around the structures</li> </ul>	None	Tanzania Airport Authority and Contractor	Project cost
	Impairment of air quality due to dust	<ul style="list-style-type: none"> <li>Contractor should use water sprinkler when clearing land.</li> <li>Protect stockpile of friable material subject to wind through wetting</li> <li>Cover load with friable material during transportation</li> <li>Restrict speed on loose surface roads to 30km/hr</li> </ul>	None	Tanzania Airport Authority and Contractor	Project cost

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Loss of Crops and impairment of Landscape Aesthetics	Crops and land to be compensated by the project prominent	Number and serious of claims	Tanzania Airport Authority	Tanzania Airport Authority-budget
	Income to local suppliers and service providers	<p>zations of local employments</p> <p>skills and training</p> <p>Ensure monitoring of labour standards among contractors, sub-contractors and service provider</p> <p>Institute good revenue collection system</p>	None	Tanzania Airport Authority and Sumbawanga Municipal Council	
<b>Operation</b>	Disrupted airport operations due to lack of maintenance of facilities and structures	<p>Availability of adequate resource particularly money for maintenance</p> <p>Regular maintenance schedule</p> <p>Proper operational and monitoring procedures</p> <p>Enforcement of all regulations instituted by the airport</p> <p>Monitoring and reporting for routine maintenance, repairs, replacement of all environmental sensitive areas.</p>	As efficient as possible	Tanzania Airport Authority	Normal operation budget

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Impaired quality of receiving body (land and water) due to lack of maintenance of facilities and structure	Regular maintenance schedule of airport facilities Proper waste management collection and disposal schedule	As efficient as possible	Tanzania Airport Authority	Normal operation budget
	Deterioration of public health and sanitary conditions	Availability of adequate resource particularly money for maintenance Regular maintenance schedule Proper operational and monitoring procedures	As efficient as possible	Tanzania Airport Authority	Normal operation budget
	Increase Commercial and Social Activities ( Induced Development)	airport operation Good security within the core and area of influence Undertake strategic environment assessment	None	Tanzania Airport Authority and Rukwa Regional Secretariat	Normal operation budget
	Disturbance and Nuisance to Receptor due to Increase of Air traffic	Information to community living within the airport vicinity on airport activities and flight schedules	None	Tanzania Airport Authority	Normal operation budget

Phase	Potential Direct Impacts	Management/Mitigation Measures	Target Level/Standard	Responsibility	Estimated Costs [USD]
	Deterioration of Public Health and Sanitary Conditions Due to Inadequacy Operation and Maintenance	<p>Availability of adequate resource particularly money for maintenance</p> <p>Regular maintenance schedule</p> <p>Proper operational and monitoring procedures</p>	As efficient as possible	Tanzania Airport Authority	Normal operation budget
<b>Decommissioning</b>	Loss of jobs	<ul style="list-style-type: none"> <li>• Extensive training and preparations for workers for new /self employment.</li> <li>• Membership to Social Security Fund Bodies (System)</li> </ul>	None	Tanzania Airport Authority and other airports related services provider, like Tanzania Civil Aviation Authority, Tanzania meteorological agency, etc	Normal operation budget
	Contamination/Impaired Quality of Receiving Body	<ul style="list-style-type: none"> <li>• Proper handling and disposal procedure for solid and liquid waste</li> </ul>	None	Tanzania Airport Authority	Not known



## **9. ENVIRONMENTAL & SOCIAL MONITORING PLAN**

Environmental and social monitoring plan (Table 9.1) provides the application of Environmental Management Plan as well as dealing with ad hoc or unforeseen issues which need to be mitigated. Detailed on parameter to be monitored have been considered along with costs estimates and responsible institution(s).Table 9.1 summarises key environmental and social monitoring issues of the Sumbawanga airport rehabilitation project.

**Table 9-1: Environmental and Social Monitoring Plan**

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (USD)
<b>SITE SELECTION</b>	Damage to airport building/erected structures and disruption of operation	Number of Incidents	Twice per year	Project area	Incidence	As minimum as possible	Tanzania Airport Authority	
	Cost of compensation and relocation disturbances	Number of complains and seriousness of complain	Before implementation of the project	Project Area	Number of people paid, Amount of money paid and period taken to be paid.	All affected people are compensated ; according to the Land Act of 1999	Tanzania Airport Authority	To be known after evaluation
	Disruption of economic and social activities and services	Number of affected people and resettled	Just before construction and once every year after construction	Project area	Number of affected individual	All affected people are compensated ; according to the Land Act of 1999	Tanzania Airport Authority	
<b>DESIGN</b>	Depletion of resources/conflicts with land owners and resource users	Number of Incidents	Regular during construction	Quarries, Borrow pits and Water source	Incidence	No conflict at all	Tanzania Airport Authority, Contract and Municipal council	

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (USD)
	Damage to rehabilitated structures due to ineffective storm water drainage and overflows.	Storm water collection system	Once every year	Project area	None	No effect at all	Tanzania Airport Authority	
	Exploitation of Borrow pits and other nature resources	Area exploitation and level of water	Frequently During construction	Construction materials and water sources	Meter cube	Level to water not to be less than the permitted level and exploited area as minimum as possible	Tanzania Airport Authority and Sumbawanga Municipal Council	
	Contamination and Impaired Quality of Receiving Body- Land and Water	Number of incidents	Continuously during the project life	Project area	Numbers	As minimum as possible	Tanzania Airport Authority, Contractor and Municipal Health Officer	
	Deteriorate/impaired of Local Quality due to Emission Generated from Construction Equipments							

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (USD)
	Depletion of Resources/Conflict with Land Owner and Resources Users	Claims and seriousness of claims	Frequently during construction period	Borrow pits	Number	Not at all	Tanzania Airport Authority, Sumbawanga Municipal and Contractor	Operation Cost
	Visual impacts / Public health hazards	Number of affected individual	Every month during project construction and after every six month during operations	Project area	Number	As minimum as possible	Tanzania Airport Authority, Contractor and Municipal health officer	
	Health Hazard/Disturbance and Nuisance from Construction Work	Number of affected individual	Every month during project construction and after every six month during operations	Project area	Number	As minimum as possible	Tanzania Airport Authority, Contractor and Municipal health officer	
	Occupation health and safety	Availability of protective gears	Once every month	Construction site	None	All workers use protective gears	Tanzania Airport Authority and Contractor	Project cost

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (USD)
	Compromised Security due to Social Interactions	Incidence	Frequently	Project area	Incidence	No burglary at all	Tanzania Airport Authority	Operation cost
<b>MOBILIZATION/CONSTRUCTION</b>	Destruction of vegetation cover / loss local biodiversity from vegetation clearance	Impacted ecological features	Frequently during construction	Project area	m <sup>2</sup>	As minimum as possible	Tanzania Airport Authority and contractor	Project cost
	Contamination/Impairment of quality of receiving Bodies from Fuel, Oils, Lubricate, Spillages/Leakage	Number of incidents	Continuously during the project life	Project area	Numbers	As minimum as possible	Tanzania Airport Authority, Contractor and municipal health officer	
	Damage/Disturbance to Sub-surface organisms	Impacted ecological features	Frequently during construction	Project area	None	As minimum as possible	Tanzania Airport Authority and Contractor	Project cost
	Damage/Erosion of exposed Surfaces	Damage/Soil erosion tendencies	Twice every year	Project area	None	As minimum as possible	Tanzania Airport Authority	Project cost
	Impairment of air quality due to dust	Concentration of pollutants in ambient air (dust, noxious gas)	Once every month	Project area	ppm, mg/m <sup>3</sup> ,	Tanzania, WHO standards	Tanzania Airport Authority	

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (USD)
	Loss of crops and Impairment of Land Aesthetics	Number of complains and seriousness of complain	Before implementation of the project	Project Area	Number of people paid, Amount of money paid and period taken to be paid.	All affected people are compensated ; according to the Land Act of 1999	Tanzania Airport Authority	
	Income to local suppliers and service providers	Number of employed people and services providers	Once after every three month	Project area	Number	As maximum as possible	Tanzania Airport Authority	
<b>OPERATION</b>	Disrupted airport operations due to lack of maintenance of facilities and structures	Performance of the facilities	Once per year	Sumbawang a airport (Project area)	None	Good performance record	Tanzania Airport Authority	
	Impaired quality of receiving body (land and water) due to lack of maintenance of facilities and structure	Number of incidents	Continuously during the project life	Project area	Numbers	As minimum as possible	Tanzania Airport Authority, Contractor and municipal health officer	

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (USD)
	Deterioration of public health and sanitary conditions	Number of affected individual	Every month during project construction and after every six month during operations	Project area	Number	As minimum as possible and all affected individuals are attended	Tanzania Airport Authority, Contractor and municipal health officer	
<b>DECOMMISSIONING</b>	Loss of jobs	<ul style="list-style-type: none"> <li>▪ Number of employers registered in social security schemes</li> <li>▪ Remittance of monthly contribution</li> </ul>	Once every six month	Tanzania Airport Authority Headquarter and Headquarter s of other associated services provider.	<ul style="list-style-type: none"> <li>▪ Number of employers registered in social security schemes</li> <li>▪ Remittance of monthly contribution</li> </ul>	All workers	Tanzania Airport Authority and other airport services providers	
	Contamination/Impaired Quality of Receiving Body	Number of incidents	Continuously during the project life	Project area	Numbers	As minimum as possible	Tanzania Airport Authority, Contractor and municipal health officer	

## 10 COST BENEFIT ANALYSIS

### 10.1 Financial Cost Benefit Analysis to the Company

Cost-benefit analysis is normally done in the framework of feasibility study of an activity. The aim of cost-benefit analysis is to inform assist the project developer to make a decision on:

- Whether it makes economic sense to continue with the project;
- Whether the chosen option is cost effective alternative;
- The estimate of the size of a project.

In this project the costs of the Sumbawanga airport rehabilitation project will include:

- Capital expenditures
- Operating and Maintenance costs;
- Staff costs;
- Materials;
- Research and Development; and
- Environment, Health and Other social costs.

Benefits may include:

- Better, understanding of the target resource;
- Accurate targeting of the resource to avoided unnecessary costs to extract the resources;
- Potential for additional revenues generated from new resources;
- Protection of environment and health; and
- Provision of other social benefits.

### 10.2 Quantifiable and Non-Quantifiable Benefits to Communities

There will be direct and indirect benefits to the communities as follows:

- a) The project will employ about 200 for the construction and about 20-25 personnel for the airport operation. The majority of the non-skilled labour will be recruited from the communities around the project. A good number of skilled staff will be recruited from within Tanzania.



- b) Through taxes to the Government, Tanzania Airport Authority will be indirectly contributing to development projects such as roads, medical care and education services.
- c) The presence of Airport in the area has drastically increases business opportunities in the area, hence increase revenue.

### **10.3 Quantifiable and Non-Quantifiable Benefits to Government**

The government of Tanzania will directly benefit from taxes collected from passengers, foreign and local investors will be investing to the region. Apart from tax generation, the investment will also enhance the economic growth and ancillary private sector development spurred by the operations and activities associated with the airport. The image of the government in investment sector will also be enhanced nationally and internationally that will increase attractions from other local and foreign investors and ensure continued economic growth.

### **10.4 Possible Costs to Communities**

It is a fact that airport rehabilitation entails social and environmental impacts. These have been elaborated clearly in Chapters 6 – 9. There will be individual in the communities who will be affected more than others. However, Tanzania Airport Authority is committed to mitigate the negative social and environmental impacts.

### **10.5 Possible Costs to Government**

Tanzania Airport Authority is the government institution and in this project is the representative to of government. Therefore all environmental and social impact that has been identified in chapter 6-8 will be direct costs to the government.

### **10.6 Environmental Cost Benefit Analysis**

Environmental cost benefit analysis is assessed in terms of the negative versus positive impacts. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable. As it has been mentioned in Chapters 6 – 9, the potential

benefits of the project, in terms of financial and social benefit are substantial. The environmental impacts are reasonably mitigatable and the financial resources needed to mitigate negative impacts, when compared to the required investment, are relatively small.

### **10.7 Social Economic Cost Benefit Analysis**

Availability of modern and good airport in the regions is expected to accelerate social economic development. There are several governmental initiatives such as the attraction of foreign and local investors to the regions which can not be realised without reliable mode of transport. If reliable transport is established, one should expect more investments to be established and thus create employment for the communities.

## **11. CONCLUSION AND RECOMMENDATIONS**

### **11.1 Conclusions**

The environmental Impact Assessment (Environmental Issues) Study has been completed in accordance with the Tanzanian Legislations including the Environmental Management Act (2004), the Environmental Impact Assessment and Audit regulations (2005). The Environmental Studies Team has carried out field surveys to collect the environmental and some social data and to discuss with the regional and local authorities concerning the environmental issues of the proposed rehabilitation of Sumbawanga airport and the proposed mitigation measures. The environmental team also carried out consultation with the representatives of the local communities around the project area to integrate their requirements in the project. Also this consultation enabled the Consulting team to have a physical feeling of the local conditions around the project site.

The EIA Report has identified a number of impacts both positive and negative and other residual cumulative issues pertaining to the proposed rehabilitation of Sumbawanga airport project developed in Sumbawanga, Rukwa region by Tanzania Airport Authority on behalf of government of Tanzania. The issues/impacts have been described and assessed in detail to gain adequate understanding of possible environmental effects of the proposed project – from site selection to decommissioning, in order to formulate mitigation measures in response to negative aspects which have emerged. The Environmental Management plan provides way forward for implementation of the identified mitigation measures.

The estimated costs for implementing the mitigation measures are just indicative. The consultant has used informed judgment to come up with these figures.

The study concludes that although the project can have significant and wide-ranging impacts on the environment, the project is environmentally suitable and socially acceptable subject to the implementation of the Environmental Management Plan and Environmental Monitoring Plan as proposed in chapter 8 and 9.

## 11.2 Recommendations

It is recommended that based on the findings of the EIA exercise and supplementary information, the project proponent (Tanzania Airport Authority) should implement the environmental management plan. The environmental management plan provides guidelines on managing/mitigation of impacts and monitoring performance.

In addition to the environmental management plan, it is recommended that Tanzania Airport Authority should appoint an environmental control unit which will be responsible for monitoring the application of the environmental management plan, as well as dealing with *ad hoc* or unforeseen issues which need to be mitigated.

While a number of environmental impacts have been identified and assessed, none of these are considered to be that severe after mitigation as to prevent the further planning, design and construction of the proposed development.

Belva Consult Limited of Dar es Salaam, Tanzania and Sir Fredrick & Partners Limited of United Kingdom are of the opinion that the environmental impacts identified may be mitigated. The proposed environmental management plan and environmental monitoring plan if implemented will safeguard the integrity of the environment.

## REFERENCES:

1. Ministry of Works- Environmental Assessments and Management Guidelines for Road Sector, December 2004.
2. Ministry of Water and Livestock Development: National Water Policy July 2002.
3. National Environment Management Council: Tanzania Environmental Impact Assessment Procedure and Guidelines  
Volume 1: General EIA Guidelines and Procedures  
Volume 2: Screening and Scoping Guidelines  
Volume 3: Report Writing Guidelines and Requirements  
Volume 4: Review and Monitoring Guidelines  
Volume 5: General Checklist of Environmental Characteristics
4. United Republic of Tanzania: National Environmental Policy (NEP) 1997.
5. United Republic of Tanzania: The Environmental Management Act, 2004.
6. United Republic of Tanzania: The Mining Act 1998.
7. United Republic of Tanzania; Land Act 1999
8. United Republic of Tanzania; Land Act 1999 (Act No 4 of 1999), the Land Regulations 2001, Subsidiary Legislation (Suppl. No. 16 of 4<sup>th</sup> May 2001)
9. United Republic of Tanzania, Highway Ordinance 1969
10. United Republic of Tanzania; Land Regulations 2001
11. Sumbawanga Municipal Council ; Municipal Profile -2005
12. Rukwa Region Profile 2005
13. United Republic of Tanzania; Village Land Act 1999.
14. United Republic of Tanzania, Tanzania Country Study on Biological Biodiversity. Vice Presidents Office, UNEP, June 1998.
15. United Republic of Tanzania; Report of the Presidential commission of Enquire into Land Matters, Volume 1; 1992.
16. The Land Acquisition Act of 1967
17. United Republic of Tanzania: National Environment Action Plan (NEAP 1994)

18. The National Land Policy (1996)

19. Transport Policy (2002)

## ANNEX I

### REQUIREMENT OF NATURAL RESOURCES BY DIFFERENT DEVELOPMENT SECTORS

Table A 1 below indicate the different kinds of natural resources/systems that the different development sectors requires as raw materials or support services to maintain sustained production. It has not been possible to work out the exact amounts that are currently available (*resource base*), amounts that are actually being used or the futures needs because of lack of information about the resources and ecosystems and extent and trends of their utilization. Drawing from the table, the different sectors are currently dependant on resources which could be limited in the longer-term. In line with the Tanzania growth strategy, the government is proposing/implementing aggressive industrial growth and other economic development strategies in a bid to become a middle-income country by 2025. At the current levels of economic growth (about 5% annually), Gross Domestic Product (GDP) contribution from environmental products and services and natural resources will need to increase and the pressures on the resources and environment will collate with this economic output.

**Table: A1 Natural Resources Required by Different Development Sectors**

<b>Fisheries Sector (marine and freshwater)</b> <i>Inshore, prawn, offshore</i>	<b>Forestry Sector</b> <i>Mangrove and coastal forests (upland)</i>
<ul style="list-style-type: none"> <li>• Fish stocks</li> <li>• Intertidal areas (fishing grounds)</li> <li>• Fishing grounds (deep waters)</li> <li>• Mangrove areas (breeding/nursery areas)</li> <li>• Land (for infrastructure, markets)</li> <li>• Beaches (landing site)</li> </ul>	<ul style="list-style-type: none"> <li>• Fuel-wood</li> <li>• Poles</li> <li>• Timber</li> <li>• Non-forested areas (reforestation)</li> </ul>
<b>Agriculture Sector</b> Rain-fed subsistence, Rain-fed large scale, Irrigation	<b>Aquaculture Sector</b> Fauna: large scale (shrimp); small scale (crabs, shrimp, finfish, oysters)
<ul style="list-style-type: none"> <li>◆ Arable land</li> <li>◆ Wetland</li> <li>◆ Fresh water</li> </ul>	<ul style="list-style-type: none"> <li>◆ Land (reclaimed)</li> <li>◆ Land (infrastructure)</li> <li>◆ Inter-tidal areas</li> <li>◆ Beaches (landing sites)</li> <li>◆ Fresh water</li> </ul>
<b>Tourism Sector</b> Infrastructure Recreational Souvenirs	

<ul style="list-style-type: none"> <li>◆ Fresh water</li> <li>◆ Land</li> <li>◆ Seafood, wildlife meat</li> <li>◆ Sporting grounds</li> <li>◆ Beaches</li> <li>◆ Pristine habitats</li> <li>◆ Marine species (shells, trophy etc.)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Brackish water</li> <li>◆ Stock (natural recruitment)</li> <li>◆ Natural seeds</li> </ul>
<p><b>Energy Sector</b></p> <p>Gas and oil (exploration &amp; exploitation) Hydropower</p>	<p><b>Industry Sector</b></p>
	<ul style="list-style-type: none"> <li>◆ Fresh water</li> <li>◆ Land</li> <li>◆ Non-forested mangrove areas</li> </ul>
<ul style="list-style-type: none"> <li>◆ Fresh water</li> <li>◆ Land (processing + transmission)</li> <li>◆ Marine ground (Benthos)</li> </ul>	<p><b>Urban Development</b></p>
<p><b>Wildlife Sector</b></p>	
<ul style="list-style-type: none"> <li>◆ Land</li> <li>◆ Water</li> </ul>	
<ul style="list-style-type: none"> <li>◆ Land</li> <li>◆ Food (seafood + agro)</li> <li>◆ Water</li> <li>◆ Fuel wood</li> <li>◆ Beaches</li> <li>◆ Intertidal areas (water sporting)</li> </ul>	



## ANNEX II

### TERMS OF REFERENCE

#### 1 Introduction

During scoping several key environmental issues of concern were identified after holding consultations with stakeholders of the project and also after reviewing various literature related to the project. The outcome of the scoping exercise is the scoping report which is the basis of the draft terms of reference.

The purpose of Terms of Reference (TOR) therefore, is to provide formal guidance to the Proponent /EIA Consultant of the Sumbawanga Airport project on the range of issues that must be addressed in the EIA process. They form the basis for subsequent review process. In these Terms of reference, strategies for addressing the issues identified during scoping have been in cooperated to make the EIA focused.

#### 2 Objectives of the Environmental Impact Assessment Study

Construction and Rehabilitation of airport activities are included in the mandatory list of the projects that are required to develop full EIA by the Environmental Management Act No 20 of 2004. Part IV Of EIA regulations G.N. 349 of 2005 provides the general objectives for carrying EIA, among others list comprise the following:

- ◆ To ensure that environmental considerations are explicitly addressed and incorporated into the development decision making process.
- ◆ To anticipate and avoid, minimise or offset the adverse significant biophysical, social and relevant effects of development proposal.
- ◆ To protect the productivity and capacity of natural ecosystems and ecological processes which maintain their functions.
- ◆ To promote development that is sustainable and optimises resources use and management opportunities.

Consequently, Tanzania Airport Authority would like to undertake Environmental Assessment so as to translate the principles of sustainable development and environmental protection into strategies and actions that can be practically applied to her project of rehabilitation and expansion of Sumbawanga airport.

### **The objectives of the EIA are:**

- ◆ To establish baseline information on both natural and built environment including socio-economic conditions of the proposed project area.
- ◆ To identify, predict and evaluate foreseeable impacts, both beneficial and adverse, of the proposed investment; and
- ◆ To develop mitigation measures that aim at eliminating or minimising the potential negative impacts and promote positive ones.
- ◆ To develop management clauses and monitoring aspects to be observed during project implementation.

This requirement clearly presents a broad challenge on what type of activity that is environmentally friendly need to be dealt with at Sumbawanga airport and associated areas in the Sumbawanga municipal.

### **3 Description of the Project**

Tanzania airport authority (TAA) on behalf of the government proposed rehabilitation and expansion of Sumbawanga airport. Currently Sumbawanga airport is in bad condition of which only chartered small aircrafts; government flights and helicopter are only ones landing, Schedule flight stopped on early 1990's due to the condition of the airport. Therefore TAA intend to rehabilitate and expand the airport to accommodate ATR42 as a maximum aircraft of which 1750 x 30 m of runway will be constructed, included taxiway and apron.

In future TAA intend to construct a modern terminal building which will be of the same capacity and standard with that rehabilitate airport.

### **4 Scope of Work.**

The EIA shall be conducted in accordance to the guidelines laid down by the Environment Management Act (EMA, 2004). The main steps to be followed by the Consultant in the environmental impact assessment will involve:

#### **Identifying, collecting and analyzing information which includes:**

- ◆ Project characteristics and activities;
- ◆ Baseline data of the environmental and socio-economic setup;
- ◆ Predicting impacts;
- ◆ Evaluating impact significance:

- ◆ Identifying and proposing mitigation measures:
- ◆ Preparing the Management and Monitoring Plan and Follow up; and
- ◆ Presenting the information which involves writing an environmental Impact Assessment Statement (EIS).

## **5 The Consultant shall carryout the following tasks:**

### **5.1. Stakeholders Consultations**

Consultations with stakeholders have been undertaken in this scoping stage of the EIA. Main stakeholders and their concerns are elaborated under chapter 5. *The Consultants shall* carry this further during the impact study.

### **5.2. Baseline Data and Information**

#### **5.2.1 Study area**

In order to cover assessment of all key issues related to the project, the study area should be much wider than at Sumbawanga airport area were many of the project facilities and services will be located. This is because some of the impacts might have local, regional or national implication. The Consultant shall, further determine and set the project boundaries particularly spatial boundaries (i.e. impact area coverage and area of influence).

#### **5.2.2 Description of the project**

The Consultant shall give details of:

- ◆ Location of all project-related development and operation sites;
- ◆ General layout of airport, design basis, size, capacity;
- ◆ Pre-construction activities and construction activities;
- ◆ Organizational relationships, mandates and interactions among the different parties to be involved in the project.

#### **5.2.3 Description of the Environment**

The Consultant shall:

- ◆ Provide general description of the project environment and sources of information for anyone requiring a more extensive description (especially the EIA reviewers);
- ◆ Identify those features that are particularly important in the project area;
- ◆ Maps at appropriate scales to illustrate the surrounding areas likely to be environmentally and social affected.

- ◆ Identify areas that require special attention in the project implementation. The areas may represent unique or sensitive geomorphologic characteristics, biotopes, or species.

Environmental Impact Assessment shall specifically focus on these ecological components to ensure that the proposed development does not harm the well being or these characteristics.

## **6 Legislative and Regulatory Considerations.**

The scoping report has to identify some of the policies and legislation.

The Consultant shall describe how relevant the identified local, national and international regulations and standards governing environmental quality, health and safety, protection of sensitive areas and endangered species, land use control etc. in relation to the project activities.

## **7 Impact Assessments**

Below are listed tasks to be undertaken by the consultant during EIA, using baseline data and information gathered. Extent to which each will be undertaken will depend on the issues identified during scoping. The consultant will strive to balance the tasks in order to achieve the described objectives of the EIA.

To avoid ambiguity in the impact assessment (identifying potential impacts, relevant environmental factors and mitigative measures) the Consultant shall make use of the checklist covering the major areas of impact as provided for in the EIA guidelines.

### **Task 1: Identification and Prediction of Impacts.**

Under this activity the consultant shall:

- ◆ Identify issues and concerns in order to find suitable remedies;
- ◆ Identify linkages among project components and the issues;
- ◆ Identify where project activities or elements interact with social and biophysical environment (direct impacts);
- ◆ Identify indirect impacts of the project on the environment;
- ◆ Identify cumulative impacts that may be anticipated;
- ◆ Identify residual impacts if any;
- ◆ Predict probability, magnitude, distribution and timing of expected impacts;

### **Task 2: Estimation of the Significance of the Impacts.**

The consultant shall:

- ◆ Determine which environmental components are mostly affected by the project or its alternatives;
- ◆ List issues raised by the public and classify them according the level and frequency of concern whenever possible;
- ◆ List regulatory standards, guidelines etc. that need to be met; and
- ◆ Rank predicted impacts in order of priority for avoidance, mitigation, compensation and monitoring.

**Task 3: Development of Management Plan to Mitigate Negative Impacts, and Development of Monitoring Plan.**

The consultant shall:

- ◆ Determine appropriate measures to avoid or mitigate undesirable impacts;
- ◆ Assess and describe the anticipated effectiveness of proposed measures;
- ◆ Ascertain regulatory requirements and expected performance standards;
- ◆ Determine and assess methods to monitor impacts for prediction accuracy remedial measures for effectiveness;
- ◆ Determine and assess methods to monitor for early warning of unexpected effects;
- ◆ Re-assess project plans, design and project management structure;
- ◆ Describe follow-up scheme and post-project action plan for achieving EIA objectives; and
- ◆ Assess the level of financial commitment by the project proponent for the management and monitoring plan, and follow up activities.

The consultant shall be guided by the cost-effectiveness principles in proposing amelioration measures. Estimation of costs of those measures shall be made. The assessment will provide a detailed plan to monitor the implementation of the mitigation measures and impacts of the project during construction and operation.

**Task 4: Identification of Institutional Needs to Implement Recommendations.**

The Consultant shall review the institutional set-up - community, ward, District/ Regional and national levels - for implementation of the Management and Monitoring Plans recommended in the environmental assessment. The assessment shall identify who should be responsible for what and when.

### **Task 5: Drawing Recommendations.**

The consultant shall:

- ◆ Highlight key concerns and considerations associated with the acceptance and implementation of recommended actions;
- ◆ Determine resources requirements for implementing recommendations;
- ◆ Determine capacity and resourcefulness of the client to meeting such commitment;
- ◆ Explain rationale for proposed development and benefits and costs vis-à-vis the no-project option;
- ◆ Ascertain degree of public acceptance of or reaction to recommendations.

### **Task 6: Environmental Impact Statement (EIS).**

The assessment shall result into an EIS focusing on findings of the assessment, conclusions and recommended actions, supported by summaries of data collected etc. This shall be a concise document limited to significant environmental issues. The report format will be as per NEMC EIA guidelines.

### **Task 7: Review**

The review report from NEMC may require further input (data collection, consultation inputs etc.). The consultant shall undertake to provide extra information and inputs until the project review is satisfactorily concluded.

## **8 Peoples Participation**

The assessment shall establish the level of consultation of the affected stakeholders before designing the project, level of involvement in the running and maintenance of the project facilities as this is an important aspect for both environmental and project sustainability.

The assessment will provide a framework:

- For coordinating the environmental impact assessment with other government agencies, Marine Parks and Reserves; and
- For obtaining the views of affected groups, and in keeping records of meeting and other activities, communications, and comments and their disposition.

A people's participation report will be prepared as part of the EIS i.e. apart from the socio-economic and cultural impact report (which basically are dealing with consultant's perception and interpretation of issues).

## **9 Study Team**

The consultants shall deploy consultants/experts with the demonstrable practical experience in conducting EIA studies. Specific experience in civil works, ecology and sociology.

## **10 Reporting and Report Presentation**

The final draft of the EIS document should be concise, following the report writing guidelines in the National EIA Procedure and Guidelines (NEM, Draft 1997), for simplifying the review process.

## **11 Records of Meetings**

The consultants shall provide record of the names of organizations, government and departments and individuals whose views will obtain. The record will also provide description of views and information that will be obtained.

## **12 References**

The objective of this section is to identify and record the written materials used in the study. This is extremely important because some of the material used as back ground information may be in unpublished form, and yet it may be necessary that these are available.

## ANNEX III

### PUBLIC NOTICES AND ADVERTISEMENTS

**ATTENTION! ATTENTION! ATTENTION!**

#### PUBLIC NOTICE

#### **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF REHABILITATION AND UPGRADING OF SUMBAWANGA AIRPORT PROJECT**

Tanzania Airport Authority (TAA) intends to undertake a project for the rehabilitation and upgrading of Sumbawanga Airport as part of the national effort to upgrade high priority commercial airports across the country. The Sumbawanga project will involve rehabilitation and extension of gravelled surfaced runway of 1600m x 33m, apron and taxiways to a surfaced bitumen standard.

On behalf of TAA, M/S Sir Fredrick Snow & Partners Ltd of UK in association with BELVA Consult Limited of Tanzania are undertaking a study of the impacts of the project to the existing environment, and social and economic set ups as required by the government (Environmental Management Act No 20, 2004).

If you have any issue or concern regarding this project, express/send them to the below offices where details of the project are also found.

Director General  
Tanzania Airport Authority (TAA)  
Julius Nyerere International Airport – Terminal I  
P. O. Box 18000, Dar es Salaam, Tanzania  
Tel. 255-22-2842402/3, Fax: 255-22-2844495.  
Email [info@airports.go.tz](mailto:info@airports.go.tz)

EIA Consultants, Belva Consult Ltd, P.O Box 75212 Dar es Salaam, Tel: 255-22-2775919, Fax: 255-22-2775910, Email: [belva@bol.co.tz](mailto:belva@bol.co.tz), Director: 255-754-270400, 0754 291997

Director General, National Environmental Management Council (NEMC), P.O Box 63154 Dar es Salaam, Tel: 255 (022) 2127817, 0713 608930, Email: [nemc@nemctz.org](mailto:nemc@nemctz.org)

Also to

The Rukwa Regional Secretariat, Sumbawanga Municipal Executive Director; Executive Officers & Chairpersons at Ward and "Mtaa" levels.

**ATTENTION! ATTENTION! ATTENTION!**



**ILANI! ILANI! ILANI!**

**TANGAZO**

**TATHIMINI YA ATHARI KWA MAZINGIRA NA JAMII: MRADI WA UKARABATI NA UPANUZI WA  
KIWANJA CHA NDEGE SUMBAWANGA**

Mamlaka ya Viwanja vya Ndege Tanzania (TAA) inakusudia kufanya ukarabati na upanuzi wa Kiwanja cha ndege cha Sumbawanga ikiwa ni sehemu ya uboreshaji wa viwanja vya ndege vyenye umuhimu wa kibiashara kitaifa. Mradi huu utahusisha ukarabati na upanuzi wa njia ya kutua na kuruka ya changarawe ya 1600m x 33m kuwa kiwango cha rami.

Kampuni ya M/S Sir Fredrick Snow & Partners Ltd ya Uingereza ikishirikiana na Belva Consult Ltd ya Tanzania, kwa niaba ya TAA, wanafanya tathmini ya athari ya mradi huu kwa mazingira na jamii, kama ilivyoagizwa na serikali (Sheria ya Mazingira Na. 20 ya 2004).

Kama una maoni kuhusu huu mradi unaweza kuyatoa/kuyatuma katika ofisi zifuatazo:

Mkurugenzi Mkuu  
Tanzania Airport Authority (TAA)  
Uwanja wa Ndege wa Kimataifa wa Julius Nyerere – Terminal I  
S.L.P 18000, Dar es Salaam, Tanzania  
Simu. 255-22-2842402/3, Fax: 255-22-2844495.  
Barua Pepe: [info@airports.go.tz](mailto:info@airports.go.tz)

Washauri, Belva Consult Ltd, S.L.P 75212 Dar es Salaam, Simu: 255-22-2775919; Fax: 255-22-2775910; Mobile: 255-754-270400, 0754 291997; Barua Pepe: [belva@bol.co.tz](mailto:belva@bol.co.tz)

Mkurugenzi Mkuu, Baraza la Taifa la Usimamizi na Hifadhi ya Mazingira, S.L.P 63154 Dar es Salaam, Simu: 255 (022) 2127817, 0713 608930, Barua Pepe: [nemc@nemctz.org](mailto:nemc@nemctz.org)

Au Kwa

Secretarieti ya Mkoa wa Rukwa; Mkurugenzi Mtendaji wa Manispaa ya Sumbawanga; Afisa Watendaji na Wenyeviti wa Kata na Mitaa.

**ILANI! ILANI! ILANI!**

**ANNEX IV**

**LIST OF STAKEHOLDERS CONSULTED**