



# **DEPARTMENT OF ENVIRONMENT**

## **ENVIRONMENTAL IMPACT ASSESSMENT**

### **GUIDELINES AND PROCEDURES**

#### **ANNEXES**

**2009**

**ANNEX – I: ENVIRONMENTAL IMPACT ASSESSMENT REGISTRATION FORM**



**DEPARTMENT OF ENVIRONMENT**

**ENVIRONMENTAL IMPACT ASSESSMENT REGISTRATION FORM**

*(To be completed in Duplicate)*

<b>ASSESSMENT NO:</b>		<b>FILE NO:</b>		<b>YEAR:</b>	
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**1.0 PARTICULARS OF PROPONENT:**

1.1 Full Name of Proponent: -----  
-----  
-----  
-----

1.2 Address for correspondence  
-----  
-----  
-----

1.3 Contact person. -----Position-----

Phone No-----Fax No-----

E: mail:.....



2.4 Scope of Project/Activity (size of labour force, equipment and machinery, installed/production capacity, product type, area covered facility/proposal, market)

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-----  
-----  
-----

3.0 **PROPOSED SITE**

3.1 Municipality/Town/District Council: -----

-----

3.2 Region: -----

-----

3.3 District: -----

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3.4 Shehia:-----

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3.5 Village:-----

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3.6 Current zoning:-----

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*(Attached Location Map/site plan/map)*

3.7 Distance to nearest residential and/or other facilities

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3.8 Size of the project site (land) in square meters (m<sup>2</sup>).....

.....

3.9 Current and future proposed the project site land use.....

.....

.....

3.10 Adjacent land uses (existing & proposed)

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3.11 Site description (Biological, physical and cultural)

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-----  
-----  
**4.0 INFRASTRUCTURE AND UTILITIES**

4.1 Structures (buildings and other facilities):

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-----  
4.2 Land required:

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-----  
4.3 Water (source, quantity)

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-----  
4.4 Power (type, source & quantity)

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-----  
4.4 Road

-----  
-----  
4.5 Other major utilities (e.g. sewerage, etc.)





**DECLARATION:**

I,....., hereby declare that the information provided on this form is true to the best of my knowledge and shall provide any additional information that shall come to my notice in the course of processing this application.

.....

**Full name**

.....

**Professional**

.....

**Mobile Number**

.....

**Date:**

.....

**Signature**

.....

**E: mail address**

.....

**Postal Address**

**ANNEX – II: CLASSIFICATION CHECKLISTS FOR PROJECTS/ACTIVITIES  
WHICH LIKELY REQUIRE SCREENING FOR EIA**

Description of the project	Applicable criteria	Indicative criteria
<b>Agriculture and aquaculture</b>		
(a) Project for the use of uncultivated land or semi natural areas for intensive agricultural purposes	The area of the development exceeds 50m <sup>2</sup>	The activity is unlikely to require EIA unless it covers more than 50m <sup>2</sup> . In considering whether particular development is likely to have significant effects, consideration should be given to impacts on the surrounding ecology, hydrology and landscape.
(b) Water management projects for agriculture, including irrigation and drainage projects	The area of the works exceeds 50m <sup>2</sup>	EIA is more likely to be required if the development would result in permanent changes to the character or more than 50m <sup>2</sup> of land. In assessing the significance of any likely effects, particular regard should be taken to whether the project would have damaging wider impacts on hydrology and surrounding ecosystem. It follows that EIA will not normally be required for routine water management activities undertaken by farmers.
(c) Intensive livestock installations	The area of new floorspace exceeds 50m <sup>2</sup>	The significance or otherwise of the impacts of intensive livestock installations will often depend on the level of odours, increased traffic and arrangements for waste handling. EIA is more likely to be required for intensive livestock installations if they are designed to house more than 500 ruminants and non ruminant, more than 50,000 broilers and layers or other poultry.
(d) Intensive fish farming	The installation resulting from the development is designed to produce more than 10 tones of dead weight fish per year	Apart from the physical scale of any project, the likelihood of significant effects will generally depend on the extent of any likely wider impacts on the hydrology and ecology of the surrounding area. Projects designed to produce more than 100 tones (dead weight) of fish per year will be more likely to require EIA
(e) Reclamation of land from the sea	All projects	In assessing the significance of any project, regard should be taken to the likely wider impacts on natural coastal processes beyond the site itself, as well as to the scale of reclamation works themselves. EIA is more likely to be required where work is proposed on a site which exceeds 1 hector.
<b>Extractive industry</b>		
(a) Quarries, open-cast mining and peat mining	All projects where the floorspace exceed 50m <sup>2</sup>	The likelihood of significant effects will tend to depend on the scale and duration of the works, and the likely consequent impacts of noise, dust, discharges to water and visual intrusion. All new open-cast and underground mines will generally require EIA. For clay, sand and gravel working, quarries, queries and peat extraction sites, EIA is more likely to be required if the extraction would involve more than 1000 tones of mineral.

		Particular consideration should be given to noise, and any wider impacts on the surrounding hydrology and ecology. EIA is to be required where it is expected that consequent impact into hydrological and ecological process.
(b) Deep drilling in particular -- geothermal drilling -- drilling for the storage of nuclear waste materials -- drilling for water supplies	In relation to any type of drilling, the area of the works exceeds 50 square meters.	EIA is more likely to be required where the scale of the drilling operations involves projects of a surface site of more than 50 square meters. Regard should be taken to the likely wider impacts on surrounding hydrology and ecology.
(c) Surface industrial installations for the extractions of petroleum and natural gas	Any size of the surface area for the project.	The main consideration are likely to be the scale of project, emissions to air, discharges to water, the risk of accidents and the arrangements of the transporting the fuel. EIA is likely to be required if the project is on small as well as major scale.
<b>Energy industry</b>		
(a) Industrial installations for the production of electricity.	Any size of the surface area for the project.	EIA will normally be required for power generation plant. The main consideration are likely to the scale of the project, significant effects, and the process of production, supply and storing to the level of emissions to air, discharges to water and risk accidents.
(b) Installation for hydroelectric power production	Any scale of the project size	In particular to the physical scale of the project, particular regard should be taken to significant impacts on social, hydrology and ecology. EIA is more likely to be required for new hydroelectric project.
(c) Installation for the harnessing of wind power for energy production	The development of project involves the installation of the turbines (surface overhead and under-water submerged	The likelihood of significant effects is expected. EIA is more likely to be required for the project.
<b>Production and Processing Factories and Industries</b>		
(a) Manufacture and assembly of motor vehicles and manufacture of motor-vehicle engines		New manufacturing or industrial plants require EIA if the operational projects cover the site of more than 100m <sup>2</sup> . Smaller projects are more likely to require EIA if they are expected to give rise to significant discharged of wastes, emission of pollutants, accidents and operational noise
(b) Shipyards, ship-docks and installation for the construction and repair of aircraft		
(c) Manufacture of railway equipments		
(d) Installation of the manufacture of cement		
(e) Installations for the production of asbestoses		

and the manufacture of asbestos based products		
(f) Installations for the manufacture of glass including glass fibre		
(g) Manufacture of ceramic products by burning, in particular roofing tiles, bricks, tiles, stoneware and porcelain		
<b>Chemical industry</b>		
(a) Treatment of intermediate products and production of chemicals		
(b) Production of pesticides and pharmaceutical products, paints and varnishes, elastomers and peroxides		
(c) Storage facilities for petroleum, petrochemicals and chemical products	Products stored at any amount with any kind and type of facilities	
<b>Food industry</b>		
(a) Manufacture of vegetables and animal oils and fats		New manufacturing or industrial plants require EIA if the operational projects cover the site of more than 50m <sup>2</sup> . Smaller projects are more likely to require EIA if they are expected to give rise to significant discharged of wastes, emission of pollutants, accidents and operational noise
(b) Packaging and canning of animal and vegetables products		
(c) Manufacture of dairy products		
(d) Brewing and malting		
(e) Confectionery and syrup manufacture		
(f) Installations for the slaughter of animals		
(g) Industrial starch manufacturing factories		
(h) Fish-meal and fish oil factories		
(i) Sugar factories		
<b>Textile, lather, wood and paper industries</b>		
(a) Industrial plants for the production of paper and board		New manufacturing or industrial plants require EIA if the operational projects cover the site of more than 50m <sup>2</sup> . Smaller projects are more likely to require EIA if they are expected to give rise to significant discharged of wastes, emission of pollutants, accidents and operational noise
(b) Plants for the treatment (such as washing, bleaching mercerization)		

or dyeing of fibres or textiles		
(c) Cellulose-processing and production installations		
<b>Infrastructure projects</b>		
(a) Industrial estate development projects	The area of the project exceed 50 meter square and accommodate not more than 50 inhabitants	EIA is more likely to be required if the site area of the new development is more than 50m <sup>2</sup> . In determining whether significant effects are likely, particular consideration should be given to the potential increase in traffic, emissions and noise
(b) Urban development projects, including the construction of shopping centers, car parks, sports stadiums, leisure centers and multiplex cinemas.	Any size of the project area.	EIA is more likely to be required. A particular consideration should be given to the potential significant impacts. A project would have significant urbanizing effects in a previously non-urbanized area.
(c) Construction of airfields	The development involves an extension to a runaway or the extension of the airport compound	New permanent airfields will normally require EIA as well as rehabilitation for the existing runaway and terminals.
(d) Construction of roads	Any size of the project including feeder roads.	EIA is more likely to be required for the new development as well as for the rehabilitation of the existing roads. In determining whether significant effects are likely, particular consideration should be given to the potential increase in traffic, emissions and noise
(e) Construction of harbors and port installations	Any size of the project including.	Primary impacts for consideration are those on hydrology, ecology noise and increased traffic. EIA is more likely to be required for the project in both small and large scale. The projects have significant effects which would extend beyond the high water mark or would affect wider coastal processes.
(f) Inland water way construction (canalization and flood-relief work)	Any size of the project	The likelihood of the significant impacts on the social, hydrology and ecology. EIA is more likely to be required for the project.
(g) Dams and other installations designed to hold water or store it on the long term basis	Any size of the project	In considering such development project, particular regard should be hold taken to the potential wider impacts on the hydrology and ecology as well as physical scale. EIA is likely to be required for any new dam
(h) Oil and gas pipe-line installations	Any size of the project	For the projects the major impacts to be considered will generally be the disruption to the surrounding ecosystems during construction and operation. The EIA is more likely to be required for the projects.

(i) Coastal work to combat erosion and maritime works capable of altering the coastal through the construction for example dykes, moles, jetties, other coastal projects.	All developments	The impacts of such projects will depend largely on the nature of the particular site and the likely wider impacts on natural coastal processes outside the site. EIA will be more likely for the projects.
(j) Waste water treatment plants	Any size of the project	Particular consideration should be given to the size, treatment
(k) Installation for the disposal of wastes such as incinerators, land-filling, large scale composting	The area of the development exceed 50m <sup>2</sup> or installation within any controlled natural waters	The likelihood of significant effects will generally depend on the scale of the development and the nature of the potential impact in terms of discharge, emissions and odours. Installations for the deposit, recovery, disposal of households and commercial wastes the EIA is more likely to be required where the capacity is created to hold more than 100 tons per month.
(l) Storage of scraps (iron, plastics, wood, tin materials)		
(m) Installations for the manufacture of the materials or artificial minerals		EIA is more likely to be required where the site is intended hold more than 50m <sup>2</sup> . Particular consideration should be given to discharged to the soil, site noise and traffic generation
(n) Installations for the recovery or destruction of explosive substances		
<b>Tourism development projects</b>		
(a) Holiday resort and hotels complexes and associated development projects	The area of the project exceeds 50m <sup>2</sup> of the floorspace and the area of nearshore and shallow water.	EIA is more likely to be required if the site is intended to hold an area 50m <sup>2</sup> . Particular consideration should be given to any visual or ecological impacts. In assessing whether significant impacts are likely, particular regards should be given to any wider impacts on natural coastal process in the site as well as outside the site. EIA is more likely to be required for marine activities (sea water site)
(b) Golf courses and associated development	The area of the project exceeds 50m <sup>2</sup> of the floorspace	Golf courses are likely to require EIA. The main impacts are likely to be those on the surrounding hydrology, ecosystem and landscape as well as those form traffic generations.

**ANNEX – III: SITE VERIFICATION CHECKLISTS**

# SITE VERIFICATION CHECKLISTS

## **A=Agriculture Check List**

Have you include 1:1000 map of the area and another map to show the general layout of the project plan with all associated buildings?

Below is a summary of items that should be included in the report:-

### **1) The Site:**

- How much land clearing will the project involve?
- Is the area near any forest reserves? If so, what measure will the proponent take to stop encroachment of those areas?
- If a mangrove area is to be cleared, what are the implications for the dependant eco-system? What mitigation measures will be put into practice?
- Has a base line study been conducted to assess soil and water conditions?

### **2) Soil impacts:**

- Which land clearing techniques will be used and when will the land clearing take place?
- Will any erosion take place and what will be the likely impacts on soil quality? What mitigation measures will be practiced?
- Is any soil compaction expected? What mechanization will be used? What mitigation measures will be used to reduce the negative impacts from soil compaction?
- What degrees of nutrients deficiency are expected and how will this be dealt with?
- Will any chemical pesticides and fertilizers be used? Have you stated the chemical contents of these and their impacts on soil and water quality?
- What monitoring will be carried to ensure the safe application and storage of such pesticides?
- How will the project affect soil acidity? How will this be dealt with?
- If irrigation measures are used, are there adequate draining facilities? Will there be any monitoring of the salinity of the irrigation water.

### **3) Impacts on water resources:**

- Have details of the conditions and availability of the water sources been outlined?
- Where will the irrigation water be obtained from?
- What measures will be taken to combat problems of salinity intrusion in swamp areas or coastal areas?
- How will agricultural fertilizers affect water quality?
- How will the agricultural fertilizers affect nearby fisheries and aquaculture project? Have you outlined what fishing activities there are in adjacent areas?

### **4) The spreading of pests and diseases**

- Are any new plants or varieties of plants to be introduced? Will any new seeds be introduced? What implications will this have on pest management?
- Will any integrated pest management be practiced?

**5) Impacts of the use of biotechnology:**

- What genetic materials, if any, will be lost? Are there any mitigation measures which could be used to prevent this?
- Will any genetically modified organisms be introduced?

**6) Impact on air and climate**

- Will there be any? How will they be avoided?

**7) Socio-economic impacts:**

- What is the land currently used for?
- What are the land use plans for this area?
- Where will labor for the project be obtained from?
- Will any housing and sanitary provisions be made for non-local workers?
- Has social -economic data for the villages concerned been compiled?

**8) Irrigation:**

- Is it certain that the extraction rate of ground water does not exceed the natural replenishment of the resources?
- Have the possibility of recirculation of water or water catchment been investigated and assessed during the project planning?
- Will extraction of water from surface sources cause a reduced water flow downstream with impacts on the ecology and utilization of the water course?
- What is the soils' capacity to retain humidity and is this reflected in the irrigation plan?
- What drainage facilities are being planned?
- Is there a risk that irrigation through canal systems will spread pollution from agriculture?
- Is the spread of water-related diseases assessed before implementation of the project?
- Is there a risk that irrigation canal can cause considerable erosion?
- Will management of the water resources in the irrigation system ensure the correct amount of water to the right time?

## **B=Hotel Check List**

Please consider each of the items in this check list when planning your investment. The environmental report should specifically all the issues in the following list.

### **1) The site**

- Have you clearly identifying the site that you have applying for and enclosed 1:10000 map of the area?
- Have you given a description of the site and supplied a sketch map showing its principal natural and manmade features.
- Have you made a sketch site plan, which can be compared with the sketch map?
  - ✓ Have you included sketches of the sample buildings to show the propose architectural style of the project?
  - ✓ Are the design, architectural style and material use harmonious with the natural environment and Zanzibar's traditional styles?
- Is the beach eroding, stable or growing?
  - ✓ Will all the development be behind the specified set back line?
- What measures will be taken to conserve the original vegetation at the site?
  - ✓ Will palm fringe be left undisturbed?
  - ✓ Will all mangroves be left undisturbed?
  - ✓ Are any exotic species to be introduced?
- What infrastructure will the project have to bring to the site before the operation can begin (Road, electricity)?

### **2) Existing uses of the site and nearby areas**

- Have you describe the existing use of the site and the nearby area?
- Have you consider how local users will be affected by the propose development?
- Have you describe measures that the project will take to minimize the potential negative impacts on local people?
- How the local residents benefit economically from the development?
  - ✓ What approach would you take to encourage good relation with the local communities?
  - ✓ Do you expect the development to increase or decrease local demand for the Natural resources such as fish, lobsters, shells, forest/bush?
  - ✓ Does the development leave open access to the beach, including access for the pedestrians/ cyclists along the front of the site at high tide?

### **3) Water Supply**

- What are the anticipated water needs of the development (per day or per year?)
  - ✓ In assessing the water needs have you included all employees' family and other peoples associated with the development?
- What will be the source of water?
  - ✓ Have this been approved by the ZAWA?

#### **4) Energy supply**

- What are the anticipated energy requirements of the projects?
  - ✓ In assessing the energy needs have you included all employees family and others stakeholders?
- What will be source of electricity or any other energy needs, e.g cooking fuel, LPG etc.
  - ✓ If any use of wood or charcoal is expected, what provision is being made to obtain it from plantation rather than to the natural bush or forest?
  - ✓ If any use of wood or charcoal is expected, what provision is being made to obtain it from plantation rather than to the natural bush or forest?
  - ✓ If generator will be used what measures you are taking to ensure that people not benefiting from electricity will be not disturb by the noise pollution.

#### **5) Sewage disposal**

- How will sewage be disposed of?
- Are there any environmental considerations that constrain the design of the system at this site?
  - ✓ If a swimming pool is proposed, how water is disposed of?

#### **6) Solid waste disposal**

- What provision will the project make for the disposal for solid waste?
  - ✓ Will organic waste be composited?
  - ✓ Will glass, tin, papers, plastics be separated?
- How will hazardous items e.g. batteries, oil, pharmaceutical items be dispose?

#### **7) Construction material**

- What construction material will be use?
  - ✓ Where will you obtain these materials?

#### **8) Tourism activities**

- What kinds of tourism activities are proposed?
  - ✓ Could any of the proposed activities have impact on the natural environment or disturb others tourist or residents?
  - ✓ What ensures would you take to ensure that your tourists help, rather than hinder, environmental conservation?

#### **9) Worker's accommodation**

- How many workers is the project anticipating to employ from within and outside the local Shehias respectively?
- What provision is to be made to house those coming from the outside the area?

#### **10) Voluntary support to the environmental protection**

- Do you plan to contribute directly (in-cash or in-kind) to environmental conservation activities, environmental research, monitoring or education?
- Will you encourage your tourist to contribute to environmental conservation, and if so, how?

- Do you intend to take any steps that may reduce local pressure on natural resources e.g. by improving local energy supplies or generating tourism base economic activities as an alternative to fishing or in-shore reefs?

# **C=Urban Development Check List**

## **1) The Site**

- Have you included 1:1000 map of the area, and another map to show the layout of structure to be included in the project?
- Will the project take other adequate consideration landscape, architecture and building tradition?
- Will the project be located to a landscape which is especially vulnerable for visual changes (for instance coastal zone, cultural landscape adjacent to the urban areas (urban fringes) or exposed hills and slopes?)

## **2) Impacts during construction**

- What measures will be taken to reduce any impacts created by destruction due to land clearance, excavation and use of heavy machinery.
- To what extent will any construction project base itself on locally available building materials?
- Where and how will build rubble etc. Be dispose of, and to what degree will recycling and reuse of the building material be undertaken?
- How will any temporal work camps be constructed and controlled?
- Are any potential social conflicts envisaged between the construction work force and the local communities?
- Will ant residents or squatters need to be relocated and if so what provisions (if any) have been made for compensations?

## **3) Impacts on natural resources**

### **Water**

- Have detail of the projected demand for water been included along with the current availability of water from local water sources?
- Will the project cause excessive utilization of water resources? Will for instance ground water be pumped up in such large quantities that the buildings, or contaminations of the ground water?
- What facilities will be provided for storm water capture? Will the storm water networks be independent of the sewage networks?

### **Soil**

- Have detail of current soil conditions been included? Are the urban development activities likely to exacerbate soil erosion problem?

### **Vegetation and wildlife**

- Does the project require large areas with the potential of substation encroachment of nature?
- Will the project affect especially vulnerable species and or/ecosystem?
- Will the project cause a fragmentation of animal habitats?
- Will the project remove large areas of vegetation changing the natural surface run-off of water (precipitation)?

- To which extent will exist vegetation is protected as part of a possible construction project?
- Will the project entail import of exotic vegetation species which may be ecologically doubtful?
- Will the project entail export of exotic vegetation species which may be ecologically doubtful?
- To which extent is existing vegetation and natural areas taken care of the project?

#### **4) Impact on existing infrastructure**

##### **Energy:**

- Will the proposed project require additional electricity supply via new power line etc.?
- Will the project create electromagnetic fields, or will be located to the areas containing such fields.
- Will the project lead increased the fuel wood depletion in adjacent areas?

#### **5) Potential pollution problems**

##### **Air**

- Is the urban area located at site subjected to the temperature inversions and limited atmospheric mixing with the result that emissions to the atmosphere may have considerable local impacts?
- Will the project contribute to the increase local warming or other negative climate impacts in urban areas?
- Will air pollution resulting from the project contribute to changes in the local climate?

##### **Water**

- Is the project area connected to an adequate sewage system?
- Could water pollution cause eutrophication, toxic impacts, temperature changes or accumulation in the food chains?

##### **Soil**

- Is there a possibility that the project might pollute the soil with heavy metal or toxic substances, either directly or through precipitation?

#### **6) Social economic impacts:**

- Is there a possibility that the project can cause land use conflicts in the fringe zone between rural and urban areas, for instance by locating the project or agricultural land or area identified for other natural resources utilization or recreation?
- Will the project cause social and ethnic conflicts?
- Will the projects visual expression (building, physical environment, etc) possibly cause negative reactions and impact mental well being?
- Will the project generate visual disturbances, noise, vibrations and/or pollution of air and water which may damage cultural heritage?

**Health Impacts:**

- Will project induced pollution of air, water and soil potentially cause injuries to health?
- Will water supply and drainage connected to any new or rehabilitated buildings are of sufficient quality?
- Will the project provoke natural hazard (landslides etc.), or be located to areas especially vulnerable to natural hazards?

**Benefits**

- Has the developer listed all the potential benefits of the project e.g., health, transport provision, up-grading degraded areas etc?

**7) Mitigation**

- Will any measures be implemented to reduce the negative impacts generated from the project?
- May it be relevant to consider denser development on existing developed sites, rather than developing new areas?

## **D=Aqua-culture Check List**

### **Will the project:**

#### **1. Introduction new species?**

- Does the project presuppose the introduction of farm organisms or live feed which do not exist in the area originally?
- Will any imported species (new and genetic variants) spread into the surroundings and bring about a change in natural composition of species and the natural productivity of the site?
- Could the new species carry bacteria, virus and parasites and spread diseases to other aquatic organisms?
- Is there sufficient control of the import of new species?

#### **2. Affect vulnerable and conservation-worthy ecosystems and/or plant and animal species?**

- Will the project, due to physical location, pollution or impacts on the composition of mangrove swamps, coral reefs or other vulnerable and conservation –worthy ecosystem?
- Will the farming activity supplant other commercially important, vulnerable or conservation-worthy plant and animal species?

#### **3. Affect valuable natural and cultural landscapes?**

- Will the project create considerable visual changes in the landscape so as to make it less attractive for recreation and tourism?
- Will historic remains, buildings and other land landscape elements that are important to the local population be affected by the project?

#### **4. Cause waste and pollution problems?**

- Will the farming activities as such, or a prospective processing plant, lead to discharges of organic matter and nutrients into water? Will the extent of this be so considerable that one can expect increased growth of unwanted algae and aquatic plants, changes in the occurrence of aquatic animals, de oxygenation in the bottom layers etc?
- Will offal from slaughtering or other processing be stored on shore or dumped into water? Is this likely to cause problems with smell and attracts animals and insects, or lead de oxygenation of the bottom layers?
- Will the farm organisms be treated with drugs (antibiotics etc.), antifoulants and chemical pesticides (fungicides etc.)? If so: Which types and what amounts? Could these drugs be spread into the environment?
- Will the farm itself be treated with chemicals?

#### **5. Spread diseases to humans**

- Will the farm organisms carry diseases or serve as intermediate hosts for parasites that infect humans

- Will the farms cause changes in the water and waterside environment (speed? of current, vegetation etc.) so as to increase the risk of spreading of water-borne diseases?
- Will the use of manure, latrine waste, sewage etc. in the production pose a health risk to those who handle or eat the farm produce?
- Is there sufficient control of the use of chemicals, and is the farm produce subjected to quality controls with respect to remnants of antibiotics and Chemical pesticides?

**6. Increase the water and energy requirements?**

- Have the seasonal supplies of high-quality water been assessed? Has ample water been supply been documented?
- Will the farming activity or prospective processing of the produce require such quantities of water that it interferes with the needs of other users?
- Will the prospective utilization of ground water lead to excessive salinity in the ground water and a lowered ground table?
- Is there a risk that the evaporation of the water will be so great that it leads to increased demand for water, or causes increased concentration of e.g. pollution in the water?
- Are there sufficient valuable forest and wood resources to allow greater production of smoked fish, and materials for the building of cages and enclosures?
- Will processing and transport in association with aquaculture development lead to an increased demand for oil and electricity?

**7. Change the local population ways of living and utilization of natural resources?**

- Does the local population, or the project's target group, have long traditions concerning aquaculture, or does aquaculture represent something quite new?
- Does the project represent an extensive or semi –intensive form of farming which is adaptable to local condition or an intensive form which the locals are not qualified to handle?
- Will changes in power structure, ways of living and utilization of natural resources indirectly increase the pressure on the total natural resource based in the area?
- Will the project alter the traditional division of labour between men and women?

**8. Create conflicts with existing land ownership and land use?**

- Has the target group for project title to land and water, or merely seasonal access to these resources?
- Will the project affect land which is utilised for the purposes of agriculture, forestry or animal husbandry?
- Will the project affect land which is utilized for the purposes of agriculture, forestry or animal husbandry?

**9. Affect the utilization of other natural resources and lands than those directly affected by the project?**

- Will the aquaculture project interfere with, or affect, already existing fisheries in the area?

- Will the project displace other activities into new areas so that the land and natural resources of the latter are over exploited?
- Will the transfer of other activities into other sites, or new areas, create conflicts with other population groups?
- Will the project activities in directly cause uncontrolled exploitation of other natural resources which have not been utilized before, or which have only been utilised to a slight degree?

Will the project led to the establishment of the activities, e.g. industry, transport, etc? To what extent will these

**ANNEX – IV: GUIDELINES FOR PREPARING AN INITIAL  
ENVIRONMENTAL REPORT (IER)**

**GUIDELINES FOR PREPARING  
INITIAL ENVIRONMENTAL REPORT (IER)**  
*(CONTENTS AND FORMAT)*

## **Schedule One: *General Guidelines***

### **Introduction**

IER is an important tool for incorporating environmental concerns at the project level. IER should be carried out as early as the project planning stage as part of feasibility thus it can assure that the project will be environmentally feasible. The general objectives of IER study should at least cover the following:-

- (i) to provide information about the general environmental settings of the project area as baseline data;
- (ii) to provide information on potential impacts of the project and the characteristic of the impacts, magnitude, distribution, who will be the affected group, and their duration; and
- (iii) to provide information on potential mitigation measures to minimize the impact including mitigation costs.

The IER is conducted for all projects or activities which are subjected to EIA process. IER will be used as a screening tool to determine whether the project/activity needs EIS or not.

### **Methodology**

IER will be prepared based on:-

- (i) this general guide document which shall be available for public consumption from the Department of Environment, Internet and other relevant institutions;
- (ii) specific guidelines of the respective type of project/activity; and
- (iii) field visits.

### **Key Important Activities in undertaking IER**

#### *1. Describing Environmental Condition of the Project Area*

Collection of baseline information on biophysical, social and economic aspects of the project area is the most important reference for conducting IER study. The description of environmental settings includes the characteristic of area in which the activity of proposed project would occur and it should cover area affected by all impacts including potential compensation area, and potential area affected by its alternatives. Normally, information is obtained from secondary sources when there is a facility of maintaining database, or other existing documentation, and

through field sampling. Collection of baseline data should be designed to satisfy information requirements and should focus on relevant aspects that are likely to be affected by the proposed project. Therefore, the level of detail in this description of study area should be sufficient to convey to readers nature of environmental and social resources condition of the affected areas.

## *2. Outlining Anticipated Potential Impact*

The "technical heart" of the environmental assessment process involves the prediction of changes over time in various environmental aspects as a result of a proposed project. The prediction of the nature, extent, and magnitude of environmental changes likely to result from a proposed project checklist which depends upon the sector of concern.

At this stage the practitioner should not go in detailed on impact assessment and does not need employment of sophisticated models and techniques of quantification and assessment. Checklist will be the basic tool at this stage to identify likely impacts. The identified impacts will be followed with short description to provide indicative significance and magnitude.

## *3. Proposing Mitigation Measures*

Once the impacts have been outlined and described whether they are acceptable, require mitigation, or are unacceptable. Subsequently, measures will be devised to mitigate anticipated environmental changes and consequential impacts during project implementation and operation, or further reduce the residual environmental changes inherent in the selected project design. They normally include technical, social, and institutional measures to be implemented as integral elements of the project. Examples are sound operating rules of a reservoir to ensure minimum impacts on downstream water users, and installation of an electrostatic precipitator to remove fly ash in a coal-fired power plant project, and adequate drainage system in an irrigation project.

## **Documenting IER Studies**

### *1. Initial Environmental Examination*

The content and format of the IER report is in Table 2. If the approved IER concludes that the project will not have any significant adverse environmental impacts, then the environmental assessment is deemed complete. If there are unresolved issues, the recommendation should be either that further studies be undertaken to resolve the issues, or that a full EIA is required. The outline for an IER is:-

- A. Introduction
- B. Description of the Project
- C. Description of the Environment
- D. Identification of Environmental Impacts and Mitigation Measures
- E. Proposal of Mitigation Measures
- F. Conclusions

#### *a. Introduction*

1. This section usually includes the following:

- (i) purpose of the report, including (a) identification of the project and project proponent; (b) brief description of the nature, size, and location of the project and of its importance to the country; and (c) any other pertinent background information; and
- (ii) Extent of the IER study: scope of study, magnitude of effort, person or agency performing the study, and acknowledgement.

***b. Description of the Project***

2. Furnish sufficient details to give a brief but clear picture of the following (include only applicable items):

- (i) type of project;
- (ii) category of Project;
- (iii) need for project;
- (iv) location (use maps showing general location, specific location, and project site);
- (v) size or magnitude of operation;
- (vi) proposed schedule for implementation; and
- (vii) descriptions of the project, including drawings showing project layout, and project components. This information should be of the same type and extent as is included in feasibility reports for proposed projects to give a clear picture of the project and its operations.

***c. Description of the Environment***

3. Furnish sufficient information to give a brief but clear picture of the existing environmental resources in the area affected by the project, including the following (to the extent applicable):

(i) Physical Resources: (e.g.)

- atmosphere (e.g. air quality and climate)
- topography and soils
- surface water
- groundwater
- geology/seismology.

(ii) Ecological Resources: (e.g.)

- fisheries
- aquatic biology
- wildlife
- forests
- rare or endangered species
- protected areas
- coastal resources

(iii) Economic Development: (e.g.)

- industries
- infrastructure facilities (e.g. water supply, sewerage, flood control)
- transportation (roads, harbors, airports, and navigation)
- land use (e.g. dedicated area uses)
- power sources and transmission
- agricultural development, mineral development, and tourism facilities

(iv) Social and Cultural Resources: (e.g.)

- population and communities (e.g. numbers, locations, composition, employment)
- health facilities
- education facilities
- socio-economic conditions (e.g. community structure, family structure, social well being)
- physical or cultural heritage
- current use of lands and resources for traditional purposes by Indigenous Peoples
- structures or sites that are of historical, archaeological, paleontological, or architectural significance.

#### ***d. Identification of Environmental Impacts and Mitigation Measures***

4. Using the checklist of environmental parameters for different sector projects, this section will screen out “no significant impacts” from those with significant adverse impact by reviewing each relevant parameter according to the following factors or operational stages. Mitigation measures, where appropriate, will also be recommended environmental problems due to project location, and related to project design, construction, and operations. Potential environmental enhancement measures and additional considerations will also be covered.

#### ***e. Conclusions***

This section will discuss the result of the IER and justification, if any, of the need for additional study of EIA or not.

#### ***2. Summary of Initial Environmental Report***

5. The summary of the IER report. It describes the significant findings of the IER report, and recommendations to manage them. The summary should be presented clearly and concisely as a stand-alone chapter. Outlined summary contents are:-

##### **A. Introduction**

This section will include the purpose of the report, extent of the IER study and brief description of any special techniques or methods used.

##### **B. Description of the Project**

This section will include the type of and need for the project; and project location, size or magnitude, operation, and proposed schedule for implementation.

### C. Description of the Environment

This section will include the physical and ecological resources, human and economic development, and quality of life values with respect to project/activity site.

### D. Forecasting Environmental Impacts and Mitigation Measures

This section will outline significant impacts and appropriate mitigation measures, where necessary.

### E. Conclusions

This section will discuss the result of the IER and justification if any of the need for additional study or EIA.

## **Schedule Two: *Specific Guidelines***



# **DEPARTMENT OF ENVIRONMENT**

## **GUIDELINES FOR PREPARATION OF INITIAL ENVIRONMENTAL REPORT**

**FOR**

**AGRICULTURAL PROJECTS**

**PREPARED BY;  
DEPARTMENT OF ENVIRONMENT  
ZANZIBAR**

**OCTOBER 2009**

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## **1.0 INTRODUCTION**

The Zanzibar National Environmental Policy and Environmental Management for Sustainable Development Act of 1996 were prepared for the purposes of promoting conservation and protection of the environment for present and future generation. These documents outline the needs for agriculture sector to comply with environmental norms of achieving environmental friendly project in the agricultural sectors. Therefore, this document is considered as a guideline for preparation of Initial Environmental Report (IER) for the agricultural project in Zanzibar. This document was prepared to full fill the requirement of the section 39 (1) of the Environmental Act and aim to facilitate EIA screening process for the agricultural projects.

## **2.0 OBJECTIVE**

The objective of the Initial Environmental Report (IER) is to assist the institution responsible for environment to determine the project whether have significant impact or not. This report is among tools to be used to facilitate Screening Process.

## **3.0 THE ISSUES TO BE CONSIDERED**

For better environmental and social consideration in the development of Agricultural development project (e.g. agro processing and large scale irrigation scheme) in Zanzibar ten (10) issues need to be considered in the preparation of the report. The guide line provides a measure of each farm's social and environmental performance and best management practices. The issues are as follows:

- i. Social and Environmental Management System.
- ii. Ecosystem Conservation.
- iii. Wildlife Protection.
- iv. Water Conservation.
- v. Fair Treatment and Good Working Conditions for Workers.
- vi. Occupational Health and Safety.
- vii. Community Relations.
- viii. Integrated Crop Management.
- ix. Soil Management and Conservation.
- x. Integrated Waste Management.

### **i. Social and Environmental Management System**

There is necessity to examine carefully both social and environmental implications in the development of agricultural projects/activities. Whenever there will be heavy investment, social issues should be examined properly on how the communities shall be benefited without any destruction. Similarly, environmental management plans need to be addressed to oversee that the sustainable development notion is obtained.

### **ii. Ecosystem Conservation**

Natural habitat/ecosystems in various land compartments are required to be examined and determine the damage and cost – benefit which may occur and means of restoring the damaged environment. Special attention is required to understand the food web as well as the food chain during the planning stage of developing agricultural projects.

### **iii. Wildlife Protection**

Species diversity and its implications in agriculture projects should be properly examined. If there is any wildlife of significant importance, proper measures should be drawn for their existence and regenerating and restoration of the ecosystem ought to be clearly indicated. The farm should also carry out special programs and activities for regenerating and restoring ecosystems that are important to wildlife. At the same time, the farms, their owners and employees take measures to reduce and eventually eliminate the number of animals in captivity, despite traditional practices of keeping wildlife as pets in many regions of the world.

### **iv. Water Conservation**

Water is vital for agriculture and human existence. Farms must conduct activities to conserve water and avoid wasting of this resource. Farms must prevent contamination of surface and underground water by treating and monitoring wastewater. The Sustainable Agriculture Standard includes measures for preventing surface water contamination caused by the run-off of chemicals or sediments. Farms that do not have such measures must be able to guarantee that they are not degrading water resources through the implementation of a surface water monitoring and analysis program, until it has complied with the stipulated preventative actions.

**v. Fair Treatment and Good Working Conditions for Workers**

Assurance should be made by all employees working on certified farms, and the families that live on these farms, benefit from the rights and conditions established in the United Nations' *Universal Declaration of Human Rights* and *Children's Rights Convention*, and in the International Labour Organization's (ILO) conventions and recommendations. Farms pay salaries and benefits equal or more than the legal minimum, and the workweek and working hours must not exceed the legal maximums or those established by the ILO. Workers may organize and associate freely, especially for negotiating working conditions. Certified farms do not discriminate and do not use forced or child labor; to the contrary, these farms work hard to offer employment opportunities and education to people in neighboring communities. Housing provided by certified farms is in good condition, and has potable water, sanitary facilities and domestic waste collection. Families living on certified farms have access to medical services and the children have access to education.

**vi. Occupational Health And Safety**

All certified farms must have an occupational health and safety program to reduce or prevent the risk of accidents in the workplace. All workers receive training on how to do their work safely, especially regarding the application of agrochemicals. Certified farms provide the necessary equipment to protect workers and guarantee that the tools, infrastructure, machinery and all equipment used on the farms is in good condition and does not pose a danger to human health or the environment. Measures are taken on these farms to avoid the effects of agrochemicals on workers, neighbours and visitors. Certified farms identify potential emergencies and are prepared with plans and equipment to respond to any event or incident, as well as to minimize the possible impacts on workers and the environment.

**vii. Community Relations**

Good neighbourhood should be formulated between certified farms and the community. The farm will be requiring notifying the surrounding communities the changes and modification of the farm and its anticipated outcomes. Good relationship should be drawn between the farm and the developer.

### **viii. Integrated Crop Management**

The Sustainable Agriculture Network encourages the elimination of chemical products known internationally, regionally and nationally for their negative impacts on human health and natural resources. Certified farms contribute to the elimination of these products through integrated crop management to reduce the risk of pest infestations. They also record the use of agrochemicals to register the amounts consumed, and work to reduce and eliminate these products, especially the most toxic ones. To minimize the excessive application and waste of agrochemicals, certified farms have the procedures and equipment for mixing these products and for maintaining and calibrating application equipment. Certified farms do not use products that are not registered for use in their country, nor do they use transgenic organisms or other products prohibited by different entities or national and international agreements.

### **ix. Soil Management And Conservation**

One of the objectives of sustainable agriculture is the long-term improvement of the soils that supports agricultural production. Certified farms carry out activities that prevent or control erosion, and thus reduce the loss of nutrients and the negative impacts on water bodies. The farms have fertilization programs based on the crop requirements and soil characteristics. The use of vegetative ground cover and crop rotation reduces dependency on agrochemicals for the control of pests and weeds. Certified farms only establish new production areas on land that is suitable for agriculture and the new crops, and never by cutting forests.

### **x. Integrated Waste Management**

Certified farms are clean and orderly. Farm workers and residents cooperate with maintaining the farm clean and are proud of the farm's image. There are programs for managing waste according to its type and quantity, through recycling and waste reduction and reuse. The final destination of waste on the farm is administered and designed to minimize possible environmental and human health impacts. Certified farms have evaluated the transportation and treatment services supplied by contractors and know the final destination of the waste generated on the farm.

#### **4.0 FORMAT OF THE REPORT**

The elements necessary for inclusion in the Initial Environmental Report of the agricultural project are as follows:-

- Name or title of proposal
- Name and address of the Proponent
- The nature of the activity
- The activity to be undertaken including a description of the production process where applicable
- Proposed location (size of site, description, current uses, use of adjacent areas)
- Quantity of raw materials and other input required, including water requirement and chemicals to be used
- The number of people to be employed
- Identification of impacts
- Proposed mitigation measures
- Any other matters as may be described

## **ENVIRONMENTAL CHECKLIST**

The Environmental Checklist for the development of Initial Environmental Report for Development of Agricultural Project is:

### **4.0 PARTICULARS OF PROPONENT**

- i. Full Name of Proponent
- ii. Address for correspondence
- iii. Full address and contact person
- iv. Name of Shareholders

### **5.0 PROPOSED PROJECT/ACTIVITY:**

- i. Title of Project
- ii. Type of Project
- iii. Description of Project (nature of project/activity, unit processes [flow diagram], raw materials list of chemicals {source, types a quantities}, storage facilities, wastes/by-products {solid, liquid and gaseous).
- iv. Scope of Project/Activity (size of labour force, equipment and machinery, installed/production capacity, product type, area covered facility/proposal, market)

### **6.0 THE SITE DESCRIPTION**

- i. How much land clearing will the project involve?
- ii. Is the area near any protected area (forest reserve, water reserve etc)? If so, what measure will the proponent take to stop encroachment of those areas?
- iii. If a mangrove area is to be cleared, what are the implications for the dependant ecosystems? What mitigation measures will be put into practice?
- iv. What will be the impact of wild life populations?
- v. Has a base line study been conducted to assess soil and water conditions?
- vi. Size of the site
- vii. Existing land use and future
- viii. Site description (Biological, physical and cultural)
- ix. Size of the Project area

## **7.0 SOIL IMPACT**

- i. Which land clearing techniques will be used and when will the land clearing take place?
- ii. Will any erosion take place and what will be the likely impacts on soil quality? What mitigation measures will be practiced?
- iii. Is any soil compaction expected? What mechanization will be used? What mitigation measures will be used to reduce the negative impacts from soil compaction?
- iv. What degrees of nutrients deficiency are expected and how will this be dealt with?
- v. Will any chemical pesticides and fertilizers be used? Have you stated the chemical contents of these and their impacts on soil and water quality?
- vi. What monitoring will be carried to ensure the safe application and storage of such pesticides?
- vii. How will the project affect soil acidity? How will this be dealt with?
- viii. If irrigation measures are used, are there adequate draining facilities? Will there be any monitoring of the salinity of the irrigation water?

## **8.0 IMPACTS ON WATER RESOURCES**

- i. Have details of the conditions and availability of the water sources been outlined?
- ii. Where will the irrigation water be obtained from?
- iii. What measures will be taken to combat problems of salinity intrusion in swamp areas or coastal areas?
- iv. How will agricultural fertilizers affect water quality?
- v. How will the agricultural fertilizers affect nearby fisheries and aquaculture project? Have you outlined what fishing activities there are in adjacent areas?

## **9.0 THE SPREADING OF PESTS AND DISEASES**

- i. Are any new plants or varieties of plants to be introduced? Will any new seeds be introduced? What implications will this have on pest management?
- ii. Will any integrated pest management be practised?

## **10.0 IMPACTS OF THE USE OF BIOTECHNOLOGY**

- i. What genetic materials, if any, will be lost? Are there any mitigation measures which could be used to prevent this?
- ii. Will any genetically modified organisms be introduced?

#### **11.0 IMPACT ON AIR AND CLIMATE**

- i. Will there be any? How will they be avoided?

#### **12.0 SOCIAL ECONOMIC IMPACTS**

- i. What is the land currently used for?
- ii. What are the land use plans for this area?
- iii. Where will labor for the project be obtained from?
- iv. Will any housing and sanitary provisions be made for non-local workers?
- v. Has social -economic data for the villages concerned been compiled?

#### **10.0 IRRIGATION:**

- i. Is it certain that the extraction rate of ground water does not exceed the natural replenishment of the resources?
- ii. Have the possibility of recirculation of water or water catchment been investigated and assessed during the project planning?
- iii. Will extraction of water from surface sources cause a reduced water flow downstream with impacts on the ecology and utilization of the water course?
- iv. What is the soils' capacity to retain humidity and is this reflected in the irrigation plan?
- v. What drainage facilities are being planned?
- vi. Is there a risk that irrigation through canal systems will spread pollution from agriculture?
- vii. Is the spread of water-related diseases assessed before implementation of the project?
- viii. Is there a risk that irrigation canal can cause considerable erosion?
- ix. Will management of the water resources in the irrigation system ensure the correct amount of water to the right time?



**DEPARTMENT OF ENVIRONMENT**

**GUIDELINES FOR PREPARATION OF INITIAL ENVIRONMENTAL REPORT**

**FOR**

**HOTEL DEVELOPMENT PROJECTS**

**PREPARED BY;  
DEPARTMENT OF ENVIRONMENT  
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**OCTOBER 2009**

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## **1.0 INTRODUCTION**

The Policy of the Zanzibar Government is to encourage high class tourism in the Islands. It is now widely recognised that one important prerequisite for such high class tourisms is an unspoilt natural environment. At the moment Zanzibar can proudly boast of a beautiful natural environment, particularly in the areas designated as tourism areas and is Zanzibar experiences linear increase in number of visitors who mostly enjoying the spice tour. This sector employs more than 45,000 people and is likely to surpass agriculture as Zanzibar's leading revenue earner by the year 2015 (Commission for Tourism, 2005).

Increasing environmental and social threats from tourism activities create a great concern for the integrity of the coastal zone ecosystems as they create pressure on water resources, nature, landscape, air quality, coastal areas, natural and landscape values that are fragile assets. Moreover, tourism activities could destroy the cultural values of the local community if the business is not operated in a compatible manner with the culture of the local community. Furthermore, if environmental considerations are fully incorporated into the design of hotel projects from the outset, then undesirable and costly environmental problems can be avoided later. In addition, it is recognised that in some areas the development of the tourist industry can be a positive force for encouraging greater protection of the environment. This will be for the benefit not only of the tourists themselves, but also for the people of Zanzibar. Therefore, this document serves as a guiding document for preparation of Initial Environmental Report (IER) on hotel development project in the entire area of Zanzibar. The IER aim to facilitate EIA Screening process as mentioned on section 39 (1) of the Environmental Act.

## **2.0 OBJECTIVE**

The Initial Environmental Report (IER) will be used as yardstick to determine whether the applied project has adverse environmental impacts or not at the initial stage of the project. The IER shall be used as a tool to lead to direct better means of conducting screening process.

## **3.0 THE ISSUES TO BE CONSIDERED**

The social and environmental issues that could be considered for development of sustainable hotels in Zanzibar are:

- i. Loss of flora and fauna
- ii. Impact of collection of construction materials
- iii. Noise pollution
- iv. Impact of attracting illegal business
- v. Increase of solid waste
- vi. Increase pressure on water demand
- vii. Sewage pollution
- viii. Problem of water from swimming pools
- x. Destruction of coral reefs due to anchoring and mooring
- xi. Fire risks
- xii. Pollution from oil spillage
- xiii. Increase coastal erosion
- ix. Social conflict

**i. Loss of Flora and Fauna**

This is mainly occurring during the clearance of the site of the hotel. Usually clearance of the site will be definitely associated with loss of the existing vegetation which is important habitats of various species of flora and fauna including grasses, insects, birds, amphibians and butterflies.

**ii. Collection of construction materials**

Different type of construction materials will be needed during construction phases of the hotel project. The materials are in form of aggregates, sand, stones and soil for gardening. The volume of these materials is normally depends on the size and magnitude of the hotel but indiscriminate collection may cause adverse environmental impacts. There is a need to examine this issue in profound manner so as to lead in wise use of the natural resources.

**iii. Noise Pollution**

Any unwanted man-made sound that penetrates the environment is noise pollution. In relation to the development of hotel, noise pollution can be generated through the use of heavy machine and

engines of vehicles and other construction work. The IER will be required to draw measures to overcome noise pollution.

**iv. Illegal business**

It has been observed in many places whereby construction activity is taking place; illegal petty business is wide spread, especially the food sellers (Mama and Baba Lishe). Therefore, construction of hotel project will automatically attract the Mama and Baba Lishe and other form of petty business. This is social issue, which will be required to be addressed on the IER.

**v. Solid waste management**

Generally, amount and composition of solid waste generated is a function of many factors. Among the factor contributes to the solid waste generation is the life standards, which is directly proportional to the amount of solid waste generated. More often tourism hotels provide higher level of the life standard and therefore lead to generation of significant amount of waste with mixed composition. Presently, many part of Zanzibar is experiencing mismanagement of solid waste in various areas whereas tourism hotel have been developed. This brings about deterioration of the aesthetic value of the environment in one side and risk of human health in other side.

**vi. Pressure on water demand**

Water is a vital resource that will be needed during construction and operation period of hotel project. The amount of water required by the hotel project in all development phases is enough to increase pressure on water demand to the community from the project area. Therefore special consideration should be taken to avoid conflict with community regarding with water supply.

**ix. Sewage pollution**

It is normally considered that 80% of the total water consumption is discharged as sewage. By considering that, hotel projects accommodate many visitors, which could result a adverse significant impacts on environment. The amount of sewage generated in the hotel projects is enough to create pollution and other environmental and public health problems if it will not properly managed.

**xiv. Problem of water from swimming pools**

Water in the swimming pools usually added with disinfectant to destroy microorganisms and algae. Careless disposal of disinfected swimming pool water has an adverse effect on coral reefs and other aquatic organism. Care therefore needs to be taken to ensure that there will be no spillage of water from swimming pools into marine environment.

**xv. Destruction of coral reefs due to anchoring and mooring**

Diving and sports fishing is among facilities incorporated in the hotel projects. Experience has shown that boat mooring can cause a lot of marine environment degradation especially coral reefs if no proper allocation mooring site. Therefore proper allocation of site for boat mooring should be considered in the running of the project.

**xvi. Fire risks**

Fire from any sources can damage and destroy the project properties at any time. Fire is a serious problem that needs proper consideration during planning stage of the project.

**xvii. Pollution from oil spillage**

The main source of oil spill in the hotel project is standby generator, incinerator and boat engine. Generally, oil is great threat to marine and terrestrial environment. Oil has low relative density compared to seawater that makes it to floats on the water surface. Furthermore oil on the water surface act as an obstacle, which hinder oxygen transfer between air-water interfaces. The situation affect dissolved oxygen content in the aquatic environment and upset the aquatic ecosystems. Normally sea birds are highly vulnerable to oil spill due to their tendency of catching fishes and lies on the water surface. Similarly oil spill can pollute soil and land and further to ground and stream water on the land. Therefore care should be taken to avoid all consequences of oil spill in the running of this project.

**xviii. Increase coastal erosion**

Coastal erosion in Zanzibar is mainly accelerated by loss of vegetation, creeping of topsoil and surface strata and loss of the nutrient status of the land. This is mainly due to human activities

for trapping off the resources irrationally. On the other hand beach erosion is commonly the results of fixed structures such as hotels on beach and dunes.

#### **4.0 FORMAT OF THE REPORT**

The elements necessary for inclusion in the Initial Environmental Report would therefore be:-

- Name or title of proposal
- Name and address of the Proponent
- The nature of the activity
- The activity to be undertaken including a description of the production process where applicable
- Proposed location (size of site, description, current uses, use of adjacent areas)
- Quantity of raw materials and other input required, including water requirement and chemicals to be used
- The number of people to be employed
- Identification of impacts
- Proposed mitigations
- Any other matters as may be described

## ENVIRONMENTAL CHECKLIST

Environmental Checklist for writing an Initial Environmental Report for hotel development in Zanzibar is as follows.

### 1) The site

- Have you clearly identifying the site that you have applying for and enclosed 1:10000 map of the area?
- Have you given a description of the site and supplied a sketch map showing its principal natural and manmade features.
- Have you made a sketch site plan, which can be compared with the sketch map?
  - ✓ Have you included sketches of the sample buildings to show the propose architectural style of the project?
  - ✓ Are the design, architectural style and material use harmonious with the natural environment and Zanzibar's traditional styles?
- Is the beach eroding, stable or growing?
  - ✓ Will all the development be behind the specified set back line?
- What measures will be taken to conserve the original vegetation at the site?
  - ✓ Will palm fringe be left undisturbed?
  - ✓ Will all mangroves be left undisturbed?
  - ✓ Are any exotic species to be introduced?
- What infrastructure will the project have to bring to the site before the operation can begin (Road, electricity)?

### 2) Existing uses of the site and nearby areas

- Have you describe the existing use of the site and the nearby area?
- Have you consider how local users will be affected by the propose development?
- Have you describe measures that the project will take to minimize the potential negative impacts on local people?
- How the local residents benefit economically from the development?
  - What approach would you take to encourage good relation with the local communities?
  - Do you expect the development to increase or decrease local demand for the Natural resources such as fish, lobsters, shells, forest/bush?
  - Does the development leave open access to the beach, including access for the pedestrians/ cyclists along the front of the site at high tide?

### 3) Water Supply

- What are the anticipated water needs of the development (per day or per year?)
  - In assessing the water needs have you included all employees' family and other peoples associated with the development?
- What will be the source of water?
  - Have this been approved by the ZAWA?

### 4) Energy supply

- What are the anticipated energy requirements of the projects?
  - ✓ In assessing the energy needs have you included all employees family and others stakeholders?
- What will be source of electricity or any other energy needs, e.g cooking fuel, LPG etc.
  - ✓ If any use of wood or charcoal is expected, what provision is being made to obtain it from plantation rather than to the natural bush or forest?
  - ✓ If any use of wood or charcoal is expected, what provision is being made to obtain it from plantation rather than to the natural bush or forest?
  - ✓ If generator will be used what measures you are taking to ensure that people not benefiting from electricity will be not disturb by the noise pollution.

#### **5) Sewage disposal**

- How will sewage be disposed of?
- Are there any environmental considerations that constrain the design of the system at this site?
  - If a swimming pool is proposed, how water is disposed of?

#### **6) Solid waste disposal**

- What provision will the project make for the disposal for solid waste?
  - Will organic waste be composited?
  - Will glass, tin, papers, plastics be separated?
- How will hazardous items e.g. batteries, oil, pharmaceutical items be dispose?

#### **7) Construction material**

- What construction material will be use?
  - ✓ Where will you obtain these materials?

#### **8) Tourism activities**

- What kinds of tourism activities are proposed?
  - ✓ Could any of the proposed activities have impact on the natural environment or disturb others tourist or residents?
  - ✓ What ensures would you take to ensure that your tourists help, rather than hinder, environmental conservation?

#### **9) Worker's accommodation**

- How many workers is the project anticipating to employ from within and outside the local Shehias respectively?
- What provision is to be made to house those coming from the outside the area?

#### **10) Voluntary support to the environmental protection**

- Do you plant to contribute directly (in-cash or in-kind) to environmental conservation activities, environmental research, monitoring or education?
- Will you encourage your tourist to contribute to environmental conservation, and if so, how?

- Do you intend to take any steps that may reduce local pressure on natural resources e.g. by improving local energy supplies or generating tourism base economic activities as an alternative to fishing or in-shore reefs?



**DEPARTMENT OF ENVIRONMENT**

**GUIDELINES FOR PREPARATION OF INITIAL ENVIRONMENTAL REPORT**

**FOR**

**AQUACULTURE PROJECT**

**PREPARED BY;  
DEPARTMENT OF ENVIRONMENT  
ZANZIBAR**

**OCTOBER 2009**

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## **1.0 INTRODUCTION**

Aquaculture entails controlled farming or cultivation of organisms in salt, brackish or fresh water for the purpose of food production. Aquaculture produce is also put to good use in other connections, e.g. pharmaceutical or cosmetic industries. This initial environmental assessment covers aquaculture projects consisting of farming/cultivation and harvesting of fish, shellfish, mollusks (shells, snails) or seaweeds. The aquaculture farm as such, a project may include facilities for the production of fry and feed. Some aquaculture projects may also require facilities for the processing and distribution of the aquaculture productions. These can be separate projects or sub-projects of a major Aquacultural investment. Aquacultural investment may also entail measures in terms of training, research, legislation, consulting, marketing, administration and establishment of institutions.

The choice of technology, scale and intensity of cultivation will vary a great deal, and will be decisive for the environmental and socio – cultural impacts of aquaculture. Aquaculture projects may vary as to stocking of organisms, preparation of the production areas and the degree of feeding, fertilization and medication. The farm organisms can be restocked at different stages of development. For example, they may be wild fry which have been collected for further cultivation. In other cases the fry are farm – cultivated. Preparing the production areas may involve making enclosures in bays, lagoons, lakes, ponds or man – made ponds/reservoirs, the building of artificial embankments and basins, and the use of cages. A cage is an open, free floating net attached to a frame-work for use in both freshwater and salt – water environment.

It is common to distinguish between extensive, semi – intensive and intensive production, depending on the degree of feeding and fertilization in the farms. Extensive farming involves no feeding and no, or minimal, fertilization, semi – intensive some supplementary feeding and fertilization, and intensive steady supply of feed and fertilizers.

## **2.0 POSSIBLE ENVIRONMENTAL IMPACTS**

The possible environmental impacts associated with aquaculture project are:

- i. Introduction of new species
- ii. Impacts on the ecosystem, and the natural and cultural landscape

- iii. Pollution and waste disposal
- iv. Spreading of diseases to humans
- v. Increased demand for water and energy
- vi. Impact on traditional ways of life and utilization of natural resources
- vii. Impacts of new activities, and already existing activities

**i. Introduction of new species**

In some cases it may be desirable to farm species that do not naturally exist in the project area. Should faults occur, however, or should the farm be wrecked, this may cause new species to be spread into the environment. There will a concern that imported organisms may replace local and genetically better adapted fish stocks and variants. Further, there is also a risk of genetic changes in naturally existing fish.

Another impact which is often associated with the spreading of new species is the spreading of fish diseases. New species or farm organisms, which have been collected from other geographical areas, may carry bacteria, viruses and parasites which then spread and cause disease.

**ii. Impacts on the ecosystem, and the natural and cultural landscape**

Technical installations, cutting down of mangroves and other forests, digging, pollution, spreading of new species and spreading of fish diseases may, alone or combined, cause such drastic environmental impacts that the original ecosystems are changed. This can affect other forms of economic exploitation of these areas and in some cases may cause or accelerate erosion. The visual character of the natural and cultural landscape may alter so that it becomes less attractive for recreation and tourism. Historic remains, buildings and other landscape elements that are important to the local population can also be affected. In order to reduce the impacts on the landscape, one ought to make values of landscape part of the planning progress with respect to mitigative and reconstructive measures.

**iii. Pollution and waste disposal**

In farm directly connected to sea or water course, artificial feeding or supply of fertilizer or organic matter can lead to eutrophication in the water body. Excessive fertilization of fresh water can cause growth of algae and other aquatic plants, which makes the water unsuitable as drinking water. Furthermore, this may hinder fishing and boat transport in the case of large water bodies. In cases of great stress periodically or constant deoxygenation in the bottom layers may result, bringing damage to the flora and fauna, and problems with smell. This type of pollution can endanger the productivity of aquaculture farms if the polluted water body is also utilized for this purpose.

With regard to salt water, it is important to consider what impacts the supply of nutrients will have on vulnerable ecosystems and on the possibility of producing other valuable species of fish, shell-fish and molluscs. In addition to the risk of eutrophication due to feeding and supply of nutrients, faeces from farm organisms are a potential pollutant. Pollution problems can also arise in connection with handling, storage and transport of fish and other farm produce. Concentrated handling and processing can create waste problems.

#### **iv. Spreading of diseases to humans**

If the project involves the building of artificial ponds and canal systems, this may create improved conditions for the propagation and spreading of water – borne diseases. Stagnant waters can create favorable conditions for the propagation of bilharzias and malaria. The use of chemical pesticides should be considered against the potential risk for humans. Use of antibiotics must be under control so that remnants in the farm produce are avoided.

#### **v. Increased demand for water and energy**

Freshwater farming of fish or other organisms requires stable supplies of high – quality water, which is often scarce. With respect to projects that require large amounts of water, one should make a survey of water sources and estimate the water supply. In case of permanent or periodical scarcity of water, conflicting demands may arise between aquaculture and irrigation or supply of drinking water. An aquaculture project may lead to competition for scarce water and fuel resources. On the other hand, the project may lead to improved water and fuel supplies in an area in which such supplies were originally insufficient. This can bring about improved living

conditions for large groups of people. However, the use of water can also have environmental impacts which need to be assessed.

**vi. Impact on traditional ways of life and utilization of natural resources**

Aquaculture projects may create changes in traditional ways of life and utilization of natural resources. Basically, aquaculture projects can range from small – scale farming carried out by locals in the countryside to intensive farming. Aquaculture can create conflicts with the local population's use of land, water and other natural resources. Areas utilized for the purposes of agriculture, forestry or animal husbandry can be affected. On the other hand, aquaculture farms can lead to local migrations causing potential land – use conflicts and increased pressure on the natural resources.

**vii. Impacts of new activities, and already existing activities**

Investments in aquaculture can initiate the development of other activities such as industry, transport, water supply etc. Such developments can indirectly lead to environment impacts which should be assessed.

### **3.0 REQUIREMENT FOR INITIAL ASSESSMENT OF AQUACULTURE PROJECTS**

#### **3.1 Project Description**

As a base for initial assessment, a description of the project/activity must be available. In most cases it will be relevant to present several alternatives technical solutions and localities. Activities in both the constructions phase and operational phase must be included. This description will to a certain extent be based on the regular technical and economic description of the project. The following questions are meant to elicit information that is relevant with regard to environmental impacts. Relatively detailed information may be required as regard production processes, use of input, locality, etc. If such information is already documented, redocumentation is not necessary.

The information resulting on the initial assessment can be included in project document before it is presented for approval. In the case of more comprehensive projects, the information may be

collected in an appendix to the project document. The following specifies essential back ground information for initial assessment. This information should be normally being included in a complete project document:

- a. ***The need for the project.*** Give a brief description of how the need for the project has arisen. What is the purpose of the production? Who will benefit from the project? What other activities are likely to emerge as result of the aquaculture project?
- b. ***Alternatives considered.*** Give a brief presentation of technical alternatives and localization alternative which have been considered in connection with the project. If possible, give a brief account of any differences in technology, water, and energy requirements, infrastructure requirements, etc.
- c. ***Description of the project and potential main alternatives.*** Give a relatively comprehensive description of the alternative(s) that are viewed as relevant. The description should include examples, mapping of technical constructions, areas utilized directly and what type of areas these are. Which form of farming (extensive, semi extensive, intensive) and which farm organism(s) are relevant?
- d. **Conditions for project implementation.** Give a brief account of the public and private physical initiatives ( infrastructure, etc) and any other external prerequisites for the implementation of the project, e.g. Local institutional and administrative conditions, including environmental competence

### **3.2 Description of the Environment**

Give a brief description of the natural and man-made surroundings in which the project is to be located. Where appropriate the information should be presented as topical charts and illustrations. Sources as well as the reliability of the presented information should be indicated brief the description should contain an account of:

- The climatic, geological and soil conditions in the area.
- The hydrological conditions in the area .the characteristics of the water sources affected.
- Vulnerable and /or conservation –worthy animal species, plants species and ecosystem in the affected area.

- Unique natural or cultural areas or objects of historic, archaeological, cultural, aesthetic or scientific values.
- Main aspects of the existing utilization of areas and natural resources in the affected regions, including extensive utilization of natural areas.
- Demographic aspects, such as size and composition of affected population groups and any existing ethnic diversity etc.
- The settlement pattern and means of production, specified for each ethnic group, class, and caste where relevant. Division of labour organized on the basis of gender and age within these groups.
- The health situation with emphasis of environmentally related diseases.
- Any existing or planned activities that may hold consequences for aquaculture.

### 3.3 Checklist

The aspects included in the following checklist must be commented on. In case the problem is irrelevant this must be substantiated .if the listed effects can be expected their extent or degree should be estimated.

It is necessary to specify which group of the population will be affected by the different types of direct or in direct environmental impacts. A rough division could be as follows:

- ***The project's target group.*** This is the group of the population which one expects will benefit directly from the projects. This group may, however, also be subject to certain negative environmental impacts.
- ***The remaining local population.*** This group will not benefit from the project in any primary way, but the project may still both negative and positive consequences for them.
- ***Resettled population groups.*** These are groups of the population who either settle in the area or move away from it as a result of the project or the development initiated by it.

Within these groups it may also be relevant to specify if the environmental impacts from the project can be related to specific parts of the population, such as low-income groups, indigenous groups etc. combined with a further specification of gender and age within these groups.

**Will the project:**

## **2. Introduction new species?**

- Does the project presuppose the introduction of farm organisms or live feed which do not exist in the area originally?
- Will any imported species (new and genetic variants) spread into the surroundings and bring about a change in natural composition of species and the natural productivity of the site?
- Could the new species carry bacteria, virus and parasites and spread diseases to other aquatic organisms?
- Is there sufficient control of the import of new species?

## **2. Affect vulnerable and conservation-worthy ecosystems and/or plant and animal species?**

- Will the project, due to physical location, pollution or impacts on the composition of mangrove swamps, coral reefs or other vulnerable and conservation –worthy ecosystem?
- Will the farming activity supplant other commercially important, vulnerable or conservation-worthy plant and animal species?

## **3. Affect valuable natural and cultural landscapes?**

- Will the project create considerable visual changes in the landscape so as to make it less attractive for recreation and tourism?
- Will historic remains, buildings and other land landscape elements that are important to the local population be affected by the project?

## **4. Cause waste and pollution problems?**

- Will the farming activities as such, or a prospective processing plant, lead to discharges of organic matter and nutrients into water? Will the extent of this be so considerable that one can expect increased growth of unwanted algae and aquatic plants, changes in the occurrence of aquatic animals, de oxygenation in the bottom layers etc?

- Will offal from slaughtering or other processing be stored on shore or dumped into water? Is this likely to cause problems with smell and attracts animals and insects, or lead de oxygenation of the bottom layers?
- Will the farm organisms be treated with drugs (antibiotics etc.), antifoulants and chemical pesticides (fungicides etc.)? If so: Which types and what amounts? Could these drugs be spread into the environment?
- Will the farm itself be treated with chemicals?

#### **5. Spread diseases to humans**

- Will the farm organisms carry diseases or serve as intermediate hosts for parasites that infect humans
- Will the farms cause changes in the water and waterside environment (speed? of current, vegetation etc.) so as to increase the risk of spreading of water-borne diseases?
- Will the use of manure, latrine waste, sewage etc. in the production pose a health risk to those who handle or eat the farm produce?
- Is there sufficient control of the use of chemicals, and is the farm produce subjected to quality controls with respect to remnants of antibiotics and Chemical pesticides?

#### **6. Increase the water and energy requirements?**

- Have the seasonal supplies of high-quality water been assessed? Has ample water been supply been documented?
- Will the farming activity or prospective processing of the produce require such quantities of water that it interferes with the needs of other users?
- Will the prospective utilization of ground water lead to excessive salinity in the ground water and a lowered ground table?
- Is there a risk that the evaporation of the water will be so great that it leads to increased demand for water, or causes increased concentration of e.g. pollution in the water?
- Are there sufficient valuable forest and wood resources to allow greater production of smoked fish, and materials for the building of cages and enclosures?

- Will processing and transport in association with aquaculture development lead to an increased demand for oil and electricity?

**7. Change the local population ways of living and utilization of natural resources?**

- Does the local population, or the project's target group, have long traditions concerning aquaculture, or does aquaculture represent something quite new?
- Does the project represent an extensive or semi –intensive form of farming which is adaptable to local condition or an intensive form which the locals are not qualified to handle?
- Will changes in power structure, ways of living and utilization of natural resources indirectly increase the pressure on the total natural resource based in the area?
- Will the project alter the traditional division of labour between men and women?

**8. Create conflicts with existing land ownership and land use?**

- Has the target group for project title to land and water, or merely seasonal access to these resources?
- Will the project affect land which is utilised for the purposes of agriculture, forestry or animal husbandry?
- Will the project affect land which is utilized for the purposes of agriculture, forestry or animal husbandry?

**9. Affect the utilization of other natural resources and lands than those directly affected by the project?**

- Will the aquaculture project interfere with, or affect, already existing fisheries in the area?
- Will the project displace other activities into new areas so that the land and natural resources of the latter are over exploited?
- Will the transfer of other activities into other sites, or new areas, create conflicts with other population groups?

- Will the project activities in directly cause uncontrolled exploitation of other natural resources which have not been utilized before, or which have only been utilised to a slight degree?
- Will the project led to the establishment of the activities, e.g. industry, transport, etc?  
To what extent will these new activities affect the environment?



# **DEPARTMENT OF ENVIRONMENT**

## **GUIDELINES FOR PREPARATION OF INITIAL ENVIRONMENTAL REPORT**

**FOR**

**URBAN DEVELOPMENT PROJECTS**

**PREPARED BY;  
DEPARTMENT OF ENVIRONMENT  
ZANZIBAR**

**OCTOBER 2009**

## **GUIDELINES FOR THE PREPARATION OF PRELIMINARY ENVIRONMENTAL REPORTS FOR URBAN DEVELOPMENT PROJECTS**

The following guidelines have been produced by the Department of Environment (DoE) to be used by developers or their consultants to assist them in identifying the key issues which need to be addressed in any environmental report which must be submitted when preparing an application for an EIA certificate.

Unguja and Pemba are small islands with high population densities and rapidly growing populations. There is increasing competition for land in all areas and careful land use is essential for future economic development and for social harmony. The rapid growth of human settlements and the “built environment” is due to population pressure and urbanization, both of which are increasing its demands on land.

A considerable amount of the urban expansion (especially the informal sector) is unplanned and spontaneous and this can give rise to both environment and social problems. Where urban development is better planned and controlled, there is greater scope for managing its environmental impacts.

The negative environmental impacts of the growth in urban areas must be weighed against any environmental gains from reduced population pressures elsewhere, in the areas evacuated. In deed, where urban development is carefully managed, its expansion may impose fewer stains on the environment than the unplanned growth of agricultural communities where there is pressure on land.

Certain types and components of urban infrastructure programmes and projects have potential to give rise to significant environmental impacts. These include:

- Housing programme and projects
- Water supply, sewerage systems and sewage treatment
- Health centers, hospitals, educational facilities and other buildings
- Public transports and roads
- Urban-based industry
- Urban ports and harbor projects
- Urban-based electricity generation
- Export processing zones, business parks and retail development

Urban development brings into play some of the following effects:-

- Irrevocable changes in land use. Encroachment of the built environment on agricultural land, forest, or wasteland and in some cases coastal flats and wetland. Wildlife is forced to retreat even further.
- The demand for water is likely to lower the water table in the vicinity, threatening saline intrusion and/or drying up the existing wells. Water supplies will then be sought from further and further afield (with all that implies for the environment)
- Problems of safe and hygienic disposal of sewage, household waste and refuse in densely populated communities, large parts of which will not have sewerage connections nor regular refuse collection. The problem is compounded where animals are kept. Water and

marine pollution is likely, where flooding occurs from over stretched sewers, public health is endangered.

- Air pollution may result from traffic fumes, industrial emission and artisanal and domestic heating. This is bad for personal health and can have local climate effects
- Public health is further menaced by the risk of epidemics where people are packed together in insanitary conditions. The risk of fires also increases. Sewerage sludge from some industrialized area can contain toxic compounds, especially heavy metals, that can lead to soil or groundwater contamination
- The supply of fuel and food to large settlements can make their effects felt for long distances. The supply of fuel wood and charcoal can despoil forests over large areas in the hinterland, while providing food to the urban population could push farming into marginal, or ecological fragile areas.
- All of this means that the quality of life of existing residents is likely to fall as settlements grow larger
- Construction materials cannot be transported long distance for cost reasons. Sand gravel and timber may be obtained in ways damaging to the environment. Unplanned urban development could take place on potential sources for such materials.

As a general principle, planned housing and urban development schemes stand a better chance of coping with environmental damage than unplanned growth. This is true even if the public provision is minimal, such as the offer of a site and essential services. It is normally better to anticipate a large amount of urban growth, and plan for it minimally than to cater more lavishly for only a small part of the city, leaving most newcomers unprovided for. Planning brings the opportunity to provide environmental amenities in urban areas.

The following specific issues and requirements should be addressed in the report:

### **1. The site**

The Initial Environmental report should state clearly which site is to be developed and should include a 1:1000 map of the area, together with any future plans for extension of the project. Is the development planned for an area especially vulnerable to visual changes e.g. Coastal zones, cultural landscapes, exposed hills or slopes etc. In addition, it important to include considerations of the architectural impacts of development in the planning stage and to this end the study should also contain a rough site plan. 1:1000, showing the general layout and design of the main structure to be included in the project. [N.B this will not be considered to be the final site plan for the project. A detailed site plan must be submitted to the Department of Environment only after the signing of the land lease]

The report should describe previous uses of the site and especially whether any previous activities caused contamination to the area.

What are the uses of the site? i.e. recreational, residential, cultural, industrial, agricultural etc? the exact nature of the current uses of the site should be described e.g. if recreational, what amenity value is provided by the site? e.g. as a public space for sports or relaxation. If residential, how many people live there and where will they be reallocated? If culture or religious, what is the significance of the site. Have surveys to ascertain the opinions of those who

will be affected been taken? The developer should highlight any potential conflicts and ways in which the conflicts will be resolved.

Does the site contain any listed buildings or protected streetscapes or architectural types within the site?

Will any landscaping take place and how will this affect water courses. Soil erosion rates in the area, the creation of ponding of water etc. the ponding of water is an essentially important factor for the risks of malaria in a given area.

## **2. Impact During Construction**

The developer should describe where exactly construction materials such as sand gravel, stones, rocks, wood etc. will be collected from Zanzibar designated sites for collecting coral rocks and sand. Under no circumstances may rock or sand be collected from the sea or the beach, or sandy areas adjacent to the beach.

During construction it is important to restrict unnecessary cutting of trees, excessive excavation and unfortunate deposition of superfluous excavated mass. This is to minimize the visual impacts of the construction. In the operations phase important aspects are maintenance, order and responsible deposition of waste.

Details of where construction waste will be disposed of throughout the construction period should be outlined.

Which of the following activities will the urban development involve and how will these activities affect the natural resources highlighted above?

- Land clearing, grading, leveling, excavation cut and fill terracing etc.
- Surfacing and paving
- Construction of the plant buildings
- Construction of transmission lines and pipelines
- Road construction
- Barriers including fencing
- Blasting and drilling
- Land reclamation
- Ditching, drainage
- Dredging
- Material storage

## **3. Impact on Natural resources**

**Water:** excessive use of ground water resources can lead to salinization through seawater intrusion, especially in coastal areas where ground water resources are scarce. Surface water sources can also be depleted or polluted. Therefore the following information is needed to determine the impacts of utilization of water resources.

An outline of the existing and projected water demand, both during the construction phase and during subsequent operation is needed. This should be described in relation to water sources. This requires a description of water flow rates, volumes, seasonal variations, normal, flood and

drought year flows and related ecology. What are the rates of recharge/depletion for ground water sources?

**Soil:** What is the current soil condition? This should be evaluated according to various parameters: susceptibility to erosion, bearing capacity, soil structure and slope. Will any cultivated land be lost as a result of the development?

**Vegetation:** the developer should describe the types of vegetation found in the area, their occurrence on the island and the amount of the vegetation that would be lost to the development. Investors are encouraged to plan their site layout so as to conserve as much as possible of the original vegetation. The approach whereby the site is cleared of all vegetation before construction takes place, then new vegetation is planned afterwards, is discouraged. What measures will be taken to minimize the impacts on the surrounding vegetation?

If new tree or plant species are to be introduced, developers are encouraged to give preference to endemic species. Care should be taken if exotic plant species (e.g. cactus) are to be introduced on the site as once established these may spread far beyond their intended location. Advice on suitable species can be obtained from the Department of Environment, Department of Commercial Crops Fruits and Forestry.

Impacts on forest will mainly take the form of cutting for use as construction/raw materials and clearing forest prior to construction. What are the current conditions of forest in the area? A description of forest resources and projects will impact on these should be included.

**Landscape and geology:** Will industrial development lead to any loss of unique land features?  
**Wildlife:** What species of wildlife are found in the area and how will the development affect their habitat?

#### **4. Impact on Existing Infrastructure**

**Transport links:** Will the existing transport infrastructures be affected, or extended by the development? Details of any extension or modification of the current transport facilities should be included, preferably together with a drawing of “before” and “after” scenarios.

**Electricity supplies:** The environmental report should also explain the main energy requirements of the project and how they will be met. If main grid electricity can be supplied will the development provide for any investment in generators or other means of back-up power supply?

Where will power lines be installed relative to the housing provisions? Recent research shows that the installation of power lines close (50 meter) to housing may give rise to increased risk from cancer from the electro-magnetic fields.

**Sewage and storm water networks:** The developer should describe existing facilities for sewage disposal and storm water capture, methods of sewage disposal and how these change, if at all, for the development. With a specific tank system are there any environmental considerations at the site that put constraints on the design of the system, e.g. topography, high

groundwater level, presence of local wells close to the site. The investors should include design or detailed descriptions of how and where the septic tanks and soakpits will be built.

What facilities will be provided for storm water capture? Will the storm water networks be independent of the sewage networks?

**Solid waste disposal:** On no account should solid waste be dumped into the sea. Open dumping is equally as undesirable both for aesthetic and health reasons. Any plans for collection services, incineration, landfill sites, composting or transportation of solid waste to other areas should be described in detail. The location of the landfill sites, incineration sites or composting sites should be described.

## **5. Potential Pollution Problems**

**Air:** Air pollutants appear mostly in the form of dust (solid particles) and gases. These pollutants are damaging to both health and vegetation. How close is the proposed urban development to an industrial site? If incineration of solid waste is planned what are the impacts on the quality of air? Does the site chosen have suitable natural ventilation to deal with transport pollution emissions from neighboring industrial sites, and pollution through home energy consumption?

**Water:** If the sewerage system is inadequate in terms of ability to retreat the waste adequately, the developer should describe what impacts this will have on eutrophication, temperature changes and toxic substances, directly through sewerage sludge or through precipitation?

## **6. Socio-economic impacts**

**Construction workforce:** Housing for workers from outside the area should be incorporated within the project site. The environmental study should outline employment projections, including estimates of the percentage to come from outside the area.

**Noise pollution:** A description of sources of noise during construction and operation and the likely groups to be affected by this should be included. Will generators be used?

**Quality of life:** how large will the impacts be on the existing communities quality of life e.g. involuntary resettlements, lost open spaces, increased traffic, loss of recreational facilities, increased air pollution, noise pollution as described above, public health etc.

**Public health:** Health impacts such as increased risk of malaria, fire, epidemics through insanitary conditions should be examined by the developer along with mitigation measures designed to decrease these health impacts.

**Positive impacts:** A description of the positive impacts generated by the development should be included e.g. improved utilities and communications services, income opportunities, beautification of area etc, improved transportation services etc.

What mitigation measures can be implemented to increase the positive aspects of the project and decrease the negative impacts? e.g. Good compensation packages for the population negatively affected from the development, minimization of impacts to surrounding vegetation and forests etc.