ENVIROMENTAL ANALYSIS
FONDO APOIO SOCIAL PROJECT- SECOND PHASE
GOVERNMENT OF ANGOLA
Final Report
September, 2000

Prepared for:
FONDO APOIO SOCIAL (FAS II)
LUANDA, ANGOLA

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EXECUTIVE SUMMARY

The Social Action Fund (Fondo de Apoio Social or FAS) is a demand driven funding mechanism intended to help the process of poverty alleviation and human resource development. Specifically, the fund is intended to improve access to basic services and to generate temporary employment for the poor in rural and peri-urban areas through rehabilitating and re-equipment community infrastructure in health, education, and sanitation. The first FAS program currently being completed and a second Social Action Program (FAS II) is presently being planned for Angola for implementation in late 2000.

This report presents the results of an environmental mission, which was carried out in June, 2000 to evaluate the need for environmental assessment in this project and establish a mechanism to carry it out. The mission was carried out in conjunction with the staff at the Central FAS office in Luanda, Angola under the supervision of Mr. Victor Hugo Guilherme, Executive Director of FAS Angola.

The mission was tasked with assessing the environmental capabilities of Government of Angola, the status of environmental education and training in the country and the abilities of FAS staff to conduct environmental assessments. The mission found a strong need for institutional strengthening and environmental capacity building in all three areas.

A total of 34 FAS I subprojects were visited during the mission and screened for environmental impacts. They included schools, health centers, women's centers, latrines, water standpoints, wells, laundries, markets, chimpacas (small surface water reservoirs), livestock watering and livestock vaccination facilities, and local employment centers. The projects that were visited cost an average of $34,291 to build and benefited approximately 1203 people per project.

The key technical and scientific and environmental factors relating to the environmental screening of each project types are summarized in this document. The mission concluded that:

- None of the projects which were conducted during the FAS I program in Angola are of a scope or have impacts of a magnitude that they require Category A assessment.
- Chimpaca projects will require Category B environmental assessment.
- The latrine, buildings infrastructure, and small-scale water projects (water standpoints, bathhouses, and laundries) that were assessed during this mission can all be considered C level projects and are exempt from environmental assessment.

World Bank environmental staff have recommended that all FAS II projects be screened for environmental compliance with World Bank regulations. This is especially relevant if small road or bridge construction projects, or new project types which have not been carried out during FAS I, are put forward as the FAS II program develops. To carry out the required environmental screening procedures:
• *Environmental Guidelines for Infrastructure Sub-Projects* have been prepared to help FAS staff determine whether an Environmental Assessment is required for a given sub-project. These guidelines will be followed during the identification and preparation process of each sub-project;

• An *Environmental Assessment Method* including a computerized checklist has been included in this report;

• It is suggested that an *Environmental and Health Science Training Program* be carried out for FAS directors and technical assistants. Ideas about the composition of the course and the need for on-going supervision are included in this report.
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1.0 INTRODUCTION AND BACKGROUND

The Social Action Fund (Fondo de Apoio Social or FAS) is a demand driven funding mechanism intended to help the process of poverty alleviation and human resource development. Specifically, the fund is intended to improve access to basic services and to generate temporary employment for the poor in rural and peri-urban areas through rehabilitating and re-equipping community infrastructure in health, education, and sanitation.

An initial Social Action project (FAS I) was established in Angola in 1993. The project included a wide range of subprojects, which were focussed primarily on the reconstruction and re-establishment of essential social services. Based on a review of FAS I and Social Fund projects being carried out in other countries, the possibility that some types of sub-projects were causing adverse environmental impacts was raised by World Bank staff. These subprojects were not subject to the normal Bank Environmental Assessment procedures due to the fact that these programs were administered through a Financial Intermediary (FI). The FI environmental assessment category was created in 1999 to address this distinction.

A second Social Action Program (FAS II) is presently being planned for Angola for implementation in late 2000. The objective of the environmental mission was to evaluate the need for environmental assessment in this project and establish a mechanism to carry it out. The Terms of Reference for the mission were as follows:

(a) The consultant will review the national environmental legislation, regulations and administrative procedures in conjunction with the World Bank’s safeguard policies, and identify possible gaps.

(b) The consultant will describe the environment of the project area, assess the potential environmental and social impacts of the expected sub-projects, and recommend appropriately costed mitigation measures for inclusion in the proposed project. Particular attention should be paid to the potential need for hygiene education as well as wastewater and waste disposal.

(c) The consultant will develop (a) environmental guidelines for sub-projects not requiring environmental analysis, and (b) a screening process for sub-projects requiring environmental analysis.

(d) The consultant will assess the capacity of the provincial offices of FAS II to conduct environmental analyses and to implement environmental mitigation measures, and make appropriate recommendations regarding training needs and costs for inclusion in the proposed project.

(e) The consultant will develop a monitoring plan to track the potential environmental impacts of the expected investments.

(f) Based on his findings, the consultant will recommend appropriate institutional arrangements for FAS II regarding environmental management and assessment.
This assessment was conducted by Derek P Smith, Environmental Consultant (WESA Ltd. Canada), in Angola from June 9-22 2000.

2.0 WORK COMPLETED

This mission was carried out in conjunction with the staff at the Central FAS office in Luanda, Angola under the supervision of Mr. Victor Hugo Guilherme, Executive Director of FAS Angola.

Interviews were conducted with staff from the Ministry of Fisheries and Environment in Luanda, the Director of Juventude Ecological Angola (JEA, the primary NGO involved in environmental education in Angola) and ADRA (the primary NGO working in environmental and health issues in rural Angola). Field visits were made to the FAS offices operating in Luanda Province (Towns of Viana and Cacuaco), Bengo (City of Caxito), Namibe (City of Namibe) and Huila (City of Lubango).

Detailed discussions were held in each FAS office relating to the components of FAS I, and the proposed content and scope of FAS II. This work forms the basis for the following comments and recommendations.

During August, 2000 this document was reviewed by staff of the World Bank (Environment-Africa Region) in Washington and detailed written comments were produced. This final report considers and incorporates these comments.

2.1 TYPES OF SOCIAL ACTION PROJECTS

The 34 FAS projects visited during this mission are listed in Table I (following page). They include schools, health centers, women's centers, latrines, water standpoints, wells, laundries, markets, chimpacas, livestock watering and livestock vaccination facilities, and local employment centers. The projects that were visited cost an average of $34,291 to build and benefited approximately 1203 people per project.

2.2 WORLD BANK ENVIRONMENTAL SAFEGUARD CRITERIA

The original environmental and social data sheet, which was completed by World Bank staff for the FAS II project included the following assessment:

- The World Bank policies for environmental assessment and pest management apply to the project.
- The issues of involuntary resettlement dam safety, international waterways and disputed territories do not apply to the project.
<table>
<thead>
<tr>
<th>Project Location</th>
<th>Type of Project</th>
<th>Total Cost</th>
<th>Number of Beneficiaries</th>
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<tbody>
<tr>
<td><strong>Province of Bengo</strong></td>
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<td>Mifuma</td>
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<td>School</td>
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<td>650</td>
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<td>Manuais Da Aidi</td>
<td>School + water supply</td>
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<td>Saco Mar</td>
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<td>800</td>
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<td>Figueira 2</td>
<td>Water Standpoint and pump</td>
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<td>Viana</td>
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<tr>
<td>Cacuaco</td>
<td>Water stands and laundry</td>
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<td></td>
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<td></td>
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<td></td>
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<td></td>
<td>Market Building</td>
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<td>Latrine</td>
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<tr>
<td><strong>Average Cost of Project:</strong></td>
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<td><strong>Average Number of Beneficiaries:</strong></td>
<td>1204</td>
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</table>
• A number of issues were listed as "to be determined" by the project. These included the safeguard policies regarding natural habitat, forestry, tropical forests, and agro-chemicals, cultural property and indigenous people.

It is the opinion of the consultant that only the issue of environmental assessment applies to the project. The issue of internal resettlement of indigenous people due to the civil war is an issue of major significance in Angola. However, resettlement is a voluntary process and is not an involuntary issue caused or altered by the FAS process. Field study has shown that pest management is not a safeguard issue related to FAS I or FAS II subprojects as originally mentioned.

3.0 IDENTIFICATION OF KEY ENVIRONMENTAL ISSUES

Each person interviewed in Angola was asked to list the most important environmental issues facing the country. It is of interest that nobody could do it. The Director of JEA explained that "there is inadequate information and study of environmental issues to permit them to be identified and prioritized". The issues raised in the international literature about Angola include:

• deforestation of tropical rain forest in response to both international demand for tropical timber and the loss of natural habitat associated with this process,
• the overuse of pastures and subsequent soil erosion attributable to population pressures,
• desertification, partly due to the domestic use of trees and brush as fuel,
• socio-economic impacts due to the internal displacement of people within Angola due to the civil war,
• the lack of potable water supplies and human health effects due to water contamination, specifically due to the lack of adequate sanitation facilities,
• the building of dams, increased irrigation and the lack of watershed management practices in arid and sub-arid areas,
• the construction of new roads in ecologically sensitive areas, and
• environmental issues related to destruction caused by civil war activities, including the issues related to land mine removal and reclamation of war zones.

4.0 ANGOLA'S NATIONAL ENVIRONMENTAL LEGISLATION AND CAPACITIES

The Government of Angola includes a Ministry of Fisheries and Environment (MFE), which is lead by Minister Maria de Fatima Fonteiro Jardin. The Government gives strong emphasis to the Fisheries part of the portfolio, with the environmental portfolio being added only in January, 1999.
The MFE has produced two environmental position papers:

1) the environmental "law" of June 19, 1998 which ratified four international conventions (The law of the Sea, The Treaty on Desertification, the Treaty on Climate Change and the Montreal Protocol on Ozone Emissions), and

2) a draft environmental "strategy" which was released in June 2000. This document identifies, in a general way, the need for environmental assessment, new legislation, compliance with international standards, environmental education and environmentally acceptable sustainable development. The environmental strategy is under discussion in the Government at the present time and no date for adoption or implementation has been announced.

The Ministry:

- has not legally defined their regulatory powers as yet and has almost no institutional capacity (including financing mechanisms, institutional structure, or human resource capacity).
- reports to a justice system that is not ready for environmental regulation.
- has adopted no environmental discharge standards and has no enforcement capability.

The first Angolan National forum on the environment was held in Luanda on December 6, 1999. The conference identified three key issues of importance to the country:

- the need for urban planning controls,
- the need to protect and manage the countries forest resources, and
- the careful utilization of water resources.

The conference was hosted by the Department of Fisheries and Environment.

4.1 THE STATUS OF ENVIRONMENTAL EDUCATION IN ANGOLA

JEA (the primary NGO working in environmental education in Angola) report that the government is building three training centres where environmental studies will be taught. However, they do not have qualified teachers and there is no curriculum planned to date. The schools are intended to start the process of teaching environmental education throughout the country. At present, there are no courses taught in environmental sciences or environmental engineering anywhere in Angola at any level. The public university in Luanda (Angostino Nato University) has 5 faculties (engineering, science, economics, medicine and architecture). Some environmental studies are taught as part of the biology courses, but this is a very small part of the overall curriculum. The university is the public university in Angola, has 20,000 students at present and has regional hubs in some of the provinces.
The NGO community has very limited training in environmental sciences and few resources available to carry out environmental projects JEA and ADRA have one person organizing environmental projects in each organization. Neither person has a degree in environmental studies.

4.2 FAS Staff Capabilities

The FAS process is a respected, community based program which has improved the lives of thousands of people in Angola through the construction of schools, secure water supplies, laundries, medical centres, markets, women’s centers and day care centers. The success of the program is impressive. The competence and dedication of FAS staff in each of the 4 provinces visited is also impressive. However, FAS staff have limited experience with environmental and health sciences, in part because there is literally no education in the environmental field in the Angolan school system. During the mission FAS employees expressed a keen interest in receiving environmental training, especially related to water and health issues.

Due to this lack of education and training, FAS staff do not presently have the capacity to conduct Category B environmental assessments. Proposed training and a recommended screening and assessment process for FAS II is discussed under Section 6 of this document.

5.0 Environmental Analysis of FAS I Projects

Each of the FAS I projects listed was screened for possible negative impacts. Information was collected on the project type, size, location and construction material and methods. A terrain analysis was conducted at each of the 34 locations visited, and observations were recorded and photographs taken. This permitted an analysis of impacts to be made and an assessment category assigned to each type of project. This analysis was done by the FAS director, technical assistant and the Consultant.

Table 2 summarizes this information by grouping the FAS sub-projects into the following groups:

- the construction of buildings,
- latrine/sanitation projects,
- water standpoints, laundry stations and bathhouses which require water sources, and
- surface water/watershed projects.

The term environment impact is used in a broad sense, and includes the negative and positive impacts that will occur during and after the implementation of the project. The “environment” includes the physical, socio-economic and human characteristics of the area in which the project will function.

The scope of possible environmental impacts from FAS subprojects in Angola was considered in light of a series of historical and regional factors. FAS projects are predominantly located in peri-urban or rural
areas that have been very heavily impacted by the social and ecological damage caused by 25 years of civil war. These areas;

- show severe levels of terrain disruption due to human activities,
- almost entirely lack vegetation, partly due to the natural arid nature of these zones and partly due to the deforestation of the sparse tree and brush cover for use as fuel,
- are densely populated, in part due to the internal displacement of people from rural war zones into the fringe areas around major cities.

The people in these areas are squatters who live in horrendous conditions of overpopulation, poverty and suffering, and have no access to basic infrastructure. The only available materials for housing construction is waste, scavenged from local dumping areas, and sun-dried adobe blocks, made from the fine grained lateritic soils upon which the squatter settlements are located. In addition, there is a severe lack of potable water and heavily contaminated surface water is used for human consumption in many rural areas.

Annex 1 of this document includes a series of photos, illustrating project types and the terrain conditions in which they are located.

5.1. ENVIRONMENTAL IMPACTS OF FAS I - PROJECTS

Some of the key factors relating to the environmental screening of each project types are outlined in this section of the document.

Latrines

Latrine projects are carried out in existing areas of housing where sanitary facilities are unavailable. Ditches and open spaces in these zones are soiled with human excrement. Approximately 15 households build latrines under each project. FAS provides the construction plans, cement, lime whitewash, paint materials and supervises the project. The homeowner provides his own labour and the latrines are built immediately adjacent to the owners home. A 1.5 to 2 metre pit is dug in the ground and lined with blocks, with holes provided in the structure for exfiltration of liquids. The pit is covered with a cement plate, through which there is a hole and upon which are foot guides. The soil from the pit is used to make unfired adobe blocks and a small block building is built over the pit. Two bags of cement and as little as 1.5 cubic metres of soil are required to make the blocks. The cost per latrines may be as low as $50. If an inadequate soil volume is excavated from the pit, the adobe blocks are made from soil which is taken from the ground surface within a few metres of the pit. The latrine is completed by painting or whitewashing. Typically as many as 10 people live in each two-room house, and as many as 125 people are given sanitation facilities by each latrine project.
A number of pit latrines and water standpoint projects were inspected in the field to determine how they were located and constructed, and to determine the potential for aquifer contamination from the subsurface migration of human effluents. In all cases, pit latrines were completed in fine grained, low permeability, unsaturated soils above the groundwater table. The disposal of effluents under these conditions permits several important processes to take place; the slow decomposition of feces, the release of gases (the pits are vented to the ground surface) and the very slow movement of liquids into the unsaturated soil vadose zone. Pit latrines typically function for 4-5 years, at which time the inert material in the pit can be encapsulated and a new latrine built in an area adjacent to the existing pit.

There were no cases observed where the contamination of confined or unconfined aquifers was possible for the following reasons:

- latrines are not built upgradient (in a groundwater flow sense as well as a topographic sense) from well locations, which prohibits contaminant movement between latrines and wells,
- non near surface groundwater flux between source and receptors,
- the wells at each water standpoint are drilled and cement grouted wells, constructed by air-rotary water well techniques and tap deep aquifers that are hydraulic isolated from pit privies by deep thickness of surficial sediments,
- in several cases the natural groundwater quality is saline, and is not used for human consumption as a result.

Where water standpoints are serviced by piped water from city supplies (such as the zones near Luanda), pit latrines cannot cause migration of contaminants into depressurized pipes, because the supply pipes are new and properly constructed, and there is no near surface groundwater table to act as a transmissive medium.

In places, such as Bengo, which is located within 50 km of a ceramic plant, fired bricks are imported by truck and used in the construction of the latrines walls. This provides more reliable and stronger wall structure in the long term. The brick factory uses borrow pits and quarries adjacent to the plant site as its supply of raw materials. The Luanda cement plant, which is located north on the coast several kilometers north of the city center, is the main source of cement within Northern Angola. The cement plant derives its calcareous material from several quarries located on near the plant. In some cases, river sand is used for latrine construction. This is removed from river flood planes during low flow periods.

Latrine projects have a highly positive impact. They improve sanitary facilities and remove the health risk of human excrement in public areas. Negative environmental impact related to the making of adobe blocks are very localized. Soil disruption occurs on ground which is already highly disturbed, is without vegetation, is not used for gardening, and is without conflicting land uses or water/drainage impacts. Latrines were not located close to groundwater supplies in any of the areas visited during the field mission. The importation of small quantities of sand from local river beds is not a significant impact. The
rivers consist of dry channels filled with sandy sediment during at least 10 months of the year and the sedimentological or hydrological characteristics of the river are not affected by this process.

FAS Construction Projects (schools, training centers, markets, medical posts, first aid stations, day-care centers)

FAS buildings are constructed in similar manner using similar techniques and building methods. The final use (women’s training center or school or medical post etc.) and the size of the buildings being the main difference between the types of construction projects.

FAS buildings are constructed using a cement slab-on-grade construction method. The development sites have been chosen carefully by the community. Cut and fill activities are not necessary on most sites (only minor site leveling) because the terrain is flat in all cases. None of the FAS project sites visited by the mission involved the clearing and grubbing of vegetation. Vegetation either never existed due to the arid/desert nature of the terrain or was removed long ago. FAS buildings are designed to incorporate proper drainage features in the site design.

The buildings are built with fired blocks or bricks, with the use of some steel framing to improve roof support in the larger structures. Materials are imported from the most cost-effective source. In the Bengo or Viana areas, the ceramic plants in Luanda are the source of these materials. In Huila and Namibe materials are often imported from Namibia, where they can be procured at a cheaper price. Cement fibre roofing materials are used on all structures. The buildings are painted when completed.

Many FAS projects, especially schools and medical posts, include the construction of on-site latrines and water standpoints. Water supplies come from a piped extension of the water supply network, if the project was close to urban centers, or from drilled or dug wells. Hydrogeological observations were made at each of the site visited. No cases were identified where there was a chance of groundwater contamination from the latrines. (i.e. the latrines had been situated upgradient from dug wells).

All of the sites visited had been cleaned after construction and no waste material or refuse piles are present. Trees and flowers were planted around most of the completed buildings, in some case being the only living vegetation within view.

FAS construction projects are being carried out so that they are not producing negative environmental impacts related to site location or construction methods. Building construction activities are of short duration and are very localized. Building sites are remediated to a condition which is far superior to the conditions present before construction was initiated and far superior to the ambient environment in the surrounding neighborhood. FAS buildings provide a variety of essential services to the community relating to education and public health, and the overall impacts of the projects are highly positive.
The use of ceramic bricks, paint, whitewash, cement, roofing materials and structural steel on FAS building projects does not produce negative environmental impact. However, the production of some of these materials in Angola undoubtedly produces negative environmental impacts, due to the unregulated nature of the industries within the country. The Luanda cement plant, for example, emits qualities of particulate matter and ash from its stack which would contravene emission regulations in North America or Europe. The mitigation of this type of impact is beyond the scope of this screening process. Two facts are important to consider in this discussion;

- there are no other types of building materials (wood, for example) which are available in Angola which could replace the materials being used at present in FAS projects.
- FAS usage of these materials is a minute percentage of their total use in the country. For example, most of the homes in the city of Luanda, except for the downtown core, are constructed using similar types of materials.

This discussion supports the need for institutional and regulatory strengthening within the Ministry of Fisheries and Environment.

**Water Projects** (Water standpoints, laundry station and bathhouses)

Water supplies are obtained for FAS projects in two ways; by extending small diameter pipes from existing water supply distribution networks when projects are located close to these services, and by drilling or digging wells.

Pipe extensions were observed at several project sites. They consist of digging a 0.3 metre deep trench with a width of 20 cm in the sandy soil and extending the pipes. A typical trench length is 200-300 metres. This process occurs along road and pathways in areas which are heavily disturbed by human and vehicular traffic. This process does not disturb vegetation because it is not present in these areas. Inspections at completed projects showed that trench rehabilitation had been competed satisfactorily and the location of the trenches could not be identified in most a cases. In some cases, revegetation of the areas had been started after the FAS project has been completed.

Drilled wells are constructed by private contractor using rotary drilling equipment. Dug wells were only observed in the Bengo area. They have been completed to the water table by hand where they encountered a saline water table. These wells are used for washing purposes only and are unfit for human consumption. All wells were completed with adequate wellhead protection and drainage features. All drilled wells were outfitted with manual pumps that permit yields of only 30-40 litres per minute. This is not a high enough rate to cause groundwater interference or drawdown problems.
Laundry facilities in all cases were located 5-9 metres from the water source and were outfitted with greywater sumps and drainage features to prohibit the contamination of the wellhead with contaminated surface drainage. Water is moved to the washstands from the taps manually. Several wellheads have adjacent bathhouses that include four to five shower stalls and provide important public sanitation facilities.

Several water standpoints have been equipped with drainage/overflow channels which permit any spilt of excess water to move into garden plots, where tomatoes and other vegetable crops flourish.

All water sources were inspected for possible sources of groundwater contamination and were found to be situated and constructed in a way that this problem will not occur.

The results of the availability of improved and secure water sources, bathing facility and washing areas are highly positive. Each facility visited was being used intensely. The positive impact of clean water is most important to women, who are predominately responsible for the provision of water and for family health in Angolan households. The reduced distance that women need to travel to obtain water and the reliability of the water quality are strong positive impacts on women’s lives. Clean water has a strongly positive impact on the use and resources of community health systems. The construction of wells, laundries and bathhouses have very localized and very short term construction impacts associated with them.

There is a need for education in basic health and hygiene practices at a community level, to insure that clean water is not contaminated by human activities after the water has been drawn from the standpoints.

Chimpaca Projects

A chimpaca is a water reservoir the size of a football field that is constructed to store rainwater runoff for use during periods of low precipitation. Chimpaca’s are usually located in rural areas along existing watercourses. The Hango chimpaca project was studied in the field. A case study of this project, including a discussion of impacts and mitigative measures, is appended in Annex 2 of this document.

The Hango project produced the following negative environmental impacts:

1) The project did not meet its objectives of supplying increased amounts of water during dry season conditions for agricultural use and a secure potable water supply to the local communities on a sustainable basis.
2) The project increased the risk of health related diseases by permitting and encouraging the consumption of contaminated water in the local community.
3) The project wasted local labour time, wasted the investment made in it and caused a decrease in confidence in the local community. The project was expensive to build.
4) Other impacts may include increased risk of malaria due to the increased habitat provided for mosquito reproduction.

No positive impacts could be identified in relationship to the Hango chimpaca project. Chimpaca projects produce serious negative environmental and social impacts and these projects require environmental impact assessment.

5.2 SUMMARY OF ENVIRONMENTAL ASSESSMENTS LEVELS OF FAS I - PROJECTS
(refer to table 2 on the following pages)

Category A:

None of the projects which were conducted during the FAS I program in Angola are of a scope or have impacts of a magnitude that they require Category A assessment.

Category B:

Chimpaca projects require Category B environmental assessment.

Category C:

The latrine, building, and small scale water projects (water standpoints, bath houses, and laundries) assessed during the environmental mission can all be considered C level projects and are exempt from environmental assessment for the following reasons:

- they are small scale construction and rehabilitation projects,
- are very limited in geographic scope and area of impact,
- are located in arid desert areas without natural vegetation, and do not impact terrestrial or aquatic ecosystems, agricultural production areas,
- do not produce air, water or soil contamination in any form,
- do not produce long term maintenance-related impacts,
- do not produce impacts of regional or national significance,
- include minimal and very localized, small scale utilization of natural resources and building materials,
- they are built in areas which have already been highly impacted by anthropogenic activities,
- and they produce strongly positive social, economic and community level impacts.

6.0 ENVIRONMENTAL SCREENING OF FAS II - PROJECTS

The mission was informed that the scope and variety of projects proposed for completion under FAS II is unlikely to vary greatly from FAS I. However, the May, 2000 Project Approval Document (PAD) produced by the World Bank mentions that communities will be encouraged to focus on their needs
### Table 2: Environmental Assessment Analysis, FAS 1, Angola

<table>
<thead>
<tr>
<th>Construction of Buildings</th>
<th>Average project size is less than $50,000 U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two to five room schools</td>
<td>The footprint of a typical building ranges from approximately 40 square metres for a one-room first aid post to 500 square metres for the largest five-room school. All of the buildings have one story only.</td>
</tr>
<tr>
<td>One room first aid posts</td>
<td>All buildings located in existing urban and peri-urban communities; mostly in densely overpopulated marginal slum areas.</td>
</tr>
<tr>
<td>Three to five room medical centres</td>
<td>All buildings located in areas of intense existing human settlement and disruption due to high population density and human activities</td>
</tr>
<tr>
<td>Two to three room daycare centres</td>
<td>Buildings located on sites that are flat and do not require drainage alterations, grubbing, cutting or filling activities</td>
</tr>
<tr>
<td>Women's centres</td>
<td>No sites are covered with vegetation due to natural desert terrain, and intense human activity</td>
</tr>
<tr>
<td>Open market buildings with vendors stalls</td>
<td>No tree removal required at any site visited; all sites are located in desert areas where tree cover is lacking naturally or in areas where mature trees were removed long ago for human use</td>
</tr>
<tr>
<td>Construction of building foundations</td>
<td>All buildings located by community consensus near existing dwellings and facilities</td>
</tr>
<tr>
<td></td>
<td>Fired Ceramic blocks and brick, trucked to site from closest ceramic factories (sometimes as much as 60 km away)</td>
</tr>
<tr>
<td></td>
<td>Adobe bricks made using local silty soils and cement</td>
</tr>
<tr>
<td></td>
<td>Cement from cement plants in Luanda or elsewhere, depending on price</td>
</tr>
<tr>
<td></td>
<td>Cement fibre tiling as roofing materials</td>
</tr>
<tr>
<td></td>
<td>Larger buildings include support structures of structural steel</td>
</tr>
<tr>
<td></td>
<td>Paint and lime whitewash</td>
</tr>
<tr>
<td></td>
<td>Sand from local dry stream channels.</td>
</tr>
<tr>
<td>Condition/Method</td>
<td>Impact</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Very limited or no site preparation required at any site</td>
<td>No disruption of ground surface, excavations, disruption of local drainage. Deforestation is either natural due to desert conditions or has already occurred due to intense human activity. Adobe blocks fabrication causes near surface topography variations due to soil excavations on a very limited scale. This does not disrupt surface drainage and no vegetative cover existed before building construction. Waste and excess building materials routinely removed from site after construction; Site vegetation plans competed in all cases with flowers, hedges, and trees planted.</td>
</tr>
<tr>
<td>Slab on grade foundation slabs poured using shallow footings</td>
<td></td>
</tr>
<tr>
<td>Block wall and mortar construction</td>
<td></td>
</tr>
<tr>
<td>Steel frameworks used on larger building (medical centres and 5 room schools)</td>
<td></td>
</tr>
<tr>
<td>No clearing grubbing or filling required on any sites; Adobe blocks made on site from on-site soil materials or materials within several hundred metres of the site; soil, cement content with sun drying; Cement Fibre roofing materials with storm gutters emptying onto permeable natural soil surfaces Liming of lower walls, and painting of upper walls and interiors;</td>
<td></td>
</tr>
<tr>
<td>Latrine Projects</td>
<td>Project Size</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Latrine projects involve the construction of a 2-metre high pit privy and building, without running water, with a footprint of 4-6 square metres. A pit latrine costs as little as $50 (average $300) in materials and construction is carried out by the homeowner. Latrine projects are organized in groups of 15 family units. The average total cost of a latrine project is in the $5000 to $8000 range including supervision, administration and purchase of materials.</td>
<td>Adjacent to existing homes. Most homes are made of adobe brick construction and are several room, one-story dwellings. Homes may house as many as 10 people.</td>
</tr>
<tr>
<td>Construction Methods</td>
<td>Provisions</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------</td>
</tr>
<tr>
<td>A 2.5 metre deep pit is dug by hand and is lined with stones or adobe blocks. Spaces are left on the sides of the pit to permit the outflow of liquids into the near surface unsaturated soil zone. A removable cement slab with a hole in it is placed over the pit. The pit is ventilated to the ground surface. A 2-metre adobe block building is built around the pit for privacy reasons. A corrugated iron or thatched roof typically competes the structure. The lower metre of the block building is typically whitewashed with lime. Occasionally the upper part of the building is painted or stained.</td>
<td>The provision of sanitary services to densely populated dwellings is an extremely positive benefit to human health and the aesthetics and smell of individual households and the community. The cessation of defecation activities in public areas, as is the case in many areas of Angola that do not have sanitation services, is a highly positive community impact. Pit privies do not pollute local water supplies in any of the areas visited. Pit latrines do not cause construction impacts. Pit latrines are constructed by individual homeowners. This experience gives pride and dignity to the family and an opportunity for basic sanitation education.</td>
</tr>
</tbody>
</table>
Water Standpoints, Laundry Stations, and Bathhouses

<table>
<thead>
<tr>
<th>Project Types</th>
<th>Project Size</th>
<th>Locations of Projects</th>
<th>Construction Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>A typical well includes a</td>
<td>A drilled well completed with a manual pump. The well head is finished with a</td>
<td>All projects are located by the community in community center areas which permit access on a reasonably equal basis. In some cases, locations are on Catholic Church property or are adjacent to schools or other FAS buildings where space is available and there is a focus of human activities.</td>
<td>Well drilling services are subcontracted to local drilling firms. Wells are constructed using casing and standard well construction methods.</td>
</tr>
<tr>
<td>drilled well completed with a</td>
<td>concrete wellhead structure with one to four taps where water buckets are filled. A</td>
<td>It is typical that well, laundries and bathhouse facilities are located together, obviously because of the location of the water source. In some locations, water standpoint projects are attached to urban piped water systems.</td>
<td></td>
</tr>
<tr>
<td>manual pump. The well head is</td>
<td>water standpoint wellhead is 2.5 metre long and 1 metre high. Provisions are</td>
<td>Urban water systems are extended using metal PVC piping through shallow trenches dug to a depth of .5 metres by hand or by a small bucket backhoe. Trenches are filled in with the excavated soil materials upon completion of the project, and quickly become revegetated or compacted and do not form a noticeable or distinct features after construction is complete.</td>
<td></td>
</tr>
<tr>
<td>finished with a concrete wellhead</td>
<td>included for the drainage of excess/spilled water through troughs by gravity into</td>
<td>All laundry and water standpoint structures are made of concrete. Sand for the concrete is often obtained from local streams. Corrugated iron and cement fibre roofing materials are used in all cases. Bathhouses are constructed of cement blocks which are purchased form local sources.</td>
<td></td>
</tr>
<tr>
<td>structure with one to four taps</td>
<td>small vegetable plots in most locations. Water is manually transported to laundry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>where water buckets are filled. A</td>
<td>stations. These are concrete structures with corrugated cement washboards in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>water standpoint wellhead is</td>
<td>cement tubs. Usually 8 to 12 tubs are provided. The structure may include a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 metre long and 1 metre high.</td>
<td>corrugated iron roof to provide some basic shelter in times of poor weather.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provisions are included for the</td>
<td>Wastewater is directed into seepage pits. Where piped water is available, as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>drainage of excess/spilled water</td>
<td>in parts of the Luanda district, bathing facilities have been constructed adjacent to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>through troughs by gravity into</td>
<td>some but not all of the water standpoint projects.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Methods</td>
<td>Analysis of Impact</td>
<td>Assessment Category</td>
<td>Comment</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>Standard construction methods as described under section 1 of this table are used consistently in all areas.</td>
<td>In all cases, wells were located where they are and would not be effected by contamination from pit privies or laundry wastewater. In all cases laundry wastewater was being directed away from well heads into dry wells through properly designed drainage channels. Specific hydrogeological observations were made at all locations visited to determine these facts. At all locations the water being used for human consumption was clear, colorless, and odorless and considered to be fit for human consumption. The effects of providing locally available sources of potable water for communities is well documented. The positive benefits include better human health, a reduction in waterborne disease, and a decreased burden on the health system and an increased quality of human life. One of the most important impacts is the extremely positive impact clean water has on effect on women's lives who are responsible for water procurement and family health across Angola. The use of sand that is derived from local river channels has the potential to have a negative impact on the river banks and beds from which the sand is derived. This impact is extremely small, given the fact that most Angolan rivers are dry sand choked rivers in the dry season (i.e., for 8 months of the year). This impact is minimal given the abundance of sandy soils and desert conditions throughout the country.</td>
<td>Category C: No impact assessment is required.</td>
<td>The mitigative measures relating to location, design and operation of these facilities is well understood by the FAS teams and have already been incorporated into the implementation of these projects. The FAS teams would benefit from basic water testing equipment so they could adopt a monitoring function at their water facilities. There is also a need and a strong desire for increased training on water, health and environmental issues in each of the FAS teams that were visited.</td>
</tr>
<tr>
<td>Project Types</td>
<td>Project Sizes</td>
<td>Locations of Projects</td>
<td>Construction Material</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Surface water / Watershed</td>
<td>The construction of a chimpaca costs an average of $50,000. This cost could</td>
<td>Chimpacas are reservoirs that are constructed along small streams or rivers in an</td>
<td>All construction materials are on site materials. Cement is imported from local</td>
</tr>
<tr>
<td>projects</td>
<td>be much higher depending on the hydrological and terrain conditions at the</td>
<td>attempt to capture rainfall and surface water runoff during the rainy season and</td>
<td>sources by truck and local sources of sand are used in the making of concrete at</td>
</tr>
<tr>
<td></td>
<td>proposed site. An average chimpaca is a reservoir 1 to 1.5 metres deep,</td>
<td>store it for use during dry periods of the year. The water in a chimpaca is</td>
<td>outlet structures.</td>
</tr>
<tr>
<td></td>
<td>constructed into native materials, without a natural or artificial</td>
<td>intended for three uses; irrigation, cattle watering and human use including a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>impermeable liner. The reservoir is located along an existing watercourse.</td>
<td>source of potable drinking water.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An earthwork dam is located at the outlet end and the reservoir is provided</td>
<td>Some but not all of the FAS provincial offices have chimpaca projects. Of the 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with an overflow channel and outlet structure to handle times of excessive</td>
<td>regional offices that were visited during this project, only the Huila district</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rainfall.</td>
<td>has constructed or is planning to construct watershed reservoir projects. In Huila,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A chimpaca is usually the size of a football pitch (i.e 30-45 metres or more</td>
<td>two chimpacas were constructed under FAS 1. The Hango project was visited. It is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in length and 25-25 metres in width.</td>
<td>located in a rural area 53 km from Lubango. Access to the site is by 4-wheel drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>vehicle, even in the dry season. In the rainy season the site is inaccessible.</td>
<td></td>
</tr>
<tr>
<td>Constructing Chimpacas</td>
<td>Analysis of Impacts</td>
<td>Assessment</td>
<td>Comment</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>Locally available excavation equipment such as backhoes or bulldozers is used to construct the reservoir by scrapping out the river channel. Part of the excavated material is used to build walls around the reservoir and build an earthwork dam at the downstream end of the chimpaca. A pump or overflow structure is added to the center of the earthwork dam, to permit water extraction when required and water overflow during high flow conditions.</td>
<td>Chimpacas are usually constructed without engineering designs or hydraulic and hydrological calculations. They may or may not provide the quantity of water for which they are being constructed. The communities that ask for their construction are unaware of the complicated series of engineering, social and environmental variables that must be considered in the design of a multiple use reservoir facility. Chimpacas cause intense local alteration to river channels and the habitat adjacent to the reservoir. Chimpacas cause water to pond and to stagnate during the dry season. They deprive downstream riparian users, (people, wildlife and ecosystems) of water due to their damming action for some part of the year. Chimpacas permit cattle watering by direct access of cattle into the reservoirs. The addition of cattle manure, plus the high natural rate of evapotranspiration in the interior arid regions of Angola, cause the impounded water to become eutrophic, mineralized and highly contaminated with bacteria. Bacteria from cattle manure is a prime source of a variety of human diseases. Chimpaca structures often fail due to water capacity loss due to high sedimentation rates with the reservoir. Chimpaca developments are expensive. Groundwater use may be a safe, cost effective and sustainable alternative to their construction. The Hango chimpaca project used a charcoal filter technology that requires sophisticated maintenance, including carbon replacement and backwashing. The technology was not appropriate for the rural conditions in which it was applied. The Hango project did not have a public information component that would have permitted people to use the system in an appropriate manner. Furthermore, the local Water Ministry representatives, who were responsible for pump maintenance lack capacity and did not carry out their job. The project failed mechanically as a consequence. The failure of chimpaca projects, as in the case of the Hango reservoir, has a negative effect on the community that asked for the project, and that had input into the project location and planning and provided labour during the construction of the project.</td>
<td>Category B: Chimpaca developments have the potential to cause serious local environmental impact and effects on human health. All proposed chimpaca/reservoir or other projects which might be proposed in the future which effect river watersheds in a significant way require environmental assessment before they can be implemented.</td>
<td>Several FAS directors expressed the opinion that chimpaca projects should be eliminated from FAS 2 because they are rural projects, are not cost effective in relationship to other FAS projects and have a poor success record.</td>
</tr>
</tbody>
</table>
related to economic recovery during FAS II. As a consequence the following project types may be included:

- the repair and upgrading of roads into communities, or the development of new localized community access points.
- the construction of small bridges to permit the movement of people and perhaps livestock over ephemeral watercourses.
- market buildings, silos, small-scale irrigation, water trough for cattle and reforestation projects.

As an example, a summary of the possible impacts from road and bridge project types has been included in Table 2a (see next page). These projects will require environmental screening, including a detailed consideration of the location, design, land use implications and possible impacts on river hydrology. Possible negative environmental impacts will be site specific and detailed mitigative measures can only be identified once project specific details are known. A few of the typical types of mitigative measures for small bridge and road projects are listed as part of Table 2a. It is not possible to estimate the cost of these mitigative measure, if and when they are required, until the details on an individual project are known.

6.1 ENVIRONMENTAL GUIDELINES FOR FAS II - PROJECTS

Environmental Guidelines for Infrastructure Sub-Projects have been prepared to help FAS staff determine whether an Environmental Assessment is required for a given sub-project (ATTACHED IN Annex 3). These guidelines will be followed during the identification and preparation process of each sub-project. Relevant regional FAS staff will be trained to ensure that the preparation of each sub-project will be carried out according to those guidelines. On the basis of this environmental screening process (see Section 6.2), FAS staff will determine whether an Environmental Assessment is required for the sub-project under consideration. The Environmental Guidelines will be included in the FAS II Operations Manual.

Guidelines for latrine, building construction and small scale water projects are included as Annex 3 of this document. Two facts should be highlighted in this regard.

- Field investigations showed that the FAS I category C projects which were visited have been constructed and completed within these guidelines.
- The guidelines in Annex 3 will be expanded and reinforced during the staff environmental staff training sessions recommended by the consultant.

6.2 ENVIRONMENTAL ASSESSMENT METHOD FOR FAS II - PROJECTS

An environmental assessment method and checklist (Annex 4) has been prepared as a tool for use in FAS II offices. The purpose of a checklist is to allow FAS staff members, who are trained in environmental
<table>
<thead>
<tr>
<th>Project Types</th>
<th>Project Sizes</th>
<th>Locations of Projects</th>
<th>Construction Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>Road surface upgrades to permit vehicle traffic, construction of small access roads to communities</td>
<td>Project size less than $100,000 U.S.</td>
<td>Along existing roadways in peri-urban areas</td>
</tr>
<tr>
<td>Bridges</td>
<td>Small bridges for human travel, over small water sources.</td>
<td>Project site less than $100,000 U.S.</td>
<td>Over ephemeral drainage channels, streams and small river tributaries.</td>
</tr>
<tr>
<td>Construction Methods</td>
<td>Analysis of Impacts</td>
<td>Assessment Category</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------------------------------------------------</td>
<td>---------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Use of mechanized excavation / compaction equipment</td>
<td>Increased use of hollow pits, possible land use conflicts</td>
<td>Possible Category B impacts; need for environmental screening</td>
<td>Impacts and degree of assessment will vary with site-specific characteristics of each project; mitigative measures may be required. They might include road and bridge relocations and changes to the proposed design and construction scheduling.</td>
</tr>
<tr>
<td>To be defined</td>
<td>Positive social impacts related to improved transport of people and goods. Etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and health education, to collect and analyze pertinent project data in a routine, comparative and reproduceable way.

The checklist is specific, detailed and is based on all types of FAS I projects. It is not considered necessary at this time to customize spreadsheets for each type of project. Projects will vary in location, scope and possible environmental impacts on a site specific basis. A generic spreadsheet, containing as much detail as possible is recommended for use at the start of the project. It is intended that the checklist be modified as required during the environmental training to make it more or less detailed, or more culturally sensitive sessions with the full participation on the FAS staff.

The checklist is included in two formats: a printed version and an electronic version on disk. The checklist has been written in HTML format to facilitate data entry by using flexible data boxes and permit their transmission electronically. The intent of producing an electronic spreadsheet is to permit results to be reviewed by e-mail, thereby minimizing field visits. It should be noted that each FAS unit includes a computer expert and all FAS offices, including Provincial offices, have access to electronic mail.

The specific roles and responsibilities of provincial and national level staff in the application and monitoring of the subproject environmental screening process will be finalized as part of the environmental training scheduled for the first quarter of project effectiveness (see next section).

6.3. ENVIRONMENTAL AND HEALTH EDUCATION

It is recommended that soon after the FAS II project becomes Effective, an environmental and health education workshop will be organized. The objective of the training workshop would be to ensure that the participants have sufficient knowledge and experience to carry out the required environmental screening procedures. Through the training workshop relevant FAS staff would be able to: (i) apply the Environmental Guidelines for Infrastructure Sub-Projects and determine whether an Environmental Assessment is required for a given sub-project; and (ii) to adapt the Environmental Assessment Method for those sub-projects that require environmental assessments. FAS management agreed that the training workshop could be financed through the FAS II Capacity Building component.

There is a strong need and strong interest amongst FAS staff for more education in environmental and health sciences. It is proposed that a training course be conducted with the Director and Technical Assistant in each regional FAS unit. A four-day course would be required, including classroom sessions and field visits to typical projects. The environmental guidelines and the environmental assessment method/checklist would be used as the basis for the field screenings. The checklist can be expanded and refined to incorporate the ideas of the course participants. The topics to be covered would include but not be limited to;

- the basic principles of environmental geology including the hydrologic cycle, erosion and desertification,
- the fundamentals of surface and groundwater water supply,
• water chemistry, water contamination and public health,
• human waste disposal and alternate latrine designs,
• basic sanitation and hygiene practices,
• the need for solid waste management in Angolan cities and rural solutions to waste disposal,
• environmental screening using the computerized checklist,
• the use of cost effective, environmentally appropriate technologies to solve environmental problems,
• the design and implementation of public environmental education programs.

6.4 INSTITUTIONAL ARRANGEMENTS FOR CARRYING OUT ENVIRONMENTAL ASSESSMENTS

FAS staff will be trained to apply the Environmental Guidelines and the Environmental Assessment Method as described in annexes 3 and 4. FAS staff do not have the capacity at this time to conduct Category B environmental assessments, if and when the screening process indicates that an assessment is required. It will be possible to develop this capability within the FAS team by providing extra training to one of the individuals in the FAS head office in Luanda. The contracting of Category B level assessments to private consultants will most likely not be cost effective, given the small size and budgets of the projects involved in the program. However, a foreign consultant could supervise screening activities effectively using e-mail techniques and annual visits. FAS management agreed to explore the possibilities of hiring an African - Portuguese speaking – environmental specialist for this position.

7.0 CONCLUSIONS AND RECOMMENDATIONS

1) Four FAS regional units were visited in the field and 34 typical FAS I projects were screened for environmental compliance with World Bank regulations. No Category A projects were identified. The building of chimpaca reservoir projects requires Category B assessment. The other project types identified are Category C projects.

2) World Banks staff recommend that all projects in the FAS II program, especially new project types such as small scale roads or bridges, reforestation or irrigation projects, should be subjected to an environmental screening process to determine their assessment category.

3) The following program is recommended for FAS II:

• The environmental guidelines need to followed for each individual infrastructure sub-project. A draft copy of the guidelines has been included in this report;

• An environmental assessment method including a computerized checklist will be provided to the directors and technical assistants in each project unit. A draft copy of the method and checklist has been included in this report;
An Environmental and Health Science training program should be designed for FAS directors and technical assistants. The course will be based on an assemblage of appropriate documents from the World Bank literature on water, sanitation hygiene, health and the environment. The course should be given in Angola, and would require five days of field and classroom training. The degree to which public education will be included as a part of the FAS II process has not been identified at this time. A public environmental education process could be designed as part of this training program.

There will be need for on-going monitoring, especially during the initiation of the project. A routine review process will be set up by Internet. The FAS regional directors should be asked to submit brief reports of activities every 3 months. This would include copies of their completed environmental checklists. In addition, annual field visits should be carried out by a qualified consultant to permit project supervision and reporting as well as an on-going education and exchange of information process to take place. During such monitoring, a set of performance indicators should be developed to gauge the success of the screening and education process. Performance indicators would include natural resource, construction, health and social parameters and would be developed jointly with FAS staff during the staff training period. The performance indicators will be developed during the environmental and health education workshop. Keeping track of these indicators will be part of the comprehensive monitoring and evaluation system that is being developed under the monitoring and evaluation component of FAS II.
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Annexes:

Annex 1: Project Photos (not included in current version)

Annex 2: A case Study of the Environmental Impacts of the Hango Chimpaca Project

Annex 3: Environmental Guidelines for Infrastructure Projects not requiring environmental assessment

Annex 4: Environmental Screening Method and Checklist
ANNEX 2

A Case Study of the Environmental Impacts of the Hango Chimpaca Project
A Case Study of the Environmental Impacts of the Hango Chimpaca Project

The following discussion is based on a field visit to the Hango chimpaca in Huila province. It is included as an example of the issues related to a project that produces negative environmental impacts.

A chimpaca is water reservoir that has been constructed to capture and retain rainfall in times of abundant precipitation for use in low precipitation periods. The Hango chimpaca was built in the early 1990's within a lower section of a small river watershed, and thereby has a stream channel that enters it and a stream channel leaving it. The chimpaca is about 100 metres wide at its largest point and 200 metres long. An earthwork dam about 50 metres long and 3 metres high provides water retention at the outlet end of the reservoir.

Rainfall in the Huila area is concentrated in a 4-month rainy season. Rainfall events are of high intensity, and short duration and sediment loads in the stream under these conditions are high. The presence of a heavily eroded, one metre deep dry channel, which acts as an overflow out of the reservoir during heavy rains, is further evidence of the intensity of the local storms.

The land around the reservoir is flat and scrubby savanna land which is used to pasture cattle and to grow corn and manioc in places. A mature tree cover does not exist near the reservoir, although a few Acacia and other mature trees are present. It is probable that the tree cover has been negatively impacted in the area due to the production of charcoal and for domestic use.

The Hango chimpaca is located about 50 km from Lubango, in an area of low-density population. People live in traditional adobe homes and use surface water sources as their only available water supply. The nearest home to the reservoir is over 300 metres from the dam and no homes are located in the stream floodway.

The Hango chimpaca was visited during the dry season. The reservoir contains very shallow water and there is abundant evidence of heavy siltation and grass and reed growth not only along the its edges but across the deepest section of the pond. A maximum water depth of 1.5 metres was estimated visually during the site visit. Cattle have access to the chimpaca on all sides and there is abundant evidence of cattle tracks leading into the water in many places. The water in the reservoir is severely degraded, eutrophic and stagnant. The water is a light green colour due to high algal growth and is extremely turbid. The reservoir water is highly contaminated with manure, is warm in correspondence to the ambient temperature of the air (22°C during the day and 10°C at night and is likely to contain very high bacterial levels).

The Hango reservoir represents a major local source of drinking and wash water for the community living near the site. The actual number of users of the chimpaca is not know, nor are there statistics on levels and types of water borne diseases in the area. There are no data on water quality in the area. It is likely that the water would contain very high levels of bacterial contamination. (Note that bacteria from cattle can
produce severe sickness and death in the human population. Symptoms can include fever, nausea, vomiting, diarrhea and dehydration and kidney failure).

There are no meteorological or hydrometric data and the chimpaca was designed without any basic engineering or hydrological concepts. It was simply excavated into the sandy soil.

The local area does not include a health post. There has been no public education in the area relating to water, health and sanitation and no signs or indicators in the area telling people that water is unfit for human consumption and to suggest that the water should be boiled or otherwise treated before it is consumed.

In 1997, FAS I funded and supervised the construction of the following structures in order to remediate this situation. They included:

1) a manual pump and storage structure at the dam outlet in order to remove water from the chimpaca on an annual basis
2) a fence structure to eliminate the access of cattle to the reservoir
3) a charcoal filter in a concrete tank slightly downgradient from the dam with 2 taps to permit human only access to the purified water
4) a livestock watering trough fed both from the pump and the overflow from the taps.

The projects also included the removal of sediment from the reservoir to increase its storage capacity. The project cost $52,000 (with $10,000 being funded through the local communities, primarily in labour).

The project failed by 1998 and was totally inoperative during a site visit in June 2000. The fence has been removed and the community and their cattle had access to the reservoir with the full environmental health and social consequences mentioned above.

The problems involved in the project included the following:

- Pump maintenance is the responsibility of the local office of the Ministry of Water. No maintenance was carried out on the pump.
- The project team did not understand of the degree of maintenance associated with charcoal filters. There is a strong need for charcoal replacement, backwashing, and constant problems with biofouling in these systems. Other designs should have been considered.
- There was inadequate education of the local community relating to the operation of the system and the health risks related to the consumption of contaminated water.
- The methods of keeping cattle from direct access to the reservoir were inadequate.
- There was an inadequate scientific understanding of the hydrological balance and water chemistry variations of the stream and a lack of adequate engineering design.
- High siltation rates in the stream has caused a severe drop in reservoir capacity.
• The project has been a very poor return on investment and has caused a decrease in respect in the local community.

Summary of Environmental Impacts:

Negative Impacts

1) The project did not meet its objectives of supplying increased amounts of water during dry season conditions for agricultural use and a secure potable water supply to the local communities on a sustainable basis.
2) The project increased the risk of health related diseases due to contaminated water consumption in the local community.
3) The project wasted local labour time, wasted the investment made in it and caused a decrease in confidence in the local community.
4) Other impacts may include increased risk of malaria due to the increased habitat provided for mosquito reproduction.

Positive Impacts

There were no positive environmental benefits associated with this project.

Mitigative Measures

The following mitigative measures should have been included in the planning of the project:

• The Lubango region receives abundant annual rainfall and has excellent groundwater resources. A properly designed well system should have been built to meet the human consumption needs of the local population. A well project could have been completed at less cost than the surface water scheme.
• Basic information on the use of the site and the sources and results of drinking contaminated water should have been provided to the users of the site through the local participants in the FAS process.
• There is a strong need for capacity building within the local water department. Someone should have taken ownership for the pump maintenance and an appropriate level of monitoring and reporting should be established with the FAS team and the local community.
• There is a need for capacity building and training of FAS staff in the areas of health, sanitation, the use of appropriate environmental technologies and environmental assessment.
Annex 3: Environmental Guidelines for Infrastructure Sub-projects

ANGOLA
SOCIAL FUND II
OPERATIONAL MANUAL

A. Potential Infrastructure Sub-Projects:

FAS II will continue to support a wide range of small and medium scale social and economic infrastructure. Sub-projects will be identified by the poor communities and implemented with the assistance of Implementing Agencies such as NGOs and Churches, in coordination with local governments and sectoral agencies/line ministries. Sub-projects eligible for financing will have to meet technical, financial, economic, social, and environmental criteria set out in the Operational Manual. In the coming three years, FAS II is expected to finance over 1,200 sub-projects of which at least 750 will be in the social sectors, thereby expanding the access to basic social services to 1.5 million beneficiaries living in rural and peri-urban areas. The demand for sub-projects is expected to be related to:

- education (elementary schools, kindergarten, children centers);
- health (health stations, posts);
- water and sanitation (water supply systems, latrines, combined services);
- economic infrastructure (rehabilitation of small feeder roads, culverts, small bridges, small scale irrigation, water troughs for cattle, and chimpacas);
- small-scale community/municipal infrastructure (including markets, silos); and
- environmental infrastructure (mainly watershed protection and reforestation)

B. Environmental Screening Procedures

The criteria listed below will be used to determine whether a sub-project requires an environmental analysis (EA) or not. More specifically, if 50% or more of the potential environmental impacts are rated to be high, an EA will be conducted. Otherwise, the environmental guidelines for sub-projects will be used to mitigate potential environmental impacts.

1. Impacts on soils       High  Low
2. Impacts on surface water  High  Low
3. Impacts on ground water  High  Low
4. Impacts on public health  High  Low
5. Impacts on biodiversity    High  Low
6. Impacts on air quality    High  Low
C. Environmental Guidelines for Infrastructure Projects NOT requiring EA:

Construction and rehabilitation of buildings

To prevent environmental impacts due to the construction or rehabilitation of *elementary schools, kindergarten, children centers, health stations and posts, markets and silos*, take the following steps:

- Protect soil surfaces during construction;
- Select construction materials sustainably, particularly wood;
- Control and clean the construction site daily;
- During construction, control dust by water or other means;
- Provide adequate waste disposal services;
- For health care centers and public markets ensure that appropriate waste disposal facilities are provided;
- Provide sanitation for schools;
- Ensure proper drainage;
- Dispose of oil and solid waste materials appropriately.

Rehabilitation of economic infrastructure

*Small feeder roads, culverts, small bridges*

To prevent soil erosion, water pollution or siltation, runoff, and flooding, take the following steps:

- Rehabilitate infrastructure during the dry season;
- During rehabilitation, control dust by water or other means;
- Protect soil surfaces during rehabilitation and revegetate or physically stabilize erodible surfaces;
- Ensure proper drainage;
- Dispose of oil and solid waste materials appropriately;
- Preserve natural habitats along streams, steep slopes, and ecologically sensitive areas;
- Develop maintenance and reclamation plans and restore vegetation and habitat.

*Small scale irrigation*

Depending on the scope of development and/or rehabilitation of small scale irrigation schemes, external technical advice and assistance might have to be sought. To prevent potential environmental impacts, the following should be taken into account:

(a) Obtain information concerning:

- Water quality and hydrology, including depth of the water table;
- Rainfall data for the area (when and how much);
The area to be irrigated (dimensions and topography);
Soil types and pH;
Percolation (the rate at which water is absorbed and travels through the soil);
The capacity of the soil to retain water;
The amount of water needed by crops;
The amount of evaporation which will take place.

(b) To build in soil conservation measures take the following steps:
To reduce evaporation and seepage, keep canals narrow and deep, and cover canals and pipes where necessary;
To slow runoff, use appropriate techniques such as terracing, contour ploughing, and mulching;
To improve soil and water retention, replant trees and vegetation of the watershed;
Select crops appropriate for soil, water, and climate conditions; and
Reach agreement on water use rates to avoid overuse.

(c) To build a drainage system to prevent waterlogged or “salty” soils and to ensure good crops, ascertain the following:
depth of crop roots;
land contours;
rate of absorption and percolation of soil;
the presence of hard or laterite soil layers that can prevent good drainage;
existing natural drainage patterns on/below the surface, natural water table depth during the wet season.

(d) When using ground water for irrigation purposes, ascertain whether this will lead to a lowering of the water table which could affect:
other dug and drilled wells in the area;
the survival of crops and natural vegetation;
the volume of water in streams, rivers, lakes, and woodlands; and
could contribute to salt water contamination of fresh water wells.

(e) If a project involves diverting streams or rivers, ascertain whether the reduced water flow in the stream could:
reduce food sources and habitat for aquatic life;
reduce food sources for people downstream;
preserve or reduce the use of water for irrigation, drinking, livestock etc. downstream;
result in seawater moving up the mouth of the river.

(f) When using fertilizers, consider potential impacts on
local water resources or downstream;
aquatic life.

(g) To reduce risks of disease from mosquitoes, snails etc., take the following steps:
line canals and ditches;
cover or pipe water where possible;
improve drainage;
apply water to avoid pools of standing water for extended periods;
keep canals and ditches free of sediment, weeds, and snails; and
use natural means of disease control (i.e. ducks, fish etc. which eat snails, mosquitoes, and flies).

(h) Consider the likelihood of attracting an increased population to the project area and ascertain whether
➢ the water supply can support the increased demand;
➢ there will be increased pressure on other local resources (housing, schools, health care);
➢ there will be increased pressure on local natural resources (trees, grazing land, soils etc.); and
➢ the politics of water user rights and priorities have been addressed.

(i) Other considerations:
➢ Community participation in planning, construction, monitoring, water allocation, operation and maintenance;
➢ Possible flood and drought cycles;
➢ Ensure that water quality is appropriate for irrigation purposes;
➢ Upstream activities (i.e. factories, other irrigation, forestry) that could affect water quantity and quality in the project area;
➢ Consider local low-cost alternatives to chemical fertilizers and pesticides;

Chimpacas

In light of the poor experience with the construction and use of chimpacas, it might be preferable not to consider the development of chimpacas in the future. However, if additional chimpacas should be required, technical specialists should be hired for this task. Furthermore, this task would definitely require an environmental assessment.

Water Supply and Sanitation

Prior to preparing a sub-project, information – as necessary - should be acquired with regard to the following:

➢ Determination of a safe yield of water at the site;
➢ A community’s pre-project preferences regarding water resources;
➢ Location of important wildlife habitats that the activity can affect;
➢ Assessment of the site’s environmental carrying capacity;
➢ The community’s institutional capacity to participate in the project; and
➢ Determination of policy reforms and training needed for the project’s sustainability.

Below please find environmental guidelines for water supply and sanitation sub-projects.
Water supply systems

Locate wells at a minimum distance of:

- 50 m from pit latrines, septic tanks, sewers;
- 100 m from borehole latrines, soak pits, trenches and sub-surface sewage disposal;
- 150 m from cesspools, sanitary land field areas, and graves.

These criteria are partly based on the rate of movement of bacteria and viruses through soils and on their survival period. Although bacteria and viruses are largely retained by the first meter of soil around the sanitary and other installations listed, there have been actual recordings of them travelling the distances mentioned as a minimum. In cases of doubt, it is up to the water or health authorities concerned to decide whether or not an intake site should be abandoned.

The well should:

- have a slab large enough to collect spill water;
- have a proper spill water outlet;
- have a connecting drainage ditch that carries water about 5 m away from the slab;
- have a soak-away of at least 75 cm depth which is back filled with gravel and stones if the water is not used in an adjacent garden;
- be protected by low vegetation with shallow roots.

Additional measures to prevent contamination of wells:

- Livestock must be kept away from the intake by fencing the area (minimum radius of 50 m);
- Defecation and urination in the area must be prohibited by law;
- Soil erosion should be prevented;
- The well should be safe from flooding;
- Bore holes should not be drilled too close to a well;
- Crossing of open water in order to reach the well should be avoided;
- The well should preferably be installed in a confined aquifer, protected by an overlying impermeable layer;
- Periodic testing of water quality, particularly ground water.

Latrines

The following environmental factors need to be considered and addressed appropriately:

- Availability of open space at the end of the latrines’ design life (1-2 square meters for simple pit latrines; more than 12 square meters plus access space for twin pour-flush latrines);
- Long-term capacity of latrines to dispose of all household liquid wastes;
- Safe ground infiltration rates (ranging from 50 liters/cubic meter/day for gravel/coarse and medium sand to 8 liters/cubic meter/day for silty clay loam and clay loam; clay is considered unsuitable for soak pits. Most soils will dispose of
human wastes safely when water consumption levels are low. However, as water use rises, infiltration rates increase and many soils, particularly those with a high clay and silt content will block up;

- Ground water pollution is preventable if the pit is more than 2 m above the water table;
- Surface water pollution can result from polluted ground water that drains into a nearby river, lake or lagoon as well as from the disposal of sullage from homes into a surface drainage system;
- Reliability of latrine emptying service
- Willingness of people to handle stabilized humus and opportunities for safe disposal (ideally in a vegetable patch or under fruit trees).

**Wastewater collection, disposal, and management**

Although this aspect may not always be relevant in rural areas, potential wastewater issues should be reviewed and addressed as appropriate:

- Appropriate collection/removal methods (i.e. the use of trucks, carts etc.);
- Identification of disposal sites (existing or new ones);
- Appropriate management methods (i.e. use of wetlands, ponds, treatment facilities, outfalls);
- As appropriate, consider technologies and management strategies designed to reuse wastewater in rural agriculture which in turn can reduce environmental pollution.

**Hygiene Education**

To ensure that the water supply and sanitation sub-projects benefit the population, a training program should focus on the following topics:

- Health and hygiene measures necessary for the protection of water supplies;
- Selection and design of sanitation facilities;
- Proper siting of facilities with respect to water supplies;
- Design of facilities with respect to operation and maintenance; and
- Operation and maintenance of water systems.
D. Procedures for Infrastructure Sub-Projects requiring EA

**Step 1: Screening**
To determine the depth of EA required, potential impacts in the following areas need to be considered:

- Population density and possible implications for resettlement;
- Health issues;
- Protected areas;
- Cultural heritage, archaeological sites;
- Existing natural resources such as forests, soils, natural swamps, water resources; wildlife or endangered species habitats;

**Step 2: Scoping**
To identify the relevant environmental issues, this step determines:
- The level of detail required for the EA;
- The extent of the area to be covered in light of the potential impact zones;
- The timeframe for the EA based on the potential impact zones;
- Sequencing and scheduling of the various EA tasks; and
- Preliminary budgets.

**Step 3: Preparation of Terms of Reference for the Sub-Project EA**
Based on the screening and scoping results, EA terms of reference will be prepared. The EA will be conducted by a consultant, and the report should have the following format:
- Description of the study area;
- Description of the infrastructure sub-projects;
- Description of the environment;
- Legislative and regulatory considerations;
- Determination of the potential impacts of the proposed infrastructure sub-project;
- Development of a mitigation plan, including cost estimates.

**Step 4: Review and Clearance of the Sub-Project EA**
The executing agency will (a) review and clear the sub-project EA, and (b) inform the public about the EA results. The executing agency will furthermore be responsible for overseeing the implementation of the sub-project EAs.
ANNEX 4

Environmental Screening Method and Checklist
Fondo Apoio Social Projects (FAS II)
Angola, 2000
Environmental Screening Method and Checklist
Fondo Apoio Social Projects (FAS II)
Angola, 2000

What Is FAS?

The Fondo de Apoio Social (FAS) is intended to help the process of poverty alleviation and human resource development in countries that are recovering from military and economic crises. Specifically, the fund is intended to improve access to basic services and to generate temporary employment for the poor in rural and peri-urban areas through rehabilitating and re-equipment of community infrastructure in health, education, water and sanitation.

What is Environmental Assessment?

The World Bank requires that all of the projects that they fund be subjected to an Environmental Impact Assessment (EIA) process to insure that they can be carried out without unacceptable negative environmental impacts. “Environment” is defined as the physical, biological, social and economic nature of the area in which the project is to take place. The purpose of Environmental Assessment is to identify negative environmental impacts, and mitigative measures to minimize them as part of the planning process before a project is carried out.

What are the most important environmental issues in Angola?

Some of the most important environmental issues in Angola at the present time include:

- deforestation of tropical rain forest in response to both international demand for tropical timber and associated loss of natural habitat
- the overuse of pastures and subsequent soil erosion attributable to population pressures
- desertification, in part due to tree cutting for domestic use as fuel
- socio-economic impacts due to resettlement of displaced people
- the lack of potable water supplies and human health effects due to water contamination, specifically due to the lack of adequate sanitation facilities
- the building of dams, increased irrigation and the lack of watershed management practices in arid and sub-arid areas,
- the construction of new roads in ecologically sensitive areas
- environmental issues related to destruction caused by civil war activities, including the issues related to land mine removal and reclamation of war zones.
World Bank EIA Categories

The World Bank has identified three types of environmental assessments. Category A assessments are detailed studies for large projects which very likely will produce large-scale negative environmental impacts. Category B assessments are required for smaller projects which may produce some environmental impacts at a local scale. Category C projects do not produce strong environmental impacts and do not require environmental assessments as a consequence.

It is important to note that projects can produce positive environmental impacts as well as negative environmental impacts, and it is important to identify both during an environmental assessment process.

What types of projects need Category A and B Environmental Assessments:

Category A and B Environmental Impact Assessment might be required if the following types of projects are included as FAS sub-projects.

- the construction of new roads or corridors (hydroelectric, pipelines etc), especially if ecologically or culturally sensitive land areas are involved
- large scale natural resource developments (for example, in the oil, forestry, or mining sectors)
- water supply developments especially using surface water supplies or large scale groundwater developments
- irrigation projects with watershed management implications at a large scale
- projects that might involve the production of large point sources of contamination (slaughterhouses, new industries, large urban subdivisions, etc.)
- projects that might produce wide area sources of contamination such as the use of pesticides for pest control or the agro/industrial use of herbicides and pesticides
- urban solid, biomedical or hazardous waste management projects.

The construction of chimpacas is one project type which requires Category B environmental assessment. The construction of roads and bridges are project types that were not included in FAS I but may be included in FAS II. They may also cause Category B impacts.

What are Category C Projects?

The following types of projects are usually exempt from environmental assessment because they are reconstruction and rehabilitation projects, are of a localized nature, and produce strongly positive social and environmental impacts.

- construction, reconstruction or rehabilitation of schools, health posts, latrines, and wells
- local road rehabilitation projects
• the construction of new small-scale infrastructure facilities such as laundries, markets, storage facilities, health centers, day care centres, women’s centres, and small bridges.

Most FAS projects are of limited extent geographically (and hence will produce localized adverse impacts). The projects have small budgets, which are on the order of $10,000 to $100,000. It is very unlikely that any FAS projects will require Category A assessments due to their scope and character. Some project types, such as those identified in the list above, might require B level consideration. The majority of FAS projects are Category C (no impact) projects.

How to screen a new project using a checklist

Checklists are used as a method of making the environmental screening of projects logical and comparable. A checklist that could be used for FAS II projects is included with this document in two forms; as a hard copy and on a computer disc. This checklist is in HTML format so that checklist files can be discussed and reviewed by e-mail between Bank staff and FAS field workers and a database of project types and impacts can be made.

The checklist is in a draft form. There may be parameters and ideas that FAS staff will want to add to this checklist based on their knowledge of Angola and the experience they have gained during FAS I.

It is important to note that environmental assessment requires knowledge, experience and common sense. Environmental Assessments are often carried out by a team of experts (a water expert, a sociologist, an ecologist, a financial analyst and an engineer). Quantitative methods, whereby numbers are assigned to natural parameters and impacts are determined mathematically, do not give logical results.

What are mitigative measures?

Mitigative measures are procedures and changes that can be made in the way a project is carried out which minimize or eliminate the negative impacts that the project will produce. Some mitigative measures that might apply to FAS projects include:

• the use of wells instead of surface water as a source of water supply sources, thereby insuring better drinking water quality
• changes in construction methods or changes in the types of construction materials
• relocation of projects (such as road locations) to avoid unnecessary ecological or human disruption
• the location of projects (such as latrines) with a knowledge of the processes of septic tank design, and groundwater contamination
• the inclusion of a sustainable technology in a project (such as an appropriate water treatment or effluent treatment method)
• the development of effective cost recovery or public education programs.
Screening Procedure

1) Fill in the checklist as completely as possible. The more information, the better the assessment.
2) Ask other specialists in the FAS team (NGO’s, University etc) for their inputs and ideas.
3) Conduct a field visit to the site. An environmental assessment cannot be carried out in an office.
4) Discuss the information as a group and decide which impacts are of importance and which impacts are acceptable. List them and be sure to identify positive and negative impacts.
5) Decide what mitigative measures should be implemented to minimize the negative impacts of the project.
6) Be confident in your opinions. Review them with World Bank environmental staff.
Environmental Screening Checklist

Environmental Assessment Manual
Fondo Apoio Social Projects (FAS II)
Angola, 2000

Environmental Screening Checklist

An environmental screening checklist must be based on field observations, consultations and strong local knowledge to be useful. Each question in the checklist should be answered in detail using full sentences. Environmental Impacts can be positive (i.e. such as increased availability of hospital and sanitary services or increased access to education for children) or negative (such as deforestation or an activity that causes water contamination). The purpose of environmental screening is to identify both types of impacts and summarize their importance in a logical way so that the worth of the project can be evaluated. Screening permits negative impacts to be identified and rated as to their importance. Negative impacts can often be mitigated through the use of appropriate measures (such as the use of different materials or construction techniques, use of improved designs, or through public education) to produce a more cost effective, socially and environmentally sustainable project.

This checklist will be completed as a computer document to permit the formation of a sub-project database and for distribution and review by electronic mail. The checklist contains expandable fields so that the amount of detail that can be included will not be limited.

Please note that the following listing should be considered to be preliminary in nature. An environmental training program has been recommended for FAS staff. An important exercise in that training session will be the modification of the following listing to include the knowledge and opinions of FAS staff.
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**Description of Project**

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</tbody>
</table>
### Location and Siting of Project

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who decided where the site should be?</td>
<td></td>
</tr>
<tr>
<td>Size of the property in question</td>
<td></td>
</tr>
<tr>
<td>Who owns the property?</td>
<td></td>
</tr>
<tr>
<td>Present land use and use for agricultural purposes</td>
<td></td>
</tr>
<tr>
<td>Is tree cutting, cut and fill or engineered remediation of the site necessary before construction can start</td>
<td></td>
</tr>
<tr>
<td>Is the site located on a floodplain, rock slopes or other hazards</td>
<td></td>
</tr>
<tr>
<td>What is the proximity to existing domestic dwellings and structures (churches, schools, stores, training centers, others)</td>
<td></td>
</tr>
<tr>
<td>Proximity of roadways and their description and traffic volumes</td>
<td></td>
</tr>
<tr>
<td>Is the site located near features of historical or community importance</td>
<td></td>
</tr>
<tr>
<td>Does the use of the site cause displacement of people</td>
<td></td>
</tr>
<tr>
<td>Does the use of the site alter community living patterns (transportation, recreation, others)</td>
<td></td>
</tr>
<tr>
<td>Do any land use conflicts exist over the use of the site</td>
<td></td>
</tr>
<tr>
<td>Degree of alteration of site from natural state due to human activity</td>
<td></td>
</tr>
</tbody>
</table>
Physical Description of Project Location

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical description of the site</td>
<td></td>
</tr>
<tr>
<td>Physiography of the site</td>
<td></td>
</tr>
<tr>
<td>Drainage of site</td>
<td></td>
</tr>
<tr>
<td>Location in watershed in relationship to watercourses</td>
<td></td>
</tr>
<tr>
<td>Are there concerns related to the rainy season (site flooding, restricted site access, availability of building materials, others)</td>
<td></td>
</tr>
<tr>
<td>Proximity to existing wells</td>
<td></td>
</tr>
<tr>
<td>Soil types and depth</td>
<td></td>
</tr>
<tr>
<td>Presence of nearsurface bedrock</td>
<td></td>
</tr>
<tr>
<td>Presence and type of vegetation</td>
<td></td>
</tr>
<tr>
<td>Presence and type of tree cover</td>
<td></td>
</tr>
<tr>
<td>Features of ecological significance</td>
<td></td>
</tr>
</tbody>
</table>
### Social Environment and Community Participation

<table>
<thead>
<tr>
<th>Description of local community: (population, number and type of dwellings, type and amount of employment, economic indicators, presence of war immigrants etc)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing sanitation facilities</td>
<td></td>
</tr>
<tr>
<td>Existing water supply facilities, baths and laundries</td>
<td></td>
</tr>
<tr>
<td>Other types of infrastructure and facilities (day care, schools, medical centres, stores, training centers, others)</td>
<td></td>
</tr>
<tr>
<td>Local solid waste disposal methods</td>
<td></td>
</tr>
<tr>
<td>Local sanitation or health problems at community level</td>
<td></td>
</tr>
<tr>
<td>Local project co-ordinator:</td>
<td></td>
</tr>
<tr>
<td>Pertinent details of local project administration:</td>
<td></td>
</tr>
<tr>
<td>Amount of local participation to the project finances:</td>
<td></td>
</tr>
<tr>
<td>Type of contribution from local community:</td>
<td></td>
</tr>
<tr>
<td>Willingness to pay</td>
<td></td>
</tr>
<tr>
<td>Scope of existing public consultation processes</td>
<td></td>
</tr>
<tr>
<td>Participation of organizations in the community (NGO's, church, others)</td>
<td></td>
</tr>
<tr>
<td>Local cultural, historical or religious sensitivities:</td>
<td></td>
</tr>
</tbody>
</table>
### Assessment of the Physical and Ecological Impacts of the Project

<table>
<thead>
<tr>
<th>Environmental Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in surface water or groundwater use and volume of water affected</td>
<td></td>
</tr>
<tr>
<td>Possible degradation in quality of water resources</td>
<td></td>
</tr>
<tr>
<td>Intent to dam rivers or cause river channel alterations or related hydrological impacts</td>
<td></td>
</tr>
<tr>
<td>Intent to clear, fill or level land (area and location of area to be effected)</td>
<td></td>
</tr>
<tr>
<td>Amount and expected effects of deforestation or vegetation removal</td>
<td></td>
</tr>
<tr>
<td>Possible effluent emissions to air or water bodies</td>
<td></td>
</tr>
<tr>
<td>Amount and type of solid waste to be produced</td>
<td></td>
</tr>
<tr>
<td>Effects on presence of wildlife and wildlife habitat</td>
<td></td>
</tr>
<tr>
<td>Effects on ecologically sensitive areas</td>
<td></td>
</tr>
<tr>
<td>Possible effects on coastal marine environments and/or fisheries</td>
<td></td>
</tr>
<tr>
<td>Relationship to national parks</td>
<td></td>
</tr>
</tbody>
</table>
## Assessment of the Social Impacts of the Project

<table>
<thead>
<tr>
<th>Number of people who will be effected by the project</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic description of the people affected (men, women, children, communities, farmers, pastoralists, war veterans, others)</td>
<td></td>
</tr>
<tr>
<td>Employment created by project</td>
<td></td>
</tr>
<tr>
<td>Effects on individual and/or community health</td>
<td></td>
</tr>
<tr>
<td>Effects for war handicapped or other minority groups</td>
<td></td>
</tr>
<tr>
<td>Effects on women's lives</td>
<td></td>
</tr>
<tr>
<td>Effects on farming activities such as crop planting and cattle grazing</td>
<td></td>
</tr>
<tr>
<td>Opportunities for health and environmental education</td>
<td></td>
</tr>
<tr>
<td>Land use impacts:</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---</td>
</tr>
<tr>
<td>Possibility of soil contamination</td>
<td></td>
</tr>
<tr>
<td>Possibility of water contamination</td>
<td></td>
</tr>
<tr>
<td>Possibility of air contamination</td>
<td></td>
</tr>
<tr>
<td>Possibility of ecological/biological impacts:</td>
<td></td>
</tr>
<tr>
<td>Types of social impacts expected</td>
<td></td>
</tr>
<tr>
<td>Positive or negative economic benefits of the project</td>
<td></td>
</tr>
<tr>
<td>Others site specific impacts</td>
<td></td>
</tr>
</tbody>
</table>
Environmental Assessment Requirements

<table>
<thead>
<tr>
<th>Summary of positive and negative impacts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating of impacts and listing of impacts which require mitigation</td>
<td></td>
</tr>
<tr>
<td>Assessment of the viability and suitability of project</td>
<td></td>
</tr>
<tr>
<td>Need for further assessment or consultations with specialists:</td>
<td></td>
</tr>
<tr>
<td>Need to change or alter proposed project design</td>
<td></td>
</tr>
<tr>
<td>Overall opinion and general comments from the Environmental Assessor:</td>
<td></td>
</tr>
<tr>
<td>Mitigative Measures</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>List and description of mitigative measures proposed</td>
<td></td>
</tr>
<tr>
<td>Site rehabilitation planning (including site revegetation plan, garbage and excess building material removal and disposal plan)</td>
<td></td>
</tr>
<tr>
<td>Degree of impact mitigation expected</td>
<td></td>
</tr>
<tr>
<td>Residual Impacts which will remain after mitigation</td>
<td></td>
</tr>
</tbody>
</table>
## Requirements for Community Participation and Public Education

<table>
<thead>
<tr>
<th>Requirement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability of community to implement project</td>
<td></td>
</tr>
<tr>
<td>Capability of community to implement mitigative</td>
<td></td>
</tr>
<tr>
<td>measures</td>
<td></td>
</tr>
<tr>
<td>Recommendations for public education needed</td>
<td></td>
</tr>
<tr>
<td>Date of screening</td>
<td></td>
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<tr>
<td>----------------------------</td>
<td>---</td>
</tr>
<tr>
<td>Date of screening updates</td>
<td></td>
</tr>
<tr>
<td>Date submitted to World Bank Advisor</td>
<td></td>
</tr>
</tbody>
</table>