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# ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED CHIANSI FARM DEVELOPMENT ON THE KAFUE RIVER



## **REPORT**

**This report has been prepared to meet the Environmental Council of Zambia and  
World Bank standards**

**MAY 2008**

## **ACRONYMS**

AIDS	Acquired immune deficiency syndrome
CAP	Chapter
CP	Chiansi Project
DWA	Department of Water Affairs
ECZ	Environmental Council of Zambia
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPPCA	Environmental Protection and Pollution Control Act
HIV	Human Immunodeficiency Virus
N	Nitrogen
PVC	Poly(vinyl chloride)
STIs	Sexually Transmitted Infections
ToRs	Terms of Reference
UNZA	The University of Zambia
ZAWA	The Zambia Wildlife Authority
ZESCO	Zambia Electricity and Supply Corporation
ZNS	Zambia National Service

## **EXECUTIVE SUMMARY**

### *Background*

The Department of Civil and Environmental Engineering at the University of Zambia was commissioned in December 2007 by INFRACO Limited, a company registered in England and Wales, to undertake an Environmental Impact Assessment (EIA) of the proposed farming enterprise involving an irrigation cropping system and the accompanying water conveyance and hydraulics system within Chanyanya settlement and surrounding area. Located 50 kilometers south of Lusaka in Kafue district, the project anticipates that the targeted arable land in Chanyanya and Demu settlements, to produce commercial crops such as wheat, soya beans and possibly paprika and irrigated maize. It is anticipated that the project will have the possibility of transforming into a sugarcane production enterprise in the near future. The proposed development will involve about one hundred and twenty (120) small-holder farms. It is therefore envisaged that all the produce from the commercial farming enterprise will have access to ready market.

The project site has previously been earmarked by the Zambian government for farm development. It is adjacent to the Kafue River, a potential and perennial source of water for irrigation. The amount of sunshine in the area is optimal, soil conditions are regarded as good to excellent and rainfall during the rainy season is abundant for crop and livestock production.

The proposed Chanyanya and Demu irrigation agricultural project will involve approximately 5 km of pipeline and open canal conveying water from the existing ZNS inlet, which is fed by the Kafue River, to approximately 561 hectares of arable land owned by small holder farmers living in or near Chanyanya and Demu villages. The 561 hectares will be irrigated using twelve (12) centre pivot sprinkler systems covering a surface area ranging from 25 to 50 hectares each. The commercial farm area and the Water Wells Ranch adjacent to the Chanyanya and Demu villages covering approximately 350 hectares of arable land area will be placed under seven (7) centre pivot systems covering an average area of 50 hectares each. Some of the arable land (up to 100 hectares) will be reserved for staple food production by individual small-scale farmers using a dragline irrigation system to be installed by the developers. The capital costs, contingency reserves and working capital requirements for the project are estimated at US\$ 7-8 million prior to harvest of the first crop.

According to the Second Schedule of Statutory instrument No. 28, of the EIA regulations, in the Environmental Protection and Pollution Control Act of 1990, development of irrigation schemes covering an area of more or equal to 50 Ha require an EIA report. According, the Environmental Council of Zambia (ECZ) is mandated to evaluate and assess the EIA report and make a decision to approve or deny the proposed irrigation and farm development.

This report, therefore outlines the findings and recommendations of the EIA study of the proposed irrigation scheme.

### *Project aim and justification*

The aim of the proposed project was to develop an irrigation and bulk water conveyance system that abstracts water from the Chiansi Lagoon in Chanyanya, through a network of pipes and open canal water conveyance system to number of centre-pivot irrigation systems for the production of commercial crops such as wheat and soya bean crops. The proposed production

of wheat and soya beans under irrigation has created a high demand for water supply requiring the development of bulk water conveyance supply system for the irrigation system.

### *Project alternatives*

In the course of arriving at the proposed project, the developers also examined other alternatives with the potential to achieve the same objectives. The alternatives were the No Action option without construction of an irrigation system, and the other choice was the construction of the pipeline and canal system, including the development of the centre pivot irrigation system. After the assessment through a feasibility study, the developer and the affected smallholder farmers adopted for the later option of constructing the pipeline and open channel water supply system.

### *Evaluation of baseline conditions*

Baseline data on the environmental characteristics of the study area was collected and evaluated by both secondary and primary methods. The inventory of the existing physical, biological and social environment for the proposed project focussed on quality, quantity, density and distribution of natural resources available in the target area. Data collection methods included reviews of available technical documents and the administration of both formal and informal questionnaires including a number of specialist studies to understand the environment and anticipated impacts associated with the project.

### *Potential negative impacts of the project and mitigation measures*

The major potentially negative impacts of the irrigation project and their mitigation measures are summarised below:

- The project will involve construction of water works and installation of centre pivot irrigation system. This will result in re-location of some of the people directly affected installation and construction works within the project area to other areas where they have never lived before. The developers which include the small scale farmers in the project area will depend on an agreed re-location development plan. The developer is committed to constructing new houses for those who will be relocated. Therefore, the developer will develop a detailed Resettlement Action Plan which will need to be approved by ECZ before construction begins.
- Some of the fears of the small scale farmers were the loss of title to land, dwellings and relocations resulting from the project. However, the farmers expressed optimism that the CP will improve their income and infrastructure. An agreement will be signed between InfraCo and the small scale and commercial farmers. The parties will be shareholders in the company to be formed. The company will lease land from the farmers, but title deeds will still be retained by the farmers. The project developer has clearly explained the benefits and risks to the project beneficiaries who have given their consent to be part of the development.
- Irrigation schemes have the tendency to cut off transport routes which most of the local communities depend on. This impact will be mitigated by burying the main pipeline and construction of new access roads
- Development of the irrigation project may increase the probability of prostitution in the area due to increased population concentration, incomes and consequently cases of HIV/AIDs may rise in the construction camp and surrounding areas. At the time of

construction, the new settlement at the camp site measures will be undertaken to create awareness of HIV/AIDS through a number strategies such as condom distributions, sensitization, and distribution of literature on HIV/AIDs. Anti-AIDS groups from some NGOs can be hired to create awareness and create anti-AIDS groups within the new settlement.

- The burning of crop residues leads to air pollution, substantial waste of precious nutrient resources and organic matter in the soil and deterioration of the soil's physical properties. Crop residues will be managed by complete retention, partial removal from the soil surface or feeding it to domestic animals.
- In order to prevent the process of salinization from irrigation and the resulting loss of productivity of the soil, mitigation strategies will be promoted that include proper management of irrigation water, application intensity and good maintenance of drainage network.
- When fertile soils are subjected to cultivation, their productivity easily fall if no proper fertility management practices are undertaken. The developer will practise appropriate land husbandry practices which will involve management of soil organic matter, pH, soil water and nutrients, soil structure and soil erosion as critical factors that influence land productivity.
- Aquatic systems can be seriously affected by herbicides entering water bodies via surface runoff. The developer will employ an Integrated Pest Management (IPM) approach that mitigates this impact. (What do we need to demonstrate this?)
- Water in the project area could be polluted by the applied agrochemicals which may find there way into groundwater or surface water in streams. Measures to prevent this include well-managed irrigation scheduling, prevention of salinization and application of chemicals in appropriate amounts. The developer will provide piped/deep bore water for domestic use for displaced farmers in the project area. This water will be monitored for contamination and pollution
- The clearing of a natural ecosystem, introduction of a monoculture system of agriculture, and heavy usage of chemicals, pesticides and herbicides may cause imbalances in ecosystems. It is important that the clearing of land is done in a planned and systematic manner to avoid unnecessary damage to the environment. The chemical, pesticide and herbicide usage should be monitored such that these are correctly applied at appropriate times to avoid completely upsetting any natural controls that may be slowly building up in the ecosystem.
- There is a potential negative impact that could result on an irrigated farm as the water being applied on the field and that in the canals may be infested with exotic weeds and harbour mosquitoes. There is a need for prevention of entry and spread of such unfavourable organism by the usage eradication techniques and the deployment of early detection methods and the institution of and timely and reliable risk assessments. On-farm mitigation measures will include activities that prevent the introduction of invasive species, surveillance for the existence and location of any such species, measures to eliminate or reduce the effects of such species and the conducting of regular field surveys to track the presence and status of the species over time. The developer will also ensure that re-vegetation is controlled so that alien plant re-growth is prevented and that appropriate indigenous species are replanted.
- The habitat created by irrigation water is also conducive for water affiliated diseases such as bilharzia and malaria. Measures to protect the local community will include residual spraying or provision of insect treated mosquito nets to reduce incidences of malaria and sensitization lessons on waterborne diseases such as cholera.

- Water attracts young children and each time youth come in contact with water, drowning is possible. Mitigation measures include signage, fencing, public education and landscape manipulation.
- While communal tenure systems allow people to have access to natural water bodies such as rivers and lakes, the commercialization of these water bodies suddenly changes the water rights. The developer will ensure that the local people have access to the drag line for irrigation of their gardens and fields.

*Potential positive impacts of the project and enhancement measures*

Some of the major positive impacts and their enhancement are:

- Commercial and small scale farming benefits greatly from the abundant perennial water from the canals that may extend into the nearby homesteads. This has the probability of increasing food production for the local communities and earning of foreign exchange for the country due to increased agricultural production.
- The interviewed local people expressed optimism that the expected project would bring more food through gardening and improve the livelihoods of the local communities. The project is expected to maximise land use; increase productivity of the area; benefit small-scale farmers in both the ability to produce their own food as well as shareholders in the development; and develop the area.
- During the construction stage, employment would be created for the local communities according to the skills required. The common view on employment was that people were going to earn money by being employed working on the irrigation scheme and would have income to buy food in years of floods and droughts unlike now when they are dependent on farming only.
- Provision of water for irrigation through the construction of pipeline/canal usually increases the amount of investment in the area. The developer will ultimately invest US\$ 7-9 million in the Chanyanya area starting with a first investment of approximately \$1 million to develop the first 120 hectares of commercial land and 30 hectares of land available to the smallholder under irrigation. It is expected that there will be more investment as the project makes profits and small scale farmers derive benefits from CP as share holders.
- Currently fishing mainly happens at the fishing camp and the project will in no way affect the fishing activities of the community per se. However, with the likelihood of having a bigger population in the area with purchasing power due to employment opportunities from the proposed project, the fishing industry would grow.
- Positive human health impacts arise from higher incomes, better diet and nutrition, improved access to health systems, all of which translate to better overall health status. And water washed diseases may reduce dramatically in irrigation systems as better water availability, regardless of quality, enhances personal hygiene practices.

*Conclusion*

The major positive impacts are expansion of agricultural activities, employment opportunities and improved livelihood. Of all the negative impacts, displacement of people and pollution of water are the most significant. It is important for the developer that adequate mitigation measures have been provided to mitigate the negative impacts.

Managing Director  
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