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Small-scale irrigation in Zambia

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SUMMARY

Some attempts of small-scale irrigation developments have been made along the shore of Lake Kariba in Zambia. In Chiyabi a 10 ha unit has been constructed by GRZ/FAO where 30 farm families are presently cultivating two crops per year. These farmers eventually have to run the scheme as a cooperative without too much Government involvement. The IRR of 25% is favourable. The scheme layout is replicable in many other areas along Lake Kariba. In the paper development aspects of Chiyabi are discussed and recommendations for a strategy for future developments are given.

1. INTRODUCTION

Zambia has a large irrigation potential, but so far irrigation development is still in its infancy. It has been limited to approximately 20,000 ha, most of which are under large scale irrigation both in the parastatal and commercial sectors.

Some attempts of small-scale irrigation developments have been made. The Government of the Republic of Zambia (GRZ) has been involved in developments along Lake Kariba in the Southern Province. Buleya Malima (61 ha) and Siatwinda (32 ha) were developed in the early seventies, while Chiyabi (10ha) was developed in 1985-86 with FAO technical assistance. Buleya Malima and Siatwinda have not been very successful to date, not only because of operation and management problems, but also because of the receding Lake waterlevel during the drought years from 1981-84, as a result of which the pumps fell dry. The schemes have been partly brought back to production during the past two years. The development in Chiyabi, which is located at a more strategic place along the Lake as far as water source is concerned, and its lessons learned so far will be discussed in the next paragraphs.

2. CHANGING NEED FOR IRRIGATION IN THE GWEMBE VALLEY

The local inhabitants of the Gwembe Valley along the Zambezi River, the Gwembe Tonga were resettled in the latter part of the fifties with the creation of the Lake Kariba. Approximately 36,000 people were relocated on the higher, less fertile areas along the shores of the new Lake.

The Tongas continued with Zilili farming, i.e. utilization of the residual moisture after the recession of river or Lake water. In order to increase the reliability of this method of farming, the Government and FAO embarked on a programme of pilot small scale irrigation development. Planning for Chiyabi was done in 1982. As much as possible use should have been made of the floodwater of the Lake to grow a rice crop during the rainy season (November-April). During the dry season (May-September) vegetables would be grown on residual moisture, supplemented with irrigation water when needed during the latter part of the dry season. For this low-lifting engine pumps would be used.

However, during the drought period from 1981 to 1984 the Lake level receded from 485.1m above Kariba Datum (K.D) to 478.8m K.D. During the past two years, the Lake level remained low, despite two years of average rainfall. No one can at the moment predict what the future Lake level will be. Thus a permanent irrigation system was designed and constructed in Chiyabi in 1985-86.

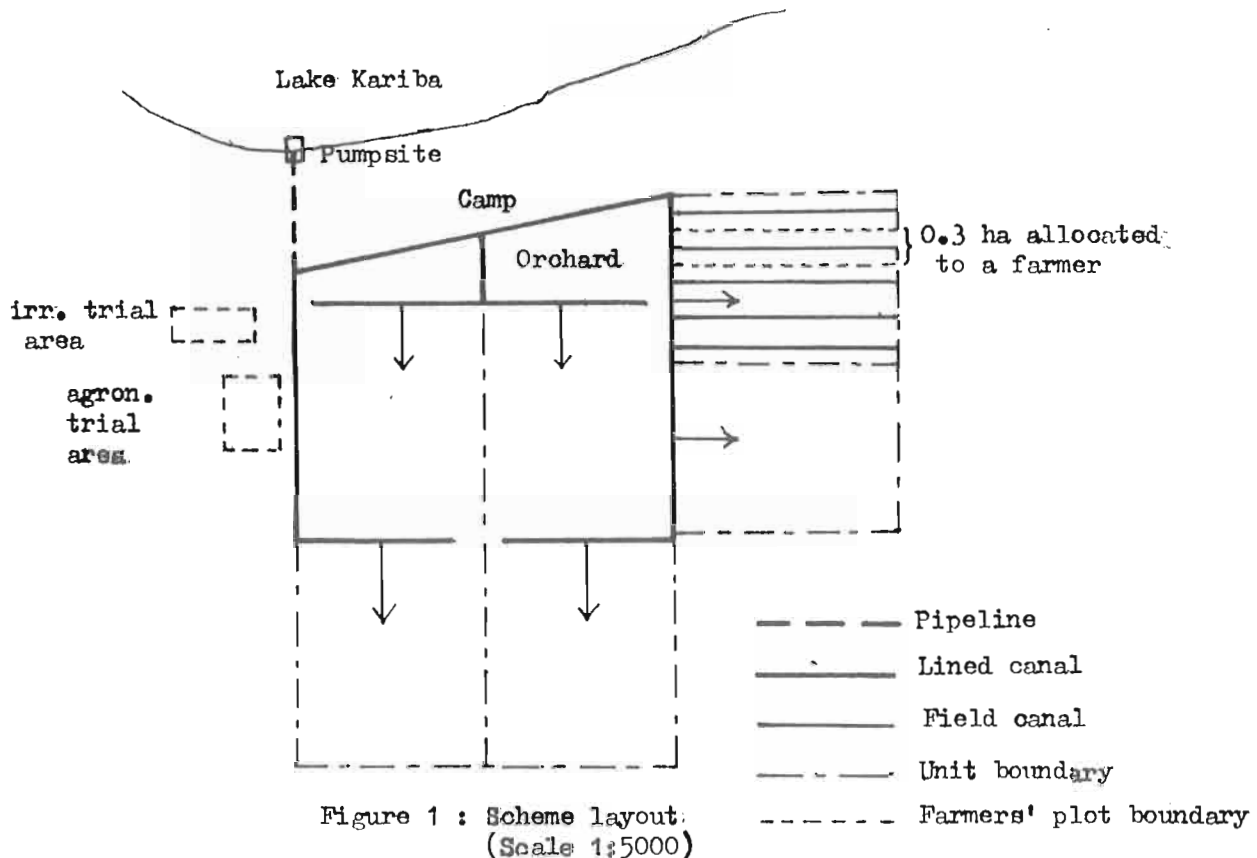
3. CHIYABI DESIGN

Figure 1 shows the layout of Chiyabi Pilot Irrigation Scheme.

The pumpsite was selected on a steep slope of the Lake. A manifold and the Asbestos Cement pipeline are situated above the known flood level. Portable diesel pumps can be placed on reinforced concrete platforms at three levels, thus the Lake level can be followed. The discharge of the 5 pumps is 56 l/sec at a design head of 10m. This design discharge exceeds the required water need with 40% thus expansion is possible.

Except for the field canals, the canals are lined with concrete slabs. The lined canals have been designed for the design discharge of 56 l/sec. The scheme has 30 field canals. Each of the 30 farmers has been allocated one field canal for which he/she is responsible. The area each farmer is cultivating is 0.3 ha. The remaining hectare will serve as a communal orchard.

Several rural structure, e.g. office, storeroom and assembly hall have been constructed.



The construction costs per ha were ZK 9,900.00, i.e. \$1,650.00 (1 US \$ = 6.0 ZK). This amount excludes the costs of the rural structures. If lining could be avoided for future schemes by selecting sites with less permeable soils than Chiyabi, the costs per ha would drop to \$ 930.00. The Internal Rate of Return (IRR) for Chiyabi is 25%, which is favourable.

4. FARMERS' PARTICIPATION

As irrigation is a new phenomenon in the Gwerbe Valley it was and is up to date difficult to make the farmers in Chiyabi interested.

During the implementation of the project only very few potential farmers were participating as casual workers.

Participation of the farmers in the scheme has been mixed successful. Most of them are not yet fully aware of their schemes' potential and their obligations towards the scheme. It will take some time before they will accept the scheme as theirs and not just as another Government scheme for raising revenue on which they work as labourers.

The present cropping pattern is rice and vegetables.

However, Chiyabi is located in a remote area with difficult access throughout the year. This makes marketing of perishable crops difficult and indeed last year farmers had to be disappointed as not all their vegetables could be transported to the markets, which is not good for their sustained interest. Thus during the dry season those crops should be grown that can be stored for a period, e.g. okra, Irish potatoes and green maize. It is thought to provide the farmers' group with a small rice mill, so that they can at least tripple their return on rice. Part of the scheme area is planted with bananas and cashew nuts to provide most of the revolving funds for running the scheme.

With the assistance of the GRZ/FAO Project the farmers should build up confidence in irrigated agriculture. The final result should be the establishment of a Cooperative after which the scheme should be managed to a great extent by the farmers themselves.

5. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE DEVELOPMENTS

The FAO/GRZ project will in the next 18 months develop more pilot schemes on which local groups of small farmers should settle. Once this exercise turns out to be successful there is scope for expansion as there are several thousands of hectares suitable in the Gwembe Valley for the type of small scale irrigation development as attempted in Chiyabi. In such a programme the following should be taken into account:

- Farmers should be made interested and knowledgeable on what will come. They should be involved from the beginning in each development stage, i.e. selection, planning and construction, so that they come to regard the scheme as their own and thus take a far greater interest in ensuring the success,
- Careful selection of pump sites and pumpsets is necessary to avoid disasters as occurred in Buleya Malima and Siatwinda,
- Availability of electricity is important for continued running of the schemes. Diesel pumps maintenance is difficult under self-help conditions in remote areas,
- Marketing possibilities for the crops are important for success of the scheme. Together with the farmers a cropping pattern should be sought that allows for easy and complete marketing,
- An orchard is important for obtaining revolving funds,
- The farmers could be assisted with
 - pre-construction study
 - field survey
 - detailed design
 - cost estimate and obtaining necessary financial support

For this a unit should be established in the Ministry of Agriculture and Water Development. A construction manpower and equipment unit to assist the farmers in skill required construction works should also be established,

- Training of farmers in elementary irrigation techniques,
- Organizing farmers towards forming cooperatives,
- Once schemes are developed, evaluation of SSIP is important as the efficiency of utilization is expected to vary considerably. Therefore a methodology for the rapid evaluation of project performance should be made. This should include irrigation efficiency, water supply, state of irrigation works, use of irrigation water, use of land, agricultural production, benefit per ha, water users' association involvement and storage facilities.

REFERENCES

1. MOONO D. SATO F. and SIAKANTU J. Annual Irrigation Research Coordination Report. NIRS, Mazabuka, 1986.
2. SCUDDER T. Ecological bottlenecks and the Development of the Kariba Lake Basin. The Careless Technology, page 206-235.
3. STOUTJESDIJK J. Chiyabi - design report. Field Document I, NIRS, Mazabuka, 1985.
4. STOUTJESDIJK J. Chiyabi - evaluation of construction works. Field Document V, NIRS, Mazabuka, 1986.