

附属資料 (4) ケニア共和国の協力要請文

REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE
NATIONAL IRRIGATION BOARD

BURA IRRIGATION SCHEME

FEASIBILITY STUDY AND APPRAISAL FOR THE
BURA WEST PHASE II AND EAST BANK DEVELOPMENT

TERMS OF REFERENCE

FOR CONSULTANCY SERVICES

SEPTEMBER 1981

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1. PROJECT

1.1 PROJECT DESCRIPTION

The Bura Irrigation Settlement Project extends over lands on the West and East Banks of the Lower Tana River in the vicinity of Bura.

The first phase of the Project covers some 6,700 hectares on the west bank of the river for settlement on small-holdings of some 5,150 landless families from all parts of Kenya, including physical and social infrastructure for a total population of 65,000. This is designated Bura West, Phase 1, and scheduled for development over the period 1977 to 1983. A temporary pump station of 8 m³/sec capacity will be installed to supply irrigation water.

A further area of some 5,500 hectares has been identified for possible extension, and designated Bura West, phase 11. This area was envisaged to be developed after more agronomic experience of production of shallow soils in phase 1 and Hola.

On the east bank, future development of about 15,000 hectares is envisaged as suitable for rice production and other crops. This is designated Bura East.

The Tana Delta Project currently under feasibility study, covers the area from Garsen along the flood plain to the mouth of the Tana River.

1.2 Bura West Phase II Development

This had been included in the original designs as part of a combined development with phase 1. It consists of 1,600 hectares which are commandable from phase 1 main canal and a 3,900 ha. block near the existing Hola Scheme which will be commanded by extending the main canal. But due to the uncertainty of yield levels due to shallowness of the non-saline non alkali soil layer (under 10 cm.), the physical development was postponed until phase 1 was developed and in full production. However all structures in the supply and main canal of phase 1 are designed to cater for phase 11 development. A temporary pump station, which is to be replaced by gravity diversion weir for phase 11 development, will supply irrigation water to phase 1. Experience on shallow soil existing at Hola would be useful. The pilot scheme would benefit from the gravity weir and hence economic benefits for this may be realised.

1.3 Bura East Development

Initially the East Bank was expected to have a potential of about 50,000 ha. But recent studies on soils and topography indicate a total potential of about 15,000 ha. for rice development.

The proposed river diversion structure mentioned above is expected to supply irrigation water for Bura East as well. The results of the feasibility study enable formulation and timing of the project to be undertaken. Clearly, the weir design does allow for this development.

Topographical maps with one metre contour intervals, aerial photography of 1:20,000 scale and a semi-detailed soils report are available.

2. Information to the Tenderer

2.1 Tenders shall be prepared in English and in two different volumes, which have to be submitted in separate sealed covers, i.e.

First Cover: 10 copies of the Technical Proposal.

Second Cover: 2 copies of the Economic Bid.

2.2 Tenders shall be submitted to:

National Irrigation Board
Lenana Road
P.O. Box 30372,
NAIROBI, KENYA

not later than

.....(closing date 1), please note that tenders will not be considered for evaluation if they are not received in the above mentioned office by this closing date.

2.3 One additional copy of the Technical Proposal (First Cover) shall be submitted to:

International Bank for Construction & Development,
1818 H Street,
N.W. Washington, D.C. 20433,
U.S.A.

before the closing date.

- 2.4 It is recommended that Tenderers enlist the assistance of local firms, especially for topographic and soils surveys, as such assistance is likely to lower the cost of the study and facilitate an earlier commencement of the surveys. It is, however, pointed out that the Tenderer shall assume the liability for all services, whether rendered by his own staff by the associated firms or staff.
- 2.5 The Technical Proposal (First Cover) shall include, but not necessarily be limited to,
- a) A concise presentation of the conceptual philosophy (guide line) of the study,
 - b) scope of services,
 - c) methodology to be applied in the main fields of investigation,
 - d) personnel assignment (curricula vitae)
 - e) bar chart of activities and reports,
 - f) bar chart of personnel assignments and mobilization.
- 2.6 The Technical Proposal shall become part of the contract, changes of personnel assignment being subject to approval during contract negotiations.
- 2.7 The Economic Bid (Second Cover) shall be subdivided under two headings, namely "Lump-sum" and "Unit Prices".
- A) The proposed lump-sum shall be presented according to the following breakdown into items:
- a) Tenderers' payroll costs for expatriate staff (by names)
 - b) indirect and overhead costs
 - c) fixed fees
 - d) accommodation for office and personnel (including families)
 - e) international travel and transport
 - f) field allowances, daily allowances, hotel etc.
 - g) salaries of local staff and labour
 - h) local travel and transport

- i) sub-contracts (such as laboratories etc.: indicate kind and scope)
- j) miscellaneous costs (such as printing etc.)
- k) any other costs not covered above (specify items).

For item (a) a statement should be appended showing for each staff member.

- 1. man month rate,
- 2. period of assignment
- 3. overhead and fixed fees.

For item (g) a statement should indicate the different categories of local staff, their number and period of employment and monthly salary for each category.

B) Unit costs shall be given for the following items:

- a) per man-month of additional services of expatriate staff, with references to names and cost breakdown given for the lump-sum
- b) per additional 100 ha. of soil survey (all necessary steps through irrigation suitability map on the basis of 1 augerdrill per 10 ha.)
- c) per additional 100 ha. of topographic survey (all necessary steps through topo-map 1:5,000 with 0.5 m - contourlines)
- d) per complete physical/chemical soil analysis (including sampling)
- e) per infiltration test
- f) per standard penetration and per vane test for foundation purposes
- g) any other proposed activity.

2.8 Facilities to be provided by the Government (through National Irrigation Board - N.I.B. -):

- a) For an initial visit to Kenya of the Tenderer for the preparation of the proposals N.I.B. will provide transport in Kenya and a staff member for field visits. All other expenses shall be borne by the Tenderer,
- b) All available reports and other evidence relevant for the proposed studies may be studied in N.I.B.'s office by the Tenderers and shall

be provided for temporary use during the study period.

- c) Importation and re-exportation free of taxes and duties will be procured by N.I.B. for all equipment, materials and personal belongings of the Consultant and his staff. Expatriate salaries and profit will be tax free.

3. Terms of Reference

3.1 Objective

The first objective of the proposed study is to review and make an economic assessment of phase II development from existing data in order to make an early decision on the timing of the river diversion structure. Evaluation will consider also the relative development advantages or benefits from expansion of the existing temporary pump station or the construction of a gravity structure.

The second objective is to review and update the existing data for Bura East in order to make planning decisions in relation to phase II and the gravity weir. Initially a full feasibility study will not be made since available information will enable a meaningful review and decisions to be made. After the initial review a full feasibility study may be carried out.

3.2 Methodology

Any methodology in conformity with sound financial and engineering practices may be adopted to cope with the objective of the studies.

The final report shall be comprehensive, giving full details of the technical, economic, financial, social and institutional aspects of the project and shall be prepared in a form acceptable to potential donors to finance the implementation of the project.

The tentative work programme to be given in the Tenderers' technical proposals is intended to be revised and updated during the first few weeks after commencement of the field work. The revised programme and proposed variations of scope and approach, if any, shall be submitted for approval to N.I.B. in the form of an Inception Report.

3.3 Points to be considered

The following - incomplete - list of specific points is recommended for consideration in the preparation of the tender.

It is the wish of the Government to develop Bura West and East, only if conditions of production are favorable. Main commercial crops will be cotton for Bura Phase II and rice for East Bank rice, or any other suitable crops.

A detailed analysis of the available experience gleaned in connection with Hola and phase I will be an indispensable prerequisite to the proposed studies.

Many of the problems observed in the existing Hola Scheme refer to practical exploitation (soil cultivation practices, type of tractors and machinery, diseases and pests, crop rotation, water management, etc.) rather than to typical study topics (infiltration rate, climatic factors, marketing, etc.).

The initial study activities should be aimed at a preliminary statement as to whether or not the project will turn out to be feasible. Such statement should be available within three months after commencement of the study.

3.4 Scope of Services

3.4.1 General

The following is understood to be a tentative estimate of the activities necessary to cope with the objective of the study. The Tenderer shall, however, exercise all reasonable skill, care and diligence to propose a scope of services to be rendered by himself and the staff that shall, inter alia, enable him to give his final cost-and-benefit estimates within a range of error that does not exceed $\pm 10\%$.

3.4.2 Content of Study

The main items of the study shall be as follows:-

- A. Review of existing data
- B. Compilation of existing data to determine the most appropriate cropping pattern, farm size, mechanization, family living conditions including subsistence crops and, subsequently, prepare inputs

for economic evaluation.

- C. Engineering investigations, such as optimization of layouts and design for all major structures, irrigation, drainage and flood protection measures, and housing plus road infrastructural works eg. roads etc. and cost estimates as an in for economic evaluation.
- D. Organization and Management
- E. Economic analysis and evaluation of the project
- G. Tentative schedule of implementation and work programme for recommended follow-up studies or implementation.

3.4.2 Details of Study

Review of the Study

An experienced Soils Specialist will review all pedological factors controlling development in both Bura West and Bura East. This may entail visiting the areas identified by previous soil surveys and will involve examining all data and information collected in the recently completed Bura East Soil Survey and comparing this information with the equivalent data available for the Bura West command. Sample areas in the Lower Tana basin with similar soils which are currently or have previously been irrigated will also be visited and compared with the soils of the Bura East and West areas. This work will be done in close liaison with Kenya Soil Survey.

The following aspects will be examined.

- i) The extent of the soils for high and marginal suitability
- ii) Infiltration rates on topsoil and subsoil horizons
- iii) Sub-soil hydraulic conductivities
- iv) Estimates of deep percolation
- v) Probable behaviour of salts and alkali components when the soils are irrigated.
- vi) Feasibility of land-levelling when saline-alkali subsoils are close to the surface
- vii) Recommendation and location of a pilot farm if necessary.

The study of the above factors will be made in conjunction with the agronomic studies and will be varied as necessary to provide the information required by the agronomist.

3.3 Crop Yield Projections

Previous studies and reports have recorded the need for crop performance trials on the predominant soils of the project. The recent soils survey results on Bura East have emphasised this need and, until some crop trials under irrigation are carried out on these soils, it will be difficult to predict crop yields with confidence. Nevertheless it is necessary to make provisional crop yield predictions now based on present information and data. This will permit the comparison of the different development options even though the precise economic evaluation may have to be confirmed at a later stage when crop trial data are available. The consultant is expected to recommend the requirements, size, and location of a pilot farm.

It is proposed, therefore, that a senior agronomist with experience of irrigated crop performance in various conditions in East Africa should join the review team. His task will be to review and update the previous agricultural studies in the light of changes which have occurred in the last four years. He will examine in detail the recently acquired soil survey information and work in close conjunction with the soil scientist in this task. He will also visit the Hola Irrigation Scheme and any other local schemes where irrigation is or has recently been used and study all crop production figures available in relation to all relevant factors including soils, climate, water quality, seed type and quality, fertilizer application and cultivation practice.

These studies will lead to a short report containing the range of crops for which future development can be planned with, for each crop, a prediction of the yields likely to be achieved on the various parts of the project together with any qualification which may be necessary where any uncertainties need to be resolved before final development decisions are made.

A full economic and financial assessment would be made of the project including:-

- Cost of the works including a detailed time schedule of the investments, duration and year to year expenditure.
- A split of the investment item by item and from year to year over local and foreign components

- Farm budgets on the basis of different yield levels indicating main income and expenditure items and demonstrating the farmer's capacity to pay for the project's current costs or even for the investment costs without losing his production incentive.
- Liquidity analysis of a sample farm.
- Comparison between net benefit to the farmer from irrigated farming and from the traditional rainfed farming (including livestock activities).
- Budgets of the project sponsor during the implementation and operation of the Scheme taking into account different possible levels of charges to the farmers and indicating main income and expenditure times.
- Estimated net benefits of the project to the Kenyan Government.
- Estimated net effect of the project on Kenya's balance of payments.
- Cost-benefit analysis indicating the financial and the economic internal rate of return.
- Sensitivity analysis indicating the effecting of probable risks on the economic viability of the project.
- Employment generation and income distribution, effect of the project.
- The N.I.B.'s investment and recurring costs will be shown separately as well as the farmer's capital and operation costs. The N.I.B.'s income and expenditure associated with the project shall be shown in a cash flow projection covering the first 15 to 20 years of the project.

ADDITIONAL SERVICE

This will include but not be limited to the following:-

- Economic comparison of Bura East and Tana Delta by ranking them against the corresponding internal rates of return.
- Any other activity approved by the client and necessary for the project.

Tentative Schedule of Implementation

The final report shall include a detailed work programme and time schedule for all activities necessary between the submission of the report and full implementation of the Project, i.e. the settling down of the last farmer's family in the scheme.

4. Reports

Submission of the following reports is required.

(i) Brief monthly progress reports	25 copies
(ii) Quarterly progress report	10 copies each
(iii) Inception report	10 copies
(iv) Draft final report	10 copies
(v) Final report	25 copies

The final drawings shall be photo-reduced to DIN A 3 standard size for all 25 copies. In addition one set of original size drawings on non-distorting transparent material of durable quality will be required.

An approximate submission date for the inception report should be not later than two months after commencement of the study.

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