AFR TZA/S 303/90

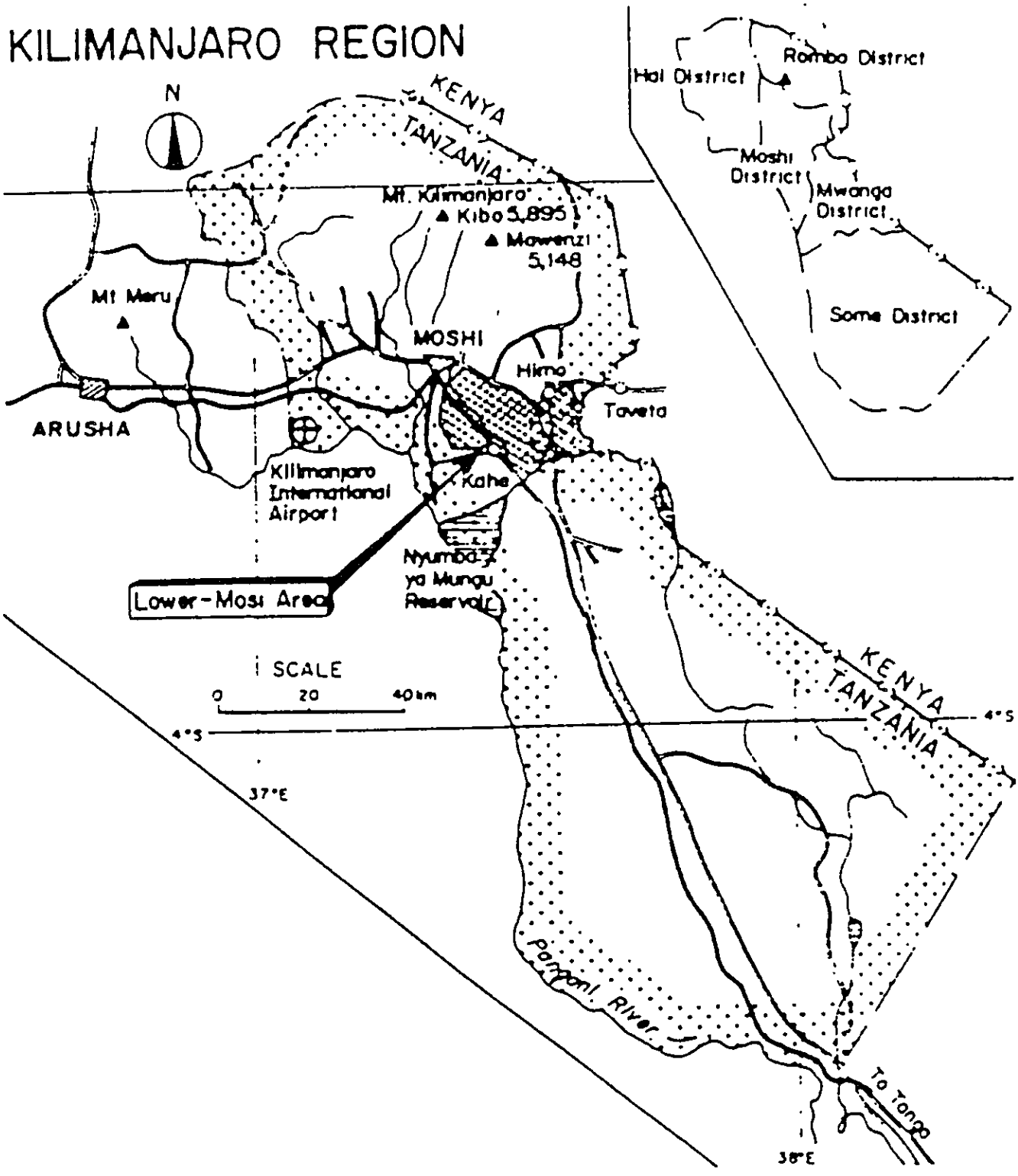
LOWER HAI & LOWER ROMBO AGRICULTRAL DEVELOPMENT PROJECT

FOLLOW-UP REPORT 1995

Project data

Region:	Africa
Country:	United Republic of Tanzania
Sector / Subsector:	Agriculture / General
Code No:	AFR TZA/S 303/90
Type:	Feasibility Study
Counterpart Agency:	Regional Development Director, Kilimanjaro Region
Fiscal Year Completed:	1990
Consultants:	Nippon Koei Co., Ltd Kokusai Kougyo Co., Ltd
Expenditure:	299,911 (¥,000)
Present Status:	Delayed or Suspended

Project site map / location



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1 Executive Summary

Summary of survey results

To date no action has been taken on the feasibility study apart from submitting a proposal to JICA for the Lower Hai project (Sanya river) via the Regional Development Directorate and the Prime Ministers' Office for funding in March 1991. The proposal was not funded. Reasons include:

- the FAO and UNDP were already involved in developing part of the river scheme;
- existing high level of donor interest in the region;
- the scheme was expensive to implement;
- the problem of water quality and salinity was unanswered.

The potential benefits from irrigated agriculture are attractive where the rural people experience crop failiures every second or third year due to drought. Despite this, the project is not considered to be attractive to donors as the cost is high in relation to perceived impact. The cost to the Government of Tanzania is also high.

Conclusions

Despite technical problems with water quality, quantity and cost; the projects represent development ideas that might be considered if the Tanzanian economy could fund the development, and if the internal economic rate of return (IRR) shifted in favour of the projects. However, at present it is probably more cost-effective to examine improvements of traditional irrigation schemes, using the lessons from Mkomazi valley.

It is felt that the area and productive value of indigenous irrigated areas was under-estimated in the JICA study. If the economic internal rate of return of the Hai and Rombo projects was reviewed in the light of the viability of indigenous irrigation systems and existing social structures, the outcome would not be attractive.

The environmental impact of the schemes also requires closer scrutiny, not only to examine impact on wildlife and regional biodiversity, especially in Boloti swamp, but also in the perceived

impact on land-use and farming systems surrounding the project area.

Recommendations for JICA

The prioritisation of these projects now rests with the Government of Tanzania. JICA may wish to review the proposals carefully in the light of recent socio-economic and technical problems on irrigation the Lower Moshi Irrigation scheme.

Dissemination and following action

In addition to the JICA UK Office, it is anticipated that this report will be distributed among the relevant authorities participating in the project: The Regional Development Director, Kilimanjaro Region, and The Ministry of Water Resources and Irrigation.

The report is intended to stimulate positive discussion among the authorities concerned, particularly with a view to enhancing future cooperation.

2 Results of survey: Project Design

Identification & outline of project rationale

The Government of Tanzania requested the Government of Japan to undertake a feasibility study in the Lower Hai and Lower Rombo districts of Kilimanjaro Region. High variability of rainfall in both districts means that rainfed cropping is subject to failiure in around 1:3 or 1:4 years.

To some extent, the identification of the project was a political issue to mitigate regional feelings the donor interest was concentrated on the Lower Moshi district.

The basic terms of reference were to:

- assess the availability of groundwater and surface water resources for agricultural development;
- identify sub-areas with high agricultural development potential;
- formulate agriculture development plan(s) for selected priority sub-area(s).

Short description of project:

The Hai and Rombo districts are situated on different sides of Mount Kilimanjaro with differing hydrological and demographic features.

	Lower Hai	Lower Rombo
Altitude (m)	750 - 1050	1000 - 1500
Mean Rainfall (mm)	500 -900	700
Area Km2	600	300
Population 1990	42,000	37,000
Density /km2	70	123

The feasibility study team surveyed Lower Rombo but discovered a lack of groundwater. The groundwater lay deep - at 100 to 200 metres, and it is not economically viable to pump water up from that depth for irrigation. Water quality was also marginal, salinity was high enough to require leaching in years of high rainfall. Following a preliminary hydrogeological survey, and for these reasons, the Rombo area was discarded from the study.

The Lower Hai was investigated further and five agricultural development scenarios examined:

1 Development of Sanya plain without dam development;

2 Development of Sanya downstream area by using groundwater and surface water, without dam development;

3 Development of Sanya plain with dam development;

4 Development of Boloti, Mungushi and Sanya with dam development;

5 Full development of Sanya plain with groundwater and dam development (Scenarios 2+3).

A hydrological appraisal was used to determine that scenario 5 was the optimal plan to maximise irrigated area under a stable water supply. It is also the more complex and expensive scenario.

The final design included the following works:

Boloti Dam: 7.8 m high, 2.4 km wide, 7.5 mcm;
Lawati Weir: 16m fixed overflow concrete weir;
Lawati Diversion canal: 2.7 km of concrete lined channel;
Intake weir: 27m fixed overflow concrete weir;
Irrigation: Boloti 290 ha Mungusi 160 ha Sanya plain 1050 ha;
Tubewells: (12 nos) 30kW submersible pump working from 70 m.

Funding

The total cost of the design was estimated at US$ 15.1 million in 1990. Of this, the Government of Tanzania would fund US$ 3 million and receive a loan of US$ 12.1 million.

The EIRR was caluculated at 15.1% and the payback period over 30 years (including a grace period of ten years) of around Tsh. 140 million/yr. Unfortunately the Tanzanian shilling is now worth one third it's value in 1991.

Review of project design

The JICA discarded the Rombo district due to technical reasons. However, the UNDP working with FAO implementors have installed two small weirs that utilise the runoff on the Ungwasi River. The Ikuini scheme had been operational for 18 months. The potential area to be irrigated is 600 ha, but to date only 90 ha are irrigated for Maize, igeon peas, millet and beans. The UNDP also funded the rehabilitation of a diversion weir and traditional furrow upstream on the Ungwasi at Lehoroma, and this supplies domestic water to two villages, and has the capacity to supply a 50 ha scheme in a good year.

People in the area dig shallow wells and use the water for irrigation from November through June. The area under traditonal irrigation is 1,170 ha rather than the estimate of 300ha in the JICA study. The JICA team maintained that irrigation requires bulk water storage, while the farmers improve the organic matter content and available water capacity of their soils to utilise residual moisture and shallow soil water storage to grow their crops into the dry season. The indigenous systems are up to 100 years old, and require sympathetic study. Adaptation may provide some improvement in yield stability.

The Lower Hai project lacked an environmental and cost-benefit analysis. The criteria used in promoting and concentrating the study on the more complex scenario did not consider the likelihood of funding or the long-term sustainability of tubewells.

Lessons drawn from the Lower Moshi scheme immediately suggest that large formal irrigation schemes are vulnerable to informal upstream development, may increase social disparities and polarise skills. To ensure sustainability, the project should be closely designed around existing structures and social systems. The management and development should be participatory and incremental, so that indigenous development processes control the project.

In Lower Moshi technical training and the improvement of marketing was the key to takeoff into the profitable and productive informal sector which now competes with the formal scheme. This situation can be avoided. Instead of funding the construction of a formal irrigation scheme, farmers may create their own scheme if the marketing incentives and technical skills are made available via the existing socio-economic structures.

The lower the inception cost, the higher the net internal rate of return.

The JICA study estimated that the total existing irrigated area in 1990 was 1,120. In 1994 the Moshi RDD estimated 1,127 ha irrigated with a high proportion of the 7,840 ha under traditional furrows also working from the Sanya river or floodplain. Land use comprises working with rainfed crops, irrigated crops, recession crops, and perennials. Grasses are also grazed and harvested from the marshy areas below Sanya plains. Livestock include cattle and goats, and wildlife resources provide some bushmeat. This integrated system is flexible in output, provides a wide range of products, including fuelwood, clay, and building materials. Many components on this system rely on a high water table in the floodplain, this would drop if the tubewells were operated.

To assess the cost-effectiveness of the formal scheme against existing or improved traditional irrigation schemes, the net return per cubic metre of water used in existing traditional systems may be calculated and balanced against the net return per cubic metre of water used in the formal scheme. If balanced with the fixed capital costs of creating the formal scheme, the formal scheme may easily become a less attractive development proposal.

3 Results of survey: Conclusions

General comments on development & lessons learned

The feasibility study is in many respects incomplete and lacking in appropriate analysis. It requires scaling down to a more appropriate proposal.

Specific comments on JICA's role

The technical analyses on hydrology, soils, conveyance are accurate and useful in the planning for the district. The Tanzanian counterparts welcomed the experience of working with the JICA experts and the study is referred to for technical information.

Requests for further surveys

The RDD in Moshi expressed a continuing interest in Rombo district because of the poverty of the people.

Annex A: Interviewees

Mr Masija, Assistant Commissioner,
Directorate of Irrigation, Dar es Salaam

Dr Sunagaya, Regional Agriculture and Livestock Development Officer (RALDO),
Moshi Regional Development Directorate

Mr Tembo, Regional Crops Officer,
Moshi Regional Development Directorate

Mr Moshi, Director,
Lower Moshi Agricultural Development Project

Mr S. Sugawara, JICA expert,
Lower Moshi Agricultural Development Project

Annex B: Photographs of project

1: Boloti Swamp, to be dammed under the Lower Hai scheme.

2: Field by Boloti Swamp, growing ten products.

3: Area to be irrigated by the Lower Hai.

4: Hill farming area in Lower Rombo.

Annex C: Terms of reference & purpose of survey

Terms of Reference

- The JICA UK Office has requested the consultants to prepare of an independent follow-up survey in Tanzania.

- It is proposed that the work be a carried out between Thursday 9th November and Friday 22nd December, 1995.

- The survey will comprise a broad evaluation and current appraisal of thirteen (13) Master Plans, Feasibility Studies, and Basic Studies in comparison to the present and future status of the individual projects or studies.

- The scope of work will cover:
  a) Study on Water Resources Development in the Ruvu River Basin
  b) Study on Dar es Salaam Road Development Plan
  c) Natural Soda Development in Lake Natron and Related Transportation Facilities
  d) Kilimanjaro Region Integrated Development Plan
  e) Southern Coast Link Road Project
  f) Proposed Mahale Mountains National Park
  g) Lower Moshi Agricultural Development Project
  h) Mkomazi Valley Area Irrigation Development Project
  i) Expanded Afforestation Work in the Same District of Kilimanjaro Region
  j) Road Improvement and Maintenaance in Dar es Salaam
  k) Lower Hai and Lower Rombo Agricultural Development Project
  l) Rehabilitation of Dar es Salaam Water Supply
  m) Topographic Mapping of Mwanza-Geita Block in the United Republic of Tanzania

- If possible, the survey will cover recent and relevant developments in the context of each project or study.

- Where appropriate, the reports will comprise questionnaires, interviews and highlight following actions for JICA and/or the Government of Tanzania.

- The reports will contain a detailed itinerary, records of interviews made and sources of information.

- The quantity and quality of information contained in the reports will reflect the availability and accessibility of information in Tanzania.

- The reports will be prepared in draft form and presented to the relevant implementing Ministries for comments before leaving Tanzania.

- Final report texts and layouts will be completed by Friday 22nd December, 1995.

Purpose of survey

This report comprises a descriptive assessment of the progress of the project against the objectives of the project as described in the original study. The purpose of the survey is to:

1. Describe project achievements to date by their:
   A. Impacts
   B. Effectiveness
   C. Relevance
   D. Efficiency
   E. Sustainability

2. If required, produce specific and general recommendations to improve the performance of this and other similar projects

3. Further communication between funding agencies, design consultancies, implementing agencies and project beneficiaries

Annex D: Methodology & Chronological Itinerary

Methodology

As far as possible, the survey was performed by a structured process:

- Identify the authorities involved
- Identify and locate key informants within the authorities
- Locate adequate documentation and reportage
- Define aims of project
- Conduct interviews on specific and general issues
- Define indicators of achievement and/or progress
- Visit the site
- Analyse the collected data
- Prepare draft report
- Discuss the draft report with key informants
- Edit and prepare final report text

Chronological Itinerary

Tuesday, November 21st

Meetings with Regional Development Directorate, Moshi:

Mr Moshi, Director
Lower Moshi Agricultural Development Project

Dr Sunagawa, Regional Agriculture and Livestock Development Officer

Mr S Sugawara, JICA Expert
Lower Moshi Agricultural Development Project

Mr Temba
Regional Crops Officer

Annex E: References & reports used in survey

JICA (1988) Plan of Operations for Topographic Mapping of the Feasibility Study on Lower Hai and Lower Rombo Agricultural Development Project in the United Republic of Tanzania. First Year. August 1988

JICA (1988) Plan of Operations for Topographic Mapping of the Feasibility Study on Lower Hai and Lower Rombo Agricultural Development Project in the United Republic of Tanzania. Second Year. October 1989

JICA (1990) The Feasibility Study on Lower Hai and Lower Rombo Agricultural Development Project. Progress Report (2). March 1990

JICA (1990) The Feasibility Study on Lower Hai and Lower Rombo Agricultural Development Project. Volume I. Main Report. November 1990

JICA (1990) The Feasibility Study on Lower Hai and Lower Rombo Agricultural Development Project. Volume II. Annex Report. November 1990

FAO (1991) Forestry for Rural energy, Hai Afforestation Scheme. Project Findings and Recommendations. 1991

Government of Tanzania, Ministry of Local Government and Regional Administration (1991) Details of Miwaleni, Lower Hai and Mwanga Agricultural Development Projects. July 1991.