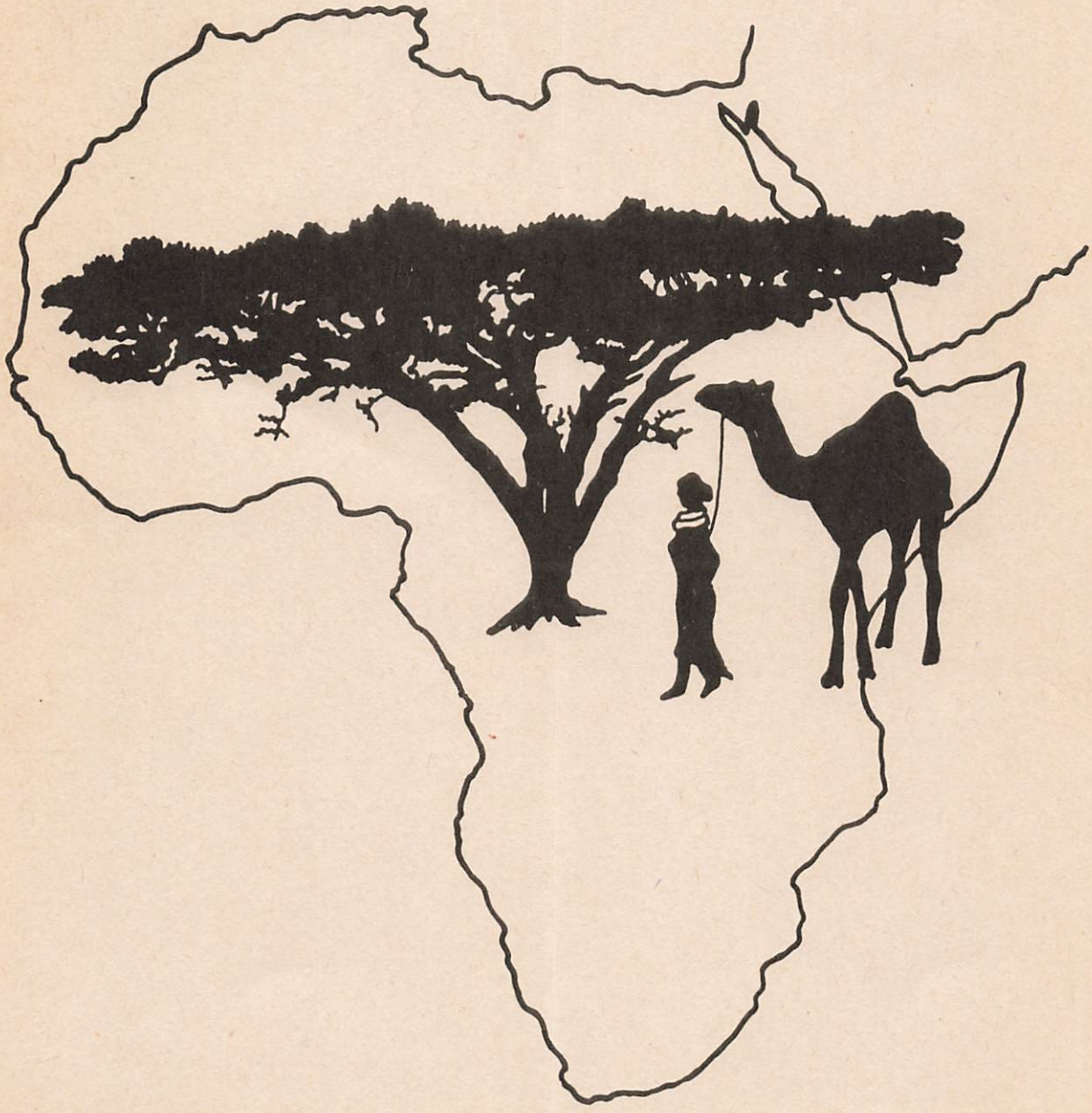
Federal Republic of Germany

Unesco Programme on Man and the Biosphere (MAB)

Republic of Kenya

Kenya Arid Lands Research Station (KALRES)



Report of the Tripartite Review Mission on the Kenya Arid Lands Research Station (KALRES) 3 – 11 February 1985

REPORT OF THE TRIPARTITE REVIEW MISSION ON THE KENYA ARID LANDS RESEARCH STATION (KALRES)

3 - 11 February 1985

BACKGROUND TO THE PROJECT

The Integrated Project on Arid Lands (IPAL) in Marsabit District of northern Kenya was conceived by UNESCO at the same time as the United Nations Conference on Desertification which recommended concerted action in the fight against desert encroachment in 1977. The UNESCO pilot project of applied research, training and demonstration started in 1976 with a view to finding direct solutions to the most urgent environmental problems associated with desert encroachment and ecological degradation of arid lands and developing new strategies for pastoral land management and regional development specific to this type of natural and human environment. The project, launched in the framework of UNESCO's inter-governmental Programme on Man and the Biosphere (MAB), represented an effort to provide the scientific basis for a holistic and integrated approach to combat desertification and improve the living conditions of pastoral people. With UNEP financial help, IPAL became an important part of MAB's fact-finding projects in the major desertifying regions of the world.

In 1978, a Traditional Livestock Management Project (TLMP) was launched in association with IPAL, but funded through a funds-in-trust agreement between the Federal Republic of Germany and UNESCO. The focus of this second project was on understanding and improving traditional livestock management of the Rendille tribe.

In line with UNEP's policy of providing only catalytic or pump-priming support to the field activities, UNEP's support of IPAL came to an end in mid-1980. Prior to that a special Evaluation Mission, which took place from 28 January to 7 February 1980, recommended that in order to make the best possible use of the investments that have already been made in northern Kenya, the research, training and demonstration activities be reoriented and continued for a further three-year period, starting 1 July 1980. The Mission, which comprised representatives of the governments of the Federal Republic of Germany and Kenya, as well as of UNESCO, also recommended that IPAL Phase III should integrate, within a single management and administrative unit, the research and other tasks which were previously handled under separate administrative and funding arrangements (i.e. the

UNEP-financed part of IPAL, and the funds-in-trust traditional livestock management project).

Based on these recommendations, tripartite agreements were set up between the governments of the Federal Republic of Germany and Kenya and UNESCO for the implementation of IPAL Phase III with Germany providing as funds-in-trust the financial resources needed for this project. In November 1982 it was agreed by all parties concerned to extend IPAL III within its existing budget until December 1983.

The performance and results of IPAL III were evaluated twice by tripartite review missions. The first one took place in November/December 1981 and the second one in February 1983. Both missions commended the progress made towards achieving the project goals, following the reorientation, change of objectives and reorganization of IPAL agreed upon for Phase III. The 1981 IPAL review mission recommended that immediate project objectives should be enlarged and that, as an action-oriented output of its research work, an integrated resource management plan should be prepared. On this basis the project submitted a draft management plan to the 1983 IPAL review mission. The mission report states: '.... a well-prepared and comprehensive Management Plan has been elaborated covering almost every aspect of development in the area. The Mission commends the efforts that were put into this.'

Acknowledging the very valid results of IPAL, the 1983 mission recommended supporting the great interest expressed by the Government of Kenya in:

(i) establishing a permanent institution for promoting, guiding and monitoring the integrated management of arid and semi-arid lands of Kenya;
(ii) starting development action in the Marsabit District based on the resource management plan prepared by IPAL.

The Kenya Arid Lands Research Station (KALRES) was established to fulfil the above wishes of the Government of Kenya.

The mission also recommended that the IPAL integrated resource management plan should be implemented in close collaboration with KALRES. Detailed proposals for such a West Marsabit Integrated Development Project were

included in the Mission report, and the content and structure of this project were further elaborated in the final version of the IPAL resource management plan (May 1984).

1. INTRODUCTION

The Mission was composed of representatives of:

- the Government of Kenya;
- the Government of the Federal Republic of Germany;
- UNESCO.

Members of the Mission are listed in Annex I.

The agreed Terms of Reference of the Mission were:

1. To review the progress of the implementation of the Project on the basis of the Project Document and the Recommendations by the Tripartite IPAL Review Mission which took place from 31 January to 11 February 1983;
2. To study and review the draft KALRES work programme as proposed by the Chief Technical Adviser and his staff;
3. On the basis of the review to advise the Project and the three parties concerned with its implementation on conceptual, scientific and operational aspects of the establishment of the Kenya Arid Lands Research Station (KALRES).
4. To discuss and advise on activities aimed at implementing all or part of the IPAL Integrated Resource Management Plan and on the role of KALRES in relation to these activities.

Mission members were provided with copies of the draft KALRES work programme in advance and thus were able to study it in detail prior to the Mission. The Mission first had introductory discussions in Nairobi with the Chairman of the Steering Committee of the Project, the Ambassador of the Federal Republic of Germany, and the Permanent Secretary in the Ministry of Agriculture and Livestock Development, respectively. The Mission then travelled to Marsabit Project Headquarters and conducted its work according to the Terms of Reference. The Mission visited the Project's field activities at Kargi, Gatab, Olturot, Ngurunit, and Lodwar. The Chief Technical Adviser of KALRES accompanied the Mission throughout.

The Mission also involved in its work the new Director of KALRES and the two UNESCO experts in woodland and animal ecology. The detailed itinerary of the Mission is given in Annex II. A list of the persons met is given in Annex III.

This report was finalized and approved by the Mission on 11 February 1985 on arrival in Nairobi. On return to Nairobi, the Mission presented its findings to the Director of the UNESCO Regional Office for Science and Technology for Africa. Representatives of the Mission also presented the findings of the Mission to the Steering Committee of the Project and to the Ambassador of the Federal Republic of Germany.

2. SUMMARY OF FINDINGS AND RECOMMENDATIONS

2.1 Transition from IPAL to KALRES

KALRES operations started formally on 1 October 1984 and not 1 July 1984 as previously envisaged and therefore will end on 30 September 1987. The immediate transition from IPAL to KALRES was considered an achievement in itself. This was made possible by the great effort and support provided by the three parties involved.

The transition was found to have been carried out harmoniously with UNESCO and Government of Kenya staff co-operating. In order to maintain the harmonious relationship so far achieved in KALRES operations, and also to ensure continued transition to a Kenyan research undertaking, every effort must be made to integrate Government of Kenya staff, through the Station Director, in all matters affecting KALRES and its operations. Suitable and effective mechanisms should be evolved to strengthen links with the Ministry of Agriculture and Livestock Development (MALD) Headquarters.

The work carried out in the final phase of IPAL and the beginning of KALRES was highly commended by the Mission. It was specifically noted that the IPAL Integrated Resource Management Plans and the IPAL Technical Reports represented a major achievement of IPAL.

2.2 Staff

Although the present small staff of KALRES is highly competent and very devoted, it is crucial that hand-over of the station's work programme to the staff of the Research Division of the Ministry of Agriculture and Livestock Development be accelerated. This should be enhanced through deployment by the Project of a few high level specialists from Kenya and the region. Special attention should be given to the continued employment of a nucleus of former IPAL field support staff which is indispensable for carrying out KALRES field activities. Funds should be made available from the 1985 international budget for field support staff.

2.3 Duty Station: Marsabit

In order to facilitate the efficient operation of KALRES, Marsabit must become the duty station for all senior staff of KALRES. Immediate completion of the construction programme, as foreseen in the Project Document and modified by an understanding between the Federal Republic of Germany and UNESCO, is strongly recommended.

2.4 The KALRES Concept

Because of the limited financial resources available to KALRES its ability to cope with the implementation of research, training, monitoring, demonstration and pre-extension, will in the foreseeable future be limited. The scope of the project will consequently have to be reduced. The station will concentrate on applied research, monitoring, demonstration and training. It must, however, be realized that expectations for active assistance through pre-extension and implementation programmes had been raised among the local population by IPAL's work. KALRES should therefore continue to provide assistance in this regard as allowed by the limited funds and available manpower. All efforts should, however, be made to encourage the implementation of the West Marsabit Integrated Development Project (WMIDP).

2.5 Programme of Work

Because of the reduced resources available the work programme will have to be seriously curtailed. Nevertheless, a minimum programme should be maintained in the different components of KALRES with priority to be given to livestock and range resources.

KALRES should continue to make available information and give technical assistance in the preparation and operation of development projects which undertake the tasks originally envisaged for the WMIDP.

KALRES should develop a programme for using the additional 110 ha (270 acres) received from the Marsabit County Council.

KALRES should co-operate with other organizations working in the dry lands of Kenya and the region.

2.6 Funding

In order to ensure full Kenyanization of KALRES by the end of the Project in 1987 it is considered crucial that a KALRES budget be established by the Government of Kenya from the 1985/86 fiscal year onward. As regards the international funding of this project, it was strongly recommended that additional German funds-in-trust be provided in 1986 and 1987. These additional funds are indispensable to meeting the objectives of the Project as defined in the Project Document, being an integral part of the agreement between the Government of the Federal Republic of Germany and UNESCO.

2.7 KALRES after 1987

Every effort should be made to secure long-term support for the KALRES Programme as the Kenyanization process continues. The widest possible collaboration should be sought with all agencies concerned with problems associated with aridity and their amelioration.

3. ACKNOWLEDGEMENTS

The work of the Mission was greatly facilitated and supported by all KALRES staff. It is particularly appreciated that the draft KALRES work programme was prepared on time and circulated prior to the Mission. The explanations given by the Chief Technical Adviser and the KALRES scientists, as well as the subsequent discussions with them, contributed greatly to the fulfilment of the Mission's task. The contribution of many Government officers and

professional staff of other projects, particularly the Wamba Food Security Programme and NORAD in Turkana, to the Mission's work was acknowledged. The work of the Mission in Nairobi was made possible through the support of the UNESCO Regional Office.

4. PROGRESS ON TRANSITION FROM IPAL TO KALRES

The Mission took note of the fact that the recommendation of the 1983 IPAL Review Mission for the establishment of two companion projects did not materialize. Members of the Mission expressed regret that it had not been possible to arrange for funding of the Rendille Integrated Development Project (now known as the West Marsabit Integrated Development Project).

It was also noted that the level of funding for KALRI (now known as KALRES) was considerably reduced. This has necessitated a reduction in the scope of the KALRES staff and work programme. Since expectations had been raised among the people in the western Marsabit area for an implementation programme, KALRES has had to devise ways of meeting those expectations to some degree (e.g. the West Marsabit Integrated Development Pilot Project, see 4.4.).

Activities of the transition phase were presented to the Mission and discussed at length. These activities were as detailed below:

4.1 Staff Establishment

The Mission noted with satisfaction that the Kenya Government had posted two scientists and four Technical Assistants to KALRES.

In the area of international staff the Mission welcomed the fact that three scientists had continued with the programme. These were the Chief Technical Adviser (formerly Project Co-ordinator), the Senior Woodland Ecologist and the Senior Livestock Ecologist. Also continuing from IPAL programme were four administrative staff.

4.2 Construction and Equipment Purchases

The Mission fully endorsed the on-going construction programme which was necessitated by transfer of project staff to Marsabit and which will also be needed to accommodate the new Kenya Government staff. It was strongly

recommended that the present funds-in-trust budget be adjusted in such a way that the construction programme can be carried out as agreed. The Mission noted that progress had also been made in the procurement of project equipment, including two new Land Rovers.

4.3 Transfer of Staff to Marsabit

The Mission endorsed the need for Marsabit to be the duty station for all professional staff of KALRES.

4.4 Assistance to Pre-Extension Projects

Although funding for the previously envisaged pre-extension project had failed to materialize, the Mission noted with appreciation the efforts made by KALRES to secure financial support for a modest pilot pre-extension project (West Marsabit Integrated Development Pilot Project) with funds channelled through the Wamba Food Security Programme. Efforts to extend KALRES' work to Turkana using NORAD funding, and involvement in drought emergency activities in the area in October 1984 were also commended.

4.5 Publications

The Mission welcomed the progress made in the preparation and publication of the IPAL technical reports. It was suggested that finalization of these reports should be given priority. In order to reduce the bulk of disseminated information in future, consolidated reports of research results with specific themes should be produced in preference to individual scientific papers.

5. OBJECTIVES OF THE PROJECT

The Mission reviewed the Project's objectives as spelled out in the Project Document. In the light of the reduced scope of the Project and the fact that the West Marsabit Integrated Development Project is not being implemented as originally envisaged, the objectives may not be attained as foreseen. In particular, promoting and guiding integrated approaches will only be possible within the scope of available resources, will be limited to the

Western Marsabit area and the extension to the 'arid and semi-arid zones of Kenya' will be limited by available resources. Furthermore it should be understood that the objectives in the extension and pre-extension programmes can only be met with the participation of Government extension staff and the pastoralists themselves. Socio-economic monitoring and preparation of audio-visual materials will not be possible, or possible only to a limited extent.

6. KALRES' PROGRAMME OF WORK

The Mission reviewed, discussed and revised the programmes of work drafted by the KALRES scientific staff. Despite the considerable constraints imposed by shortage of finance and manpower, the Mission felt that commendable efforts had been made in achieving objectives of the programme.

The main components of this programme are given in Annex IV. Comments on individual components are given below:

6.1 Human Ecology Component

The Mission noted the absence of a Human Ecologist in the Project. Because of the importance of this component, it was suggested that efforts needed to be made in order to meet the most important objectives of this work.

6.2 Physical Environment Component

This is another component for which there was no scientist on site. None the less, the Mission felt that the most important aspects, namely water resources and related problems of drought, should be taken up.

6.3 Vegetation Component

The Mission noted that this was one of the two components, together with Animal Ecology, whose activities as listed in Annex IV were endorsed.

6.4 Animal Ecology Component

As noted above, the studies in this component have continued uninterrupted. The Mission approved the amended workplan.

6.5 Education, Training and Extension Component

The Mission was concerned that this important component lacked personnel. It was recommended that every effort should be made to activate it.

7. SUPPORT FOR PRE-EXTENSION PROGRAMMES

Noting the high expectations which had been raised with respect to the West Marsabit Integrated Development Project, particularly among the local population, the Mission strongly recommended that every effort should be made by all concerned to secure funds for this programme. The Mission commended the successful efforts made by the Chief Technical Adviser to secure funds for the pilot project in the Ngurunit area.

8. FINANCIAL ADJUSTMENTS

The Mission noted that the KALRES funds-in-trust agreement established between the Federal Republic of Germany and UNESCO foresees the absolute necessity of a three-year duration for the Project, although the present budget only covers a 30-month period. Moreover, the Mission considered that the budget for the last 12 months is inadequate to meet the objectives of the Project. In this respect it was noted that in 1984, at the time of signing the KALRES agreement, the Federal Republic of Germany was not in a position to make available the full amount of the funds-in-trust needed for the setting up of KALRES as recommended by the 1983 IPAL Review Mission.

It was also pointed out again that neither the Federal Republic of Germany nor UNESCO could assume any financial responsibility for KALRES beyond the termination of the present Project. In order to ensure the success of the

whole undertaking and to facilitate the take-over of the Project by the Kenya Government, the Mission strongly recommended that the phasing out of the international experts should not be earlier than mid-1986 and that the presence of the Project Co-ordinator should be guaranteed until the end of the Project to ensure that the necessary training programme for their counterparts is completed. The Mission recommends that the international experts be replaced by senior scientists coming from the region in order to guarantee continuity of the Project activities and to minimize the problems of taking over KALRES by the Government of Kenya. These scientists, who will not be employees of UNESCO, should be paid by the Project under a special scheme. Facing this situation the members of the Mission appealed to the Government of the Federal Republic of Germany for an additional contribution for 1986 and 1987. UNESCO was asked to present an updated project budget as soon as possible in order to provide an indication of the minimum support needed.

It was the understanding of the Mission that the Government of Kenya would provide the necessary personnel both at the professional and support level as agreed in the Plan of Operation. The Mission assumes that beyond 1987 the Government of Kenya will look for international financial support to maintain the Station's activities. This would particularly include support of the above-mentioned senior scientists from the region.

9. THE FUTURE OF KALRES AFTER 1987

The Mission is aware that applied research in arid areas needs long-term commitment. Furthermore, resources needed for successful work in this environment are considerable. For these reasons the Mission strongly felt that it is necessary to mobilize both local and international support to maintain the needed high-quality scientific output of KALRES.

Annex I

MEMBERS OF THE KALRES TRIPARTITE REVIEW MISSION

1. Prof. Dr. H. Mensching
Geographical Institute
Universitat Hamburg
Bundesstrasse 55
D-2000 Hamburg 13
Federal Republic of Germany

2. Prof. Dr. Christian Gall (Secretary of Mission)
Universitat Hohenheim 480
Postfach 700562
7000 Stuttgart 70 (Hohenheim)
Garbenstrabe 17
Federal Republic of Germany

3. Prof. F.F. Ojany (Chairman of Mission Discussions)
Chairman
Department of Geography
University of Nairobi
P.O. Box 30197
Nairobi

4. Dr Horst Gabauer
Bundesministerim für wirtschaffliche
Zusammenarbeit (BMZ)
Referat 210
Postfach 120322
Karl-Marx-Strasse 4-6
D-5300 Bonn 12
West Germany

5. Dr Gisbert Glaser
Division of Ecological Sciences
UNESCO
1, rue Miollis
75015 PARIS
France

6. Dr S. Chema
Deputy Director of Livestock Development (Research)
Ministry of Agriculture and Livestock Development
Veterinary Laboratories
P.O. KABETE
Nairobi

Absent with apologies

1. Mr W.W. Wapakala
Director of Research
Ministry of Agriculture and Livestock Development
P.O. Box 30028
Nairobi

Annex I (continued)

KENYA ARID LANDS RESEARCH STATION MEMBERS OF STAFF

1. Dr W.J. Lusigi
   Chief Technical Adviser
   KALRES
   Marsabit - UNESCO

2. Dr H.F. Lamprey
   Senior Woodland Ecologist
   KALRES
   Marsabit - UNESCO

3. Dr C.R. Field
   Senior Livestock Ecologist
   KALRES
   Marsabit - UNESCO

4. Mr G.K. Njiru
   Economist
   KALRES
   Marsabit - (Employed by Wamba Project funds)

5. Mr E.R. Nkurunziza
   Range Ecologist
   KALRES
   Marsabit - (Employed by NORAD funds)

6. Dr H. Atsiaya
   Ag. Director
   KALRES
   Marsabit - (Government of Kenya)

7. Mr G. Keya
   Research Officer
   KALRES
   Marsabit - (Government of Kenya)

Annex II

PROGRAMME FOR KALRES TRIPARTITE REVIEW MISSION

3 - 11 February 1985

Sunday 3 February 1985

Arrival of members of Review Mission.

Monday 4 February 1985

9.00 a.m. - Meeting of Tripartite Review Mission to discuss the draft programme.

12.00 noon - Meeting with Mr Agoya, Deputy Director of External Aid and Chairman of KALRES Steering Committee.

2.30 p.m. - Meeting with His Excellency the Ambassador of the Federal Republic of Germany.

Tuesday 5 February 1985

Travel of mission members to Marsabit both by air and road.

Wednesday 6 February 1985

Call on District Commissioner - Marsabit.

First meeting of the KALRES Tripartite Review Mission in Marsabit.

Reception at Marsabit Lodge. All District Heads and local leaders in attendance.

Thursday 7 February 1985

Visit of Review Mission to KALRES Field Stations - to include Kargi, Mt. Kulal and Ngurunit.

Friday 8 February 1985

Second meeting of the Tripartite Review Mission.

Saturday 9 February 1985

Third meeting of KALRES Tripartite Review Mission.

Sunday 10 February 1985

Morning - Meeting of Review Mission in Marsabit

Afternoon - Visit of Mission to Lodwar - Turkana.

Overnight stay at Maralal - Samburu.

Annex II (continued)

Monday 11 February 1985

Morning	-	Travel to Nairobi.
	-	Meeting in Nairobi to adopt final report.
Afternoon	-	Meeting with the Director of UNESCO Regional Office.
Evening	-	Departure of participants.

Annex III

PERSONS MET

1. Mr D.M. Namu
Permanent Secretary
Ministry of Agriculture and Livestock Development
Nairobi, Kenya

2. H.E. Dr. von Vacano
Ambassador of the Federal Republic of Germany to Kenya

3. Mr H.B. Agoya
Deputy Director of External Aid Division
Ministry of Finance and Planning
Nairobi, Kenya

4. Prof. D.A. Bekoe
Director
UNESCO Regional Office for
Science and Technology for Africa (ROSTA)
Nairobi, Kenya

5. Mr T. Albert
First Secretary, Economic Co-operation
Embassy of the Federal Republic of Germany in Kenya

6. Mr I.K. Chelanga
District Commissioner, Marsabit (Outgoing)

7. Mr P.N. Mbogua
District Commissioner, Marsabit (Incoming)

8. Hon. G. Galgallo
Member of Parliament (M.P.)
Moyale (Marsabit)

9. Hon. A. Yattani
Member of Parliament (M.P.)
Marsabit North

10. Mr R.W. Thirikwa
District Water Officer
Marsabit, Kenya

11. Mr B.O. Adewa
District Officer I
Marsabit, Kenya

12. Mr P. Genga
District Commissioner
Turkana, Kenya

13. Mr Mathenge
District Development Officer
Turkana, Kenya

Annex III (continued)

14. Mr Andrew Bird
Co-ordinator
NORAD Programme, Turkana

15. Dr A.K. Politz
Co-ordinator
Wamba Food Security Programme

16. Dr Rose Gray
Director-General of ILRAD
Nairobi

17. Mr Letitia
Counterpart
Wamba Food Security Programme

18. Dr Curt Niesly
USAID
Nairobi

19. Dr Anthony Irvin
Secretary
Nairobi Cluster

20. Dr Robin Newson
ICIPE
Nairobi

21. Dr E. Burrow
Forester
NORAD
Turkana

22. Dr G. Murphy
Economist
NORAD
Turkana

Annex IV

REVISED PLANS OF WORK

HUMAN ECOLOGY COMPONENT

General objectives

- To arrange for specialized social sciences input in the work of KALRES.

Main objectives

The main objectives will include:

(a) Contribute to the elaboration of land management guidelines for northern Kenya, ensuring that they will improve the quality of life of the pastoral populations, achieve a better integration of Kenya's arid and semi-arid areas into the national economy and yet maintain sustained productivity of the arid lands concerned.

(b) Understand better the changes occurring with regard to the structure, social and economic organization and the dynamics of the human populations.

(c) Develop a clear understanding of the 'system', how man integrates with the animals herded and the environment in a nomadic land-use practice in decline.

(d) Ascertain the perceptions of the people concerned as regards their needs, change, land-use problems, natural environment and aspirations for the future.

Activities (as far as resources permit)

The human ecology component will continue to monitor and refine the existing data base concerning the following:

- Camp size
- Social structure and settlement
- Geographical distribution of camps/houses
- Population estimates
- Nomadic villages
- Satellite or *fora* camps

Annex IV (continued)

- Individual camp itineraries
- Movement patterns
- Pastoral economy
- Change among the pastoralists
- Water management (Rendille)
- Leadership among the Rendille
- Administrative structure for development
- Sedentarization.

These aspects of the life of the pastoralists cannot be adequately treated without some further study of their history, ritual and cultural values. The aim of the studies is to understand better:

- The development needs of the people;
- The constraints under which their pastoral economies are labouring;
- Indigenous leadership structures and how these articulate with Government administration; and
- Those practices and strategies of the pastoralists on which developmental and environmental programmes can be based with minimum disruption to the pastoral communities.

The human ecology component will contribute significantly to the design of materials for extension and assist in identification of areas for introducing appropriate development interventions into the system.

If resources and manpower allow, the human ecology activities should be extended to cover the other ethnic groups in the area - Turkana, Samburu and Boran.

Annex IV (continued)

PHYSICAL ENVIRONMENT COMPONENT

General Objectives

KALRES should prepare land evaluation studies, including land-use potential maps, involving climatological, geomorphological, hydrological and pedological data and vegetation studies.

CLIMATE

Objective

(a) To understand the major climatic regimes in the arid and semi-arid areas of northern Kenya;

(b) To investigate the effects of rainfall, temperature, and evaporation on the morphodynamic systems in the area;

(c) To study the climatic trends and rainfall variability in relation to drought and its effects on the ecosystem and the human population.

Activities

(a) To maintain the existing IPAL meteorological station and the existing 38 daily and monthly rain gauges, including the two automatic weather stations;

(b) To ensure that the data obtained are made part of the national meteorological network;

(c) To analyse and interpret the data in order to make the information available to other users.

HYDROLOGY

1. Surface Water

Objectives

(a) To assess the present and potential amount of surface water resources in the arid and semi-arid areas of northern Kenya,

(b) To devise appropriate methods for harvesting and conserving such surface water resources.

Annex IV (continued)

Activities

(a) Continue the collection of data necessary for the realization of the following activities:
- stream flow studies;
- sediment yield and transport;
- infiltration studies;
- water quality studies.

2. Ground Water

Objectives

(a) To assess the ground water potential and recharge;

(b) To study the sources of the ground water and to ensure their protection;

(c) To monitor the quality of the ground water.

Activities

(a) To study the recharge rates;

(b) To advise on appropriate well sites and their maintenance;

(c) To investigate the movement and distribution of the ground water;

(d) To study the depth of ground water levels and its change by use.

Geomorphology and Pedology

Objectives

(a) To provide basic information on the geomorphic dynamics, water and wind erosion processes;

(b) To investigate the relationship between geologic and morphological features and their relation to soil formation;

(c) To study the relation between relief, soil and the hydrological system;

(d) To study the influence of land-use methods on soil degradation and desertification;

(e) To study soil conservation.

Annex IV (continued)

Activities

(a) To identify and map geomorphic processes in the different ecological and relief units;

(b) To map desertification and degradation processes on different soils;

(c) To identify sediment transport mechanisms in relation to the hydrological system;

(d) To identify highly desertified areas and formulate corrective measures;

(e) To identify the best techniques for soil and water conservation within the study area.

VEGETATION COMPONENT

General Objective

To undertake a programme of work which will facilitate the rational use of the vegetation resources with the particular objective of improving their productivity.

Main Objectives

(a) To undertake research to obtain scientific and technical data on the rangelands and woodlands applicable to the management of these resources for the benefit of the indigenous people;

(b) To carry out systematic monitoring of these resources for the purpose of following ecological trends, assessing the results of management and up-dating management procedures;

(c) To disseminate scientific and technical information of relevance to the development and management of the rangelands and woodlands of the arid zone in Africa;

(d) To promote education and training in the ecology and management of the rangelands and woodlands of the arid zone.

Annex IV (continued)

Activities (high priorities only)

(a) To maintain existing facilities (e.g. fenced plots) where possible;

(b) To continue range production measurements;

(c) To continue tree and shrub production measurements;

(d) To complete range mapping of the working area;

(e) To test the feasibility of Commiphora live fences;

(f) To undertake trial fencing with doum palm leaves;

(g) To build stone wall livestock enclosures;

(h) To demarcate 1 km lengths of riverine Acacia tortilis woodland along a 5 km stretch in Ngurunit area to test the management technique described in the Plan, in co-operation with West Marsabit Integrated Development Pilot Project (WMIDPP);

(i) To undertake training programmes at two levels using field demonstration, classroom lectures and audio-visual shows. Such training activities would be co-ordinated with training in other subjects, particularly livestock management;

(j) A limited number of vegetation transects would be undertaken to monitor vegetation parameters in relation to the variable climate.

(k) Vegetation paddock trials at Marsabit Station.

ANIMAL ECOLOGY COMPONENT

Objectives

To assist in the introduction of integrated approaches to pastoral management which should aim at improving:

- animal productivity;
- animal health;
- herd management;
- reproductive management;
- animal nutrition;
- mobility of pastoralists.

Annex IV (continued)

Activities

(a) In the livestock demonstration and extension herds the effect of selective breeding on reproduction, adaptation and production levels will be studied:

- Productivity and adaptation of cross-bred cattle for dairy production will be studied at Marsabit;
- Production of Rendille or Somali camels and of local (small East African) and Galla goats will be compared;
- The effect of seasonal breeding on productivity will be studied.

(b) Disease diagnosis and investigation:

- Testing of vaccines and drugs;
- Herd vaccination (rinderpest, CBPP);
- Veterinary clinics.

(c) To monitor actual stocking rates in Western Marsabit and Samburu District:

- Assess carrying capacities by controlled grazing trials;
- Analyse carrying capacity at single or mixed stocking by controlled grazing trials.

(d) In the demonstration herds the relation between age at first parturition and growth, milk production and subsequent breeding interval will be analysed.

- In the demonstration herds the relation between season of parturition (in relation to rains) and production will be analysed;

(e) Depending on the final analysis of studies carried out so far, further co-operative studies (KALRES and the University) will be carried out;

(f) Riding camels will be trained and used by station personnel for transport and hauling purposes.

Annex IV (continued)

EDUCATION, TRAINING AND EXTENSION COMPONENT

Objectives

(a) Promoting and guiding integrated approaches in pre-extension, extension and development programmes in the arid and semi-arid zones of Kenya;

(b) Training and applied research directed entirely towards the integrated management of arid-zone resources for the benefit of the indigenous population of the arid regions and the national economy.

Activities

In order to fulfil the above objectives KALRES should undertake the following activities:

- Set up an education and extension unit in Marsabit to produce audio-visual and extension materials;
- Have demonstration plots for carrying capacity, range improvements, and improved livestock management at Marsabit, Kargi, Olturot and Mt. Kulal;
- Organize field days for local people in Marsabit and other stations in Kargi, Olturot and Mt. Kulal;
- The KALRES mobile audio-visual unit should visit various settlements and camps regularly;
- Provide field supervision for post-graduate training;
- Attend various forums in the district and make demonstrations of better land-use and management.