

**DRAFT**

**REPORT OF THE REVIEW TEAM  
FOR  
THE LAIKIPIA RESEARCH PROGRAMME (LRP)**

**BY:**

**F. J. WANGATI  
O. KENANI  
G-C. M. MUTISO  
S. MWICHABE**

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## ACRONYMS

APL	ASAL Programme - Laikipia
ASAL	Arid and Semi-Arid Lands
ASP	Actors, Strategies and Perspectives
CBO	Community Based Organization
CDE	Centre for Development and Environment
DAO	District Agricultural Officer
DDC	District Development Committee
DDO	District Development Officer
DEC	District Executive Committee
DEMCD	District Environment Management Committee
DGIS	Dutch International Agency for Foreign Assistance
DIDC	District Information and Documentation Centre
DLPO	District Livestock Development Officer
DPU	District Planning Unit
DRSRS	Department of Resource Surveys and Remote Sensing
DURP	Department of Urban and Regional Planning
DWE	District Water Engineer
ENNDA	Ewaso Ng'iro North Development Authority
GIS	Geographical Information System
GOK	Government of Kenya
GOSC	Government of Swiss Confederation
GTZ	German Agency for Technical Assistance
GRID	Global Resource Information Database
HATC	Highland ASAL Technologies Centre
ICRAF	International Council for Research on Agro-Forestry
IGAD	International Governmental Authority on Drought
IFAD	International Fund for Agricultural Development
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
KWS	Kenya Wildlife Services
LRDP	Laikipia Rural Development Programme
LRP	Laikipia Research Programme
MA	Master of Arts
MLRRWD	Ministry of Land Reclamation, Regional and Water Development
Msc	Master of Science
MOU	Memorandum Of Understanding
NRMMM	Natural Resources Monitoring, Modelling and Management
PhD	Doctor of Philosophy
PSC	Project Steering Committee
PO	Programme Officer
RF	Rockefeller Foundation
SAREC	Swedish Agency for Research Cooperation
SDC	Swiss Development Corporation
SNSF	Swiss National Scientific Fund
SSO	Sahara and Sahel Observatory
TOR	Terms Of Reference

TTMI Traditional Techniques for Microclimate Improvement  
UNDP United Nations Development Programme  
UNEP United Nations Environment Programme  
UNSO United Nations Sahel Organization  
UoN University of Nairobi  
USAID United States Agency for International Development  
WFP World Food Programme

## **EXECUTIVE SUMMARY**

### **1. Introduction**

The review of the Laikipia Research Programme was commissioned by the Swiss development Cooperation and was executed continuously from 22nd April to 12th May 1996. The Review Team comprised Dr F.J. Wangati (Team Leader), Mr O. Kenani, Prof. G-C. M. Mutiso and Mr S. Mwachabe. Under the terms of reference for the review, the Team was expected to:

- i) Assess the performance of LRP during the last four phases covering the period 1988 to 1996/97 in relation to the programme's set objectives, strategies, annual work plans and budgets;
- ii) Assess the impact of the two components of LRP ( the Transfer and Natural Resources Monitoring) in their areas of operation;
- iii) Make recommendations on the future of the Programme after the expiry of the current (1994/97) phase, including proposals for any changes that may need to be introduced during the current phase.

### **2. The Organization and Functions of LRP.**

The Laikipia Research Programme dates back to 1976, when scientists from the University of Berne started ecology research of Mt. Kenya. In 1984, the Laikipia Rural Development Programme (LRDP) was initiated under the sponsorship of the SDC and Kenya Government. The management of LRDP saw the benefit of the Laikipia district natural resources baseline data which LRP was accumulating. A decision was therefore taken to incorporate the management and activities of LRP within LRDP.

The objectives of the LRP were then re-defined, placing emphasis on studies to provide baseline information needed for proper prioritisation, planning and design of development programmes of LRDP. However, LRP remained a platform for postgraduate research students registered at the Universities of Berne and Nairobi. A new component, transfer of information derived from research activities, was initiated.

The long term role of LRP was never clearly articulated. As a result, emphasis on the postgraduate research platform idea has persisted. This has been reinforced by the recent reorganization of the natural resources monitoring and socioeconomic studies under independent NRMMM and ASP projects. They are within LRP and funded by different donors. Consequently, the LRP continues to operate as a collection of projects bound together only by the convenience of management services.

### **3. Achievements of LRP**

During the review period, (1984 - 96), the LRP has played an important role in postgraduate training and research. A total of 54 PhD/MSc/MA Theses and 4 Special Studies have been produced. 62 LRP reports have been published. The monitoring programmes have created natural resources and socioeconomic databases and a GIS capacity. This data has been effectively disseminated within the district planning organs. It has made impact on decision making at policy level. The documentation of the water resources and the extent of land subdivision and small holder settlement patterns in the Laikipia district is currently the most highly appreciated contribution of the LRP in the development of the Laikipia District. The influence of LRP is already extending to the wider resource management issues under the Ewaso Ng'iro North Development Authority.

The LRP has established collaborative linkages with the district heads of departments and the DDC in Laikipia, the Upper Ewaso Ng'iro Development Authority, the University of Berne and the University of Nairobi. UNEP has shown interest in promoting the use of database developed by LRP regionally and internationally.

### **4. The way forward.**

SDC, the major LRP donor, intends to stop project support in July, 1997. This has implications for other programmes, funded also by GOSC, for they are dependent on core services from LRP. The Review Team is convinced that the LRP will have an important role to play in the development of Laikipia and in development of technologies especially needed for development of cold and dry highland ASALs.

The outstanding agenda, which justifies LRP extension, includes among others:

- i) Local adaptation and extension of appropriate technologies, including crop and livestock breeds and management, that maximise water harvesting and water use efficiency at the farm, catchment and regional levels;
- ii) A more accurate understanding of the perceptions, aspirations and coping strategies of the small holder immigrant communities and development agencies;
- iii) Modelling of the behaviour of the agro-ecological system under the various land use and development and resource conservation scenarios;

- iv) Evolution of alternative livelihood systems, including wildlife management, especially for the pastoralists and small holder settlers;
- v) Integration of socio-economic and natural resource modelling in specific catchments.

The Team therefore concludes that the LRP or a similar successor organization has a long term role in the development of ASALs. This view coincides with the desire of the Department of Land Reclamation to establish such a facility in the GOK ASAL programme. The Team has however noted a number of deficiencies in the structure, management and programmes of the LRP that will need to be addressed and rectified in order to equip the LRP for the expected future role.

The Team therefore recommends that:

- i) Immediate steps should be taken to prepare LRP for incorporation into the GOK system under the Ministry of Land Reclamation, Regional and Water Development. An important and urgent step is to post to LRP a Programme Officer who is conversant with management of both research and technological development as well as the creation and strengthening of effective transfer programmes.
- ii) The mandate and programmes of LRP should be expanded to cover all ASALs with initial emphasis on the Highland Asals. All research to be undertaken under the umbrella of LRP should be focused on the priority needs of the ASALs.
- iii) The LRP should be re-named "The Highland ASAL Technology Centre". This title should help the institution to focus its activities and also to avoid confusion with the role of the National Research System.
- iv) Action should be taken to establish a budgetary line and allocation of governmental funds to support at least the current Core programme of LRP.
- v) In order to ensure orderly transition of LRP to its new role and functions, and to give the Government time to budget for the institution, the SDC should find means of supporting the Core programmes of LRP at reducing scale for at least two years from July 1997.

- vi) The Ministry of Land Reclamation, Regional and Water Development should prepare a suitable project proposal and open discussions with SDC and other donors who may be interested to support various programmes within LRP.
- vii) Any collaborative projects/programmes, including ASP and NRMMM, should provide a resident professional head (NOT STUDENT) who, with the Programme Officer, will constitute the Programme Steering Committee.

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# **1. HISTORICAL BACKGROUND TO THE LRP**

## **1.1. THE LAIKIPIA DISTRICT**

The Laikipia District comprises an area of approximately 9720 Sq. Km. stretching between the slopes of Mt. Kenya and the Aberdares Range. Ecologically, most of Laikipia District lies in the rain shadow of Mt. Kenya and falls under agro-ecological zone (AEZ) V (mean annual rainfall 500 - 700 mm) and AEZ VI (mean annual rainfall less than 500 mm). Only a small part of the district at the south west corner falls under AEZs II and III ( mean annual rainfall 700 - 1200mm).

The district was originally occupied by the Maasai who practised nomadic pastoralism. 90 % of the land was however alienated during the colonial era and converted into large scale commercial ranches. The Maasai were then confined to a smaller area in the north east which is also the driest part of the district. At independence, a number of the ranches were acquired by land buying companies and subdivided into small plots for the settlement of landless people from the fertile highlands. Land use has therefore changed drastically over the years, leading to serious over-exploitation of the land, including the vegetation, soil and water resources, especially in the drier areas which have been turned to crop production. The confinement of the Maasai on a mere 10% of the land area and in the driest part of the district has resulted in overstocking and land degradation.

The pressure on natural resources is therefore intense and is on the increase, and the water situation is particularly threatened by the rapid growth of intensive horticultural farming on the slopes of Mt. Kenya, which is depleting the limited surface water resources.

## **1.2. ORIGINAL PURPOSE, AIMS AND OBJECTIVES OF LRP**

The Laikipia Research Programme dates back to 1976 when scientists from the University of Berne initiated research projects on the ecology of the slopes of Mt. Kenya. Thus when the Laikipia Rural Development Programme (LRDP) was initiated in 1984 under the sponsorship of the SDC and Kenya Government, the management of LRDP saw the benefit of the baseline information already being accumulated by the LRP on the natural resources of the Laikipia District. A decision was therefore taken to incorporate the management and activities of LRP within LRDP.

The objectives of the LRP were then re-defined, placing emphasis in LRP on studies to provide baseline information needed for proper development prioritisation, planning and design. The major concern of LRDP was the welfare of the large number of people who had started settling on small

scale farms in the district where they were ill equipped to derive livelihood from the cool dry environment.

Consequently, the goal of the LRP was stated as "to promote the sustainable use and management of the scarce and limited natural resources, particularly water, soil, and vegetation, and hence to improve the social security of the small-scale farmers and pastoralists in the upper catchment of the Ewaso Ng'iro river".

The specific objectives set for the programme were:

- i) To monitor changes in the state of the water, soil and vegetation;
- ii) To study and document the socioeconomic conditions of the small scale farmers and pastoralists as well as the strategies and perceptions of all the actors, as an aid to design and implement appropriate developmental interventions;
- iii) To carry out adaptive research for development of appropriate technologies for the management of the natural resources;
- iv) To compile and transfer (disseminate) information derived from monitoring and research activities to the communities and the development agencies in the district;
- v) To provide a platform for training of high level manpower capable of back-stopping long term evolution of appropriate technologies for similar environments through MSc and PhD programmes.

The strategy adopted for the achievement of these objectives was to enhance the short term studies and monitoring activities already established in LRP through collaboration with universities and other relevant institutions.

### **1.3. THE EVOLUTION OF THE LRP**

The LRP has been implemented in several funding phases lasting three years or less. The first phase (1984 - 1988) saw major organizational changes leading to conversion of the LRP into an integral research component of the Laikipia Rural Development Programme (LRDP) in June 1985, (see Fig. 1). The original objectives of LRP were then further elaborated as:

- i) Monitoring of human and natural resources in order to determine the carrying capacity of the different regional units;

- ii) Providing the LRDP and District authorities with relevant information for preparation and execution of technical projects;
- iii) Monitoring of changes induced by human activities;

The LRP then focused research activities in the fields of hydrology, agro-ecology, rural/urban socio-economic interactions, and self-help. In the course of the following nine years, the LRP has used the presence of postgraduate research projects to build up impressive research facilities which have been used mainly by postgraduate students registered at the Universities of Berne and Nairobi.

The sixth phase (1993/94) coincided with the replacement of the LRDP by the ASAL Programme, Laikipia (APL) funded by the Netherlands Government. The SDC support to LRP was continued but with change of emphasis in the core programme of LRP from research and training to transfer of the information already collected.

The research activities were therefore reorganized into new and autonomous programmes:

- i) the Natural Resources Monitoring, Modelling and Management (NRMMM) under the sponsorships of the Rockefeller Foundation, the Swiss National Science Foundation, and SAREC;
- ii) the Actor's Strategies and Perceptions (ASP), funded by the SNSF through CDE; and
- iii) the Applied Research Unit (ARU), funded by the ASAL Programme, Laikipia.

The only core activity left within LRP was the Transfer Programme, an activity designed to package and make available to the relevant development agencies any useful information arising from the research and monitoring activities.

The Team was informed that it is the intention of LRP that the new relationships within research activities should be governed by formal agreements. Towards this end, a Memorandum of Understanding covering the operation of the ASP has been finalized between CDE and the Department of Urban and Regional Planning of the University of Nairobi, and another MOU to cover NRMMM is being negotiated with the Department of Agricultural Engineering of the University of Nairobi.

The Team was also informed that the major donor (SDC) that the current

phase (1994-97), which is the seventh, will be the final phase of SDC support to LRP **as a project**.

## **2. MANAGEMENT**

### **2.1. STRUCTURE OF MANAGEMENT**

The programme is currently managed by the Programme Responsible, in Berne, who has among others, three basic responsibilities: budgeting, scientific oversight and liaison with SDC. In Kenya, there is a Programme Adviser and a Programme Administrator based at the LRP in Nanyuki. The first is the chief executive as far as operations in Laikipia are concerned. The Programme Administrator doubles as an accountant as well as the logistics officer. The Laikipia Office does not seem to have budgeting responsibilities. It has to refer to Berne on work plans and budget commitments.

This management structure has not always been so. During the periods when there was a Swiss Adviser based at Nanyuki, a different distribution of key decision-making seems to have obtained whereby the Laikipia Office had wider latitude in decision making.

### **2.2. FUNDING STRUCTURE**

Since Berne controls budgets and budgeting process, it determines the movement of cash from Berne to Laikipia from time to time.

### **2.3. BUDGETS AND BUDGETING PROCESSES**

Apart from a briefing meeting between the Programme Responsible and the Team Leader at the beginning of the review, the Team was not able to interact further with the Programme Responsible in Berne and thus to obtain more detailed information on the budgets and budgetary processes. The Team, therefore, is not in a position to document the data especially for the Berne component between 1988 and 1993.

### **2.4. EXPENDITURE AND RELATIONS TO BUDGETS**

Over and above the holes in budget data, there are contradictions in the budget and expenditure lines.

### **2.5. FINANCIAL MANAGEMENT**

Financial management systems are usually underpinned by rational budgeting and expenditure processes which are built up from a detailed work-planning. The Team was unable to find a financial management system within the LRP.

## **2.6. COLLABORATIVE LINKAGES**

### **2.6.1. Relationship with GoK ASAL Development Institutions**

Since the first ASAL development programmes in 1977, the GOK created an institutional framework for staffing ASAL applied research and development activities. It was recognised that there was need for establishing baseline data, adaptive research and programming jointly between the GOK and the donors active in a particular district.

The institutional framework which has been followed for the past thirty years or so has established staffing norms for programme management, providing for core management comprising of a Programme Adviser responsible for the donor liaison and management of donor resources and a Programme Officer responsible for liaison with the GOK and management of the GOK resources. This structure of management has been followed whether projects are direct funded or implemented through the GOK. Under this management structure, both core managers are responsible for programme management. They therefore have to budget, plan and implement the baseline survey(s), development activities and finally control expenditures. They link to the GOK national and district planning and budgeting systems. This is achieved through the Inter-ministerial Project Steering Committee created under the national Ministry responsible for ASAL which approves their Forward Budgets and Annual Work Plans.

In the period under review, this normal practice for linking to the GOK has not been instituted with respect to LRP. When LRP was subordinated to the LRDP, the channel for linkage was seen as through the later institution, as shown in figure 1. Consequently, since 1994, LRP and SDC have been lobbying the Ministry of Reclamation, Water and Land Development, for the appointment of a Programme Officer. The links between the LRP and the GOK have remained informal for there is absolutely no Inter-ministerial Programme Steering Committee or a Programme Officer. This is so, notwithstanding the fact that the current GOK and GOSC bilateral agreement for 1994-1997 states that there will be a Programme Officer for LRP.

### **2.6.2. Relationships with GoK National Research Institutions**

In the normal GOK programming for ASAL development, the institution of the Inter-Ministerial Programme Steering Committee enables various district based ASAL development programmes to tap into the national Research Institutions as and when desired by giving them membership in the committee of a particular district. These are mainly in crops, livestock, and forestry. It is in the PSC that the policy on the fit of research to national research policies and programmes is articulated.

Although there has not been a single GOK research institute focusing on water or socio-economics, LRP's areas of focus were of interest to some of the national research institutions for they related to crop, livestock and forestry. It is conceivable that the national research institutions could have housed much of the research conducted in Laikipia. The key national institutions in this regard are KARI and KEFRI. Specific programmes are Drylands Crops Research, Fodder, Small Stock Breeding and Diseases, both in KARI and Agro-Forestry Research and Indigenous Trees Research in KEFRI.

The original Swiss research activities in water and socio-economics were conducted without any formal link to a national research institute though. The tradition has been continued by the Kenyan researchers based at universities. This linkage failure has militated against such research being moved from its basic to a more development oriented applied mode. This is a cost to Kenya in the long term. More costly though, is the fact that some of the research has elements of repetition of research already carried out in the country. An example is the mulching trials.

No memoranda of understanding, the acid test for formal institutional linkage, have been availed to this Team to show such links. This is not to argue that the various researchers did not have informal links with individuals in the assorted national research institutions. In fact LRP staff and university based research coordinators argue that they have all sorts of individual connections to national research institutions. This is not good enough for when they move on, LRP, the institution, loses for it does not feature in this individualistic calculus.

### **2.6.3. Relationship with GoK Regional Development Authorities**

Regional development authorities link to ASAL development activities at both national and district levels. At national level this is assured by their membership in the various Inter-Ministerial Programme Steering Committees, where they sit or are represented by the ministry housing them. At the District level, the regional authorities are members of the various DDCs and DECAs where they have programme activities or projects.

The regional authority operating in the area of LRP's interest is the Ewaso Ng'iro North Development Authority. It has only been in operation since 1989. It participates in the deliberations of the Laikipia DDC.

Since a national Inter-Ministerial PSC for the LRP does not exist, ENNDA cannot participate in it. Neither can it participate in a non-existent DDC LRP Steering Committee.

The LRP and the water resource oriented researchers have seen ENNDA as the only authority which can handle the complexity of the water resource regionally. Consequently there has been some joint activities, and a formal link has been established with ENNDA, through an MOU.

#### **2.6.4. Relationship with GoK District Institutions**

During the era of the LRDP, LRP was represented in the Laikipia DDC as well as its technical executive committee, the DEC. This official representation expired with the termination of the LRDP. Laikipia ASAL which took over the development of Laikipia from LRDP does not represent the LRP.

Since there is not a Programme Officer (ie a GOK Officer) for LRP, technically the LRP is not represented in both the DDC and the DEC! This point is lost to many who have relationships with LRP, ie Core LRP, ASP and NRMMM. The point is simply that Programme Advisers attend DDCs and DEC on invitation. It is the Programme Officers who are members of the various DDC organs.

The implication of this is that core activities of the LRP, ASP and NRMMM are not represented. The later two need to be on the basis of their applied work. The fact that the Programme Adviser attends DDC meetings and its various organs does not constitute their representation in law. It is a purely local arrangement which should be regularised. In any case, LRP attends and participates in the DDC, the DEC, the DPU and the DEMC on invitation.

Efforts have been made to establish good working relationships between LRP and the district extension services. It is however not clear to what extent the apparent harmony may have been attributed to the comparative ability of LRP to make things happen.

#### **2.6.5. Relationship with International Funding Institutions**

Relations with SDC

Since inception, and to date, LRP funding has primarily been from the SDC. This relationship is currently organised through the CDE, a legal creature of the SDC, with Dr. U. Wiesmann as the "Programme Responsible". Therefore, although many of the actors talk of the University of Berne as if it, as a corporate entity, were the contractor for LRP, it should be noted that the responsibility lies with Dr. Wiesmann, and the contractor is CDE, acting on behalf of SDC.

Through the Swiss bilateral agreements with the GOK, which have been signed from time to time, the CDE arrangements with LRP are regularised

at the governmental level.

It, however, should be noted that, under the present arrangements, the Programme Adviser is the manager on behalf of the Programme Responsible. Since the Programme Adviser has been signing contracts for all other staff, it can be concluded that all the employees of the LRP are employees of the Programme Responsible and through him, of CDE and ultimately SDC!

In terms of LRP core activities funds are provided by and managed by SDC in this framework.

### **Relations with SNSF**

Since the onset of NRMMM, there are activities within it which are funded by the Swiss National Science Foundation which also funds the ASP. It can therefore be argued that the LRP has contact with this foundation which is funded by the SDC. These funds are administered by the LRP and thus it appears that the CDE again the conduit for management and accounting through CDE to the SDC.

### **Relations with SAREC**

SAREC is one of the financiers of some of the NRMMM activities. Through this programme LRP has established contacts with SAREC, of course, through NRMMM.

### **Relations with Rockefeller Foundation**

The Rockefeller Foundation funds some aspects of the NRMMM. Funds from the Foundation are channelled to the CDE in Berne and then to LRP for disbursement. Although some of the negotiations by NRMMM for programme activities and some limited supervision takes place through the Rockefeller Nairobi Office, clearly the financing and disbursing systems show the primacy of the CDE located in Berne and working through the resident Programme Adviser.

#### **2.6.6. Relationship with International Research Institutions**

The Team has not found formal links with any of the international research institutes save for the case of UNEP-GRID. This relationship has come about in the past year as a result of lobbying activities by the resident Programme Adviser. A draft MOU has been considered by both parties and

it is expected that it will be signed in the near future.

UNEP is not funding any LRP programme activity currently. However, it is interested in utilising the collected data in attempts to develop indicators for local level environmental issues. It also would like to put the data on Internet so as to create demand for using LRP data in development and validation of sub-national, national, regional and indeed global indicators on the environment and development. Towards that end, it is willing to train LRP personnel on integration of biophysical and socio-economic data as well as linking LRP with other researchers struggling with similar data integration and derivation of indicators from such data.

### **2.6.7. Relationship with UoN**

University of Berne has signed an MOU with the University of Nairobi. This MOU regularises a long term relationship with different parts of the University of Nairobi. Although this has been done, perhaps it is worth raising some issues. Subsequent MOUs have been signed by the University of Berne and the Departments of Geography and Urban and Regional Planning as envisaged in the main MOU. The Department of Meteorology of the University of Nairobi has signed an MOU with LRP.

#### **Department of Geography**

This department of the University of Nairobi has had the longest relationship with LRP since right from the beginning a relationship was sought by the academics from the University of Berne for they initially came from the same discipline. For the period under review, the relationship has been essentially to provide for two Masters students yearly.

#### **Department of Urban and Regional Planning**

Individuals from Berne were in touch with members of the Department of Urban and Regional Planning from the time they begun research in Laikipia. The first formal links with LRP, which was then under LRDP, were in the late eighties, through offering one of the LRP staff a position in the PhD programme and through offering DURP students field work opportunities in Laikipia. Since then, this relationship has been consolidated by initiation of ASP in the past two years.

#### **Department of Agricultural Engineering**

Informal links between LRP and this department started in 1990. Since the person in LRP, who contacted the department leadership was primarily interested in ecology, the links did not grow roots. Later, as common grounds in Natural Resources management were established, the NRMMM Programme was born. However, to date, there is no MOU.

#### **Department of Meteorology and TTMI Project**

There exists an MOU between Traditional Techniques for Micro-climate Improvement (TTMI) funded by the Dutch and LRP. This MOU covered the local TTMI relationship with the local leader who is a professor in the Department of Meteorology of the University of Nairobi. This linkage has supported the training of Kenyan students in Laikipia.

The position of TTMI is that they have found LRP extremely important and

would like to see it grow in the future to assist them in having training sites. They expressed interest in advocacy for LRP.

#### **2.6.8. Relationship with KWS**

There is no formal relationship with KWS although in the past there have been extensive contacts with the antecedents of KWS and indeed KWS itself. In some ways the dropping of the previous informal links is a pity for wildlife is at the core of the development of Laikipia. Laikipia ASAL is seeking to set relationships with KWS. Lately there does not seem to have been any research student interested in wildlife related programmes.

To the extent that KWS has a large community wildlife programme in Laikipia, it may be a good idea for LRP to attract a student into the research of these problems.

#### **2.6.9. Relationship with Development NGOs**

No evidence was provided that formal relations exist with national or development NGOs, such as Oxfam, Action Aid, Wateraid etc, although from time to time NGOs like KENGO, World Vision, etc, have had informal relations with LRP.

#### **2.6.10. Relationship with CBOs**

There is no evidence that LRP has developed concrete long term relations with CBOs in Laikipia or the region.

### **3. ACHIEVEMENTS OF LRP**

#### **3.1. RESEARCH AND TRAINING**

##### **3.1.1. Research facilities**

In order to fulfil its objectives, the LRP has over the years acquired and installed a research and training infrastructure comprising:

- i) 454.99 Sq Metres of rented office space within Nanyuki Town. This facility is used for administration and working space for the various programmes operating under or in collaboration with LRP.
- ii) Sixteen desk-top and two lap-top computers which are used for word processing as well as documentation, storage and analysis of the large quantities of data acquired through research, surveys and the natural resource monitoring activities. These computers are freely

available to post-graduate students carrying out field research projects under the LRP.

- iii) Five multi-purpose vehicles which are used for research, monitoring and information transfer activities.
- iv) Two research stations located in Matanya (AEZ V and Kalalu (AEZ IV). These stations are equipped with temporary field offices, fully instrumented agro-meteorological stations, and standard run-off measurement plots. The LRP has also installed and maintains four hydro-met stations at Il Pollei (Mukogodo), Ngenia, Sirima and Rumuruti.
- v) The NRMMM has also installed and maintains monitoring stations at Embori, Teleswani, Naro Moru , Met Station, Gate Station, Munyaka and Karuri. The NRMMM also maintains river gauging stations at Logilado, Junction, Ewaso Narok and Acher's Post.

### **3.1.2. Research Programmes and their Outputs.**

The LRP is not a formal research institution and has therefore no long-term research programmes. The research activities carried out under LRP comprise post-graduate projects and ad-hoc studies carried out to provide specific information required for decision making in development programmes.

The studies carried out so far comprise 23 PhD projects (including on-going studies), 31 MA/Msc. projects and 4 Special studies. The results obtained in these projects, including ongoing studies, are published in 57 PhD/Msc/MA theses/Special studies and 62 LRP publications (see Annex II).

The major results of this research may be classified and summarised as follows:

### **a) Soil and Water Conservation**

- i) The ongoing de-forestation of the middle and upper catchments will have profound influence on the water balance and will reduce stream-flow into the Laikipia District and beyond.
- ii) Gully erosion is endemic in the settled regions, substantial loss of soil is still taking place from both cultivated and pasture land. Establishment of permanent soil cover and mulching has proved efficient in reducing run-off and evaporation on cultivated land.
- iii) There was increase in yield of maize in the first three rows from a *Plectranthus Barbatus* live fence in AEZ V after root pruning but the benefit decreased rapidly, becoming insignificant after four seasons. Crop performance and production at the research site in AEZ IV did not respond significantly to root pruning or spacing of *Grewillea Robusta* trees inter-planted with the crops.
- iv) The land in AEZ V is too dry for rain-fed crop production at existing technology. However, since the new settlers in this environment have no alternative for their subsistence, improvements of the crop microclimate, especially improvement in water use efficiency, can be achieved through mulching, shade trees, shelterbelts and minimum tillage.
- v) The rainfall infiltration rate in the cracking deep luvisols predominant in AEZ V depends more on tillage practices than on degree of ground cover. The situation is however different in the soil types of AEZ VI (Mukogodo). In the latter, areas which have been denuded of vegetation through overgrazing develop crusting of soil surface, and rainfall infiltration is 12 times less than on areas with vegetation cover. Re-establishment of vegetation in the denuded areas is therefore only possible if the surface crust is broken mechanically.

### **b) Socio-economic Issues**

- i) Shortage of labour on the small holder farms is an important constraint to crop and livestock production.
- ii) One third of the household income in the new settlements was derived from small ruminants. Availability of pastures is not yet limiting as long as a significant proportion of farm plots remains unoccupied.

- iii) Small scale manufacturing enterprises had started well in the western part of the district but their performance was on the decline.
- iv) The main constraint to cattle production is lack of pasture during the dry season. The small ruminants were less affected.
- v) Family linkages in the high potential areas of origin of the settlers and off-farm incomes provide a significant life support in the small scale settlements.
- vi) The Maasai who inhabit the Mukogodo Division still derive their main income from livestock sales. They can no longer be described as pastoralists in the traditional sense as their diet is only marginally dependent on livestock products. They have become more sedentary and relatively poorer than their counterparts in the neighbouring districts. Their future seems to depend more on availability of employment rather than improvement in livestock production.

### **c) Ecological Studies: Range management**

Except under riverine conditions where trees suppress total biomass production, biomass production under trees in rangelands was found to be double that in the open, possibly due to soil protection, better microclimate and increased soil moisture.

Shortly after the closure of the LRDP and the introduction of the Laikipia ASAL programme in 1993, the organisation and function of the LRP have changed considerably. The natural resource monitoring, management and research, the socio-economic research and the farming technology adaptation and transfer have been removed from the direct control of LRP. The only remaining functions within LRP are management of the database, special studies and transfer of information to the district and regional development and planning system, and servicing of the research and monitoring programmes. These functions are what is referred to subsequently as Core LRP.

#### **3.1.3. Training Activities and their Outputs**

In addition to the formal postgraduate training carried out under the LRP, a number of staff of LRP have been trained. (See Annex III).

### **3.2. THE NATURAL RESOURCE MONITORING NETWORK.**

Monitoring of the changes in the state of water, soil and vegetation

resources of the Laikipia ecosystem has been one of the specific objectives of LRP from the beginning. The primary concern was and remains that the scarce natural resources in Laikipia District (and the entire Ewaso Ng'iro basin) are being subjected to increasing consumptive pressure through the expanding population and introduction of "high resource demand" production systems such as irrigation and wetland reclamation. Yet the ecosystems are predominantly ASAL with a low capacity for regeneration of natural resources.

The monitoring activities were started in 1985 by a PhD student within the ecology programme. The first agro-meteorological instruments were installed at Matanya and Kalalu which have grown into research sub-stations. In the same year, the TTMI project installed specialized data-logging equipment (a wind set with 18 anemometers, a solar radiation set with 18 channels and a set of soil thermometers). The data-logger equipment has since been removed. Between 1989 and 1990, the arrival of more PhD research students expanded the network with installation of hydro-meteorological stations within five smaller dry river valley catchments with facilities for monitoring sediment transport. From 1991, the NRMMM programme has intensified not only data collection, but also the use of the data to develop models to be applied in resource management. Currently the monitoring network comprises the facilities below.

### **3.2.1. Agro-Meteorological Stations.**

The two main agro-meteorological stations are located within Agro-Ecological Zones (AEZ) IV (Kalalu) and V (Matanya). Apart from generating climatic and hydrological data, the stations are located in and provide data required for experimental plots on agro-forestry, grazing and soil and water conservation techniques. The main use of these data include modelling experiments by PhD students (currently on the calibration of the CERES maize model); experiments in agro-forestry, and in evaluating the effects of grazing/tillage techniques on water and soil conservation. Each station has a permanent staff of one research Assistant, one Foreman and one Watchman. Casual labour is hired according to seasonal requirements.

### **3.2.2. Hydro-Meteorological Stations in Small Catchments.**

There are five hydro-meteorological stations located in micro-catchments scattered over AEZ IV, V and VI within Laikipia district. The stations are located on small dry river valleys at Matanya, Rumuruti, Mokogodo, Ngenia and Sirima. Installation at Matanya and Ngenia are not fully operational. Each station comprises 1 weir, 1 anemometer, 1 evaporation pan, 1 automatic water level recorder, 1 staff gauge, 4-5 rain gauges, 3 - 5 run-off plots and about 10 neutron moisture meter access tubes. The data

collected include stream flow and sediment yields, soil moisture, meteorological data, run-off, soil loss and estimates of vegetation cover. These stations are manned by 1 Research assistant (except Sirima and Ngenia), 1 Foreman (except Mokogodo, Ngenia and Rumuruti) and 1 Watchman.

### **3.2.3. River Gauging Stations**

Twenty River Gauging Stations have been installed at strategic points along the perennial rivers within the Upper Ewaso Ng'iro basin in collaboration with Water Development Department. Installations are located at Ewaso Narok, Junction, Segera, Ngare Nyiro, Baguret, Nanyuki, Naro Moru, Munyaka, Likii, Nanyuki Confluence, Naro Moru Gate, Naro Moru Met-station, A6, Ontulili, Timau, Ngenia, Sirimon, Teleswani, Siraji, Logilado, Karuri and Archer's Post. The stations cover the entire spectrum of AEZs from Alpine I, II, III, IV, V, VI to AEZ VII). The RGS are equipped with staff gauges and automatic water level recorders and produce data on river flow and sediment loads.

### **3.2.4. Sub-Catchment "Profile" Hydrometeorological stations**

The network also integrates 2 sub-catchments (Naro Moru and Embori profiles) which have a series of hydro-meteorological stations for specific modelling studies within the NRMMM training programme. The Naro Moru sub-catchment profile collects readings on hydro-met data under conditions ranging from the alpine zone to the savanna, traversing an area under intensive irrigation agriculture; while the Embori sub-catchment provides hydro-meteorological data covering a drier montane-lowland gradient and differences in sediment yields under moorland, natural forest, squatter settlement and a large scale well managed ranch. The Rumuruti Catchment is yet to be covered.

### **3.2.5. Management of the Monitoring System**

Currently the monitoring component of NRMMM is operated by 5 Research Assistants, 8 Foremen and 3 Watchmen. Four other people are paid honoraria to help in reading the equipment. This staff complement is over and above personnel from the Water Department stationed in about 8 river gauging stations within the monitoring network. It is estimated that the running costs for these stations is in the magnitude of Ksh. 80,000.00 per month, of which about 40% is expenses related to payments for casual labour and staff allowances.

## **3.3. THE CORE-LRP PROGRAMME**

### **3.3.1. Components of the Core Programme**

The core project comprises three activities, namely, Central Management, Oriented Research, and Information Transfer.

### **Central Management**

The Central Management is responsible for the following functions:

- i) Maintaining the accounts;
- ii) Personnel matters concerning the LRP and collaborating NRMMM and ASP projects;
- iii) Administration of assets including procurement, allocation, distribution and maintenance;
- iv) Representing the LRP at district, regional and international collaborative meetings; and
- v) Providing logistical support for the Programme.

In addition, it is within the Central Management that the planning and management of the entire Programme is undertaken, including advising and coordination of the collaborative research programme and activities. Prior to 1992, and 1995, all the activities currently undertaken by the NRMMM and ASP were part of the core Project.

### **"Oriented" Research**

Research may be either primary or adaptive, technologically oriented or management oriented. Primary research explores an area for the first time while adaptive research takes previous research findings and adapts them to new situations. Technological research focuses on bi-physical sciences while management research focuses on social sciences. The Programme does not carry out its own research, but relies on the work done by M.A/M.Sc. and PhD students undertaken to meet their course requirements. However, the Programme undertakes what it terms as oriented research which is carried out either through the initiative of the Programme, or on request. Such assignments are usually contracted out as the Programme does not have internal capacity to carry out the research on its own.

To date, over fifteen oriented research/survey studies have been undertaken covering such areas as settlements, farming systems, community development, land use, off-farm activities, and household surveys. In the area of water resources, considered to be the main developmental issue in the district, the Programme has prepared a Water

Supply Inventory and a Water Development Plan for the district. Some of the current assignments for the Programme are the preparation of the District Atlas, requested for by the DPU (whose completion is expected to be in April 1997); an E.I.A. study on swamp drainage for ASAL Laikipia (draft expected by end of April, 1996); and a Feeder Roads Requirements study for ASAL Laikipia (just commenced). There are also two studies requested for by ASAL Laikipia:- a Conservation Master Plan (to commence in July 1996), and a Water Harvesting Potential study to commence in September, 1996.

### **The Transfer Project**

The Transfer project was started in 1994, about ten years after the commencement of the LRP. It was thus not part of the original components of the Programme. The rationale behind this activity was that research work, (in this case, data/information) are only useful in as much as they are disseminated to users for application. The primary objective of this project was therefore to support district development and planning institutions and the regional development authorities by making available to them relevant information and findings, generated through various programme activities. This project is directly funded by the SDC and has ten employees.

The Transfer strategy developed in 1995 involves the following partners:

- i) The ASAL Programme, Laikipia (APL) which performs a facilitator role. Actual implementation is undertaken by line ministry officials, NGOs, and communities. The APL has also commissioned several studies through the LRP which are then passed over to the relevant agencies for use.
- ii) The Ewaso Ng'iro North Development Authority (ENNDA). The mandate of this parastatal includes the development, planning, coordination, allocation, and management of the natural resources of the Ewaso Ng'iro catchment including the dry parts of North-Eastern Kenya. The Authority's area of jurisdiction covers about 37% of Kenya, and is, therefore, regional than district based.
- iii) Departmental Heads of Line Ministries. The DDO, the DAO, the DLPO, and the DWE are the main agents for transfer within the district administration. Through this collaboration, several joint projects have been initiated like training of extension workers, small ruminants improvement project, vegetation and range condition assessment, water supply inventory, among others. Further, the LRP is a member of the DPU, DDC, DEC, and PSC.
- iv) University of Nairobi. Through the links that have been established

with the various departments of the University of Nairobi, the process of transfer here is mutual whereby the LRP consults with lecturers and scientists on specific problems, and the University benefits from the research platform of the LRP.

- v) National Research Institutions. The link to the national research institutions like KARI and KEFRI is intended to lead to the development of adapted packages for the Laikipia setting.

The dissemination of information is done through co-operation and collaboration with the above partners, through facilitation at various workshops/seminars in the district, and by distribution of studies to potential users (see Annex IV). The transfer activities are concentrated in four main areas i.e. (i) Water Use and Management; (ii) Land Use Planning; (iii) Land Sub-division; and, (iv) Improvements in Farming Systems.

### **3.3.2. Achievements of the Programme**

Since its inception in 1984, the Programme can be credited with the following achievements:-

- i) A total of 62 reports in 4600 copies have been published. Out of these 2,707 copies have been distributed to 1,378 recipients. (See Annex IV).
- ii) The Programme has succeeded in forging collaboration in training and research with several institutions including eight (8) departments of the University of Nairobi and the University of Berne. A platform now exists whereby Kenyan scientists supervise Swiss students, while Swiss scientists supervise Kenyan students offering an opportunity for collaborative learning and sharing of scientific information. Through this collaboration, eleven (11) PhD students (9 Swiss and 2 Kenyans, the third Kenyan never finished), and twenty-two (22) M.A./M.Sc students, sixteen of whom were Kenyans have been trained (see Annex II). Apart from this contribution in terms of local human capacity building, the benefits to Kenyan scientists and researchers from interaction with their counterparts from an outside university and environment is a significant contribution although it cannot be quantified.
- iii) The Programme has succeeded in establishing collaboration with regional and international institutions like ENNDA, UNEP/GRID, ICRAF, and with the district policy and development agencies of the Government. This collaboration facilitates topical and scientific exchange of data and information,

- iv) Through the LRP, the SDC has found an appropriate channel for training and research grants which have benefitted both Kenyan scientists and researchers in particular, and the nation at large in supplementing local training resources, and through data generation. Laikipia district is now considered as the most researched district in Kenya, and the dearth of information which normally impedes development planning as far as this district is concerned is not a major constraint.
- v) Through the Programme, an institution, albeit an informal one, has been created and equipped with a variety of scientific and management equipment and has developed internal management capacity that can be used not only for generating data for use in development of the district, but also at the national level and global levels. The Programme has developed bio-physical and socio-economic data sets which can form the basis for further analysis and interpretation, and a unique opportunity to generate a functionally interactive data base for highland ASAL ecologies. Further, local scientists have found, in the LRP, a platform through which they can publish their work thus contributing to scholarship and professionalism.
- vi) The Programme has made an important contribution to planning and policy making at the district and regional levels by demonstrating the vital need for detailed information generated and located at the district level. District based government agencies, have for example, found it more expedient to contact the LRP than parent ministries for specific types of data whose scale can only be availed through and by the LRP. At the regional level, the ENNDA has been provided with information to intervene in regulating uncontrolled water abstraction in the affected areas.

## **4. CONTRIBUTION OF THE NEW PROGRAMMES TO LRP OBJECTIVES**

### **4.1. NATURAL RESOURCE MONITORING, MODELLING AND MANAGEMENT (NRMMM).**

In 1991, the NRMMM programme grew out of the Ecology programme of LRP with financial support from the Rockefeller Foundation. The aim is to intensify research in natural resources in Laikipia and its environs while at the same time using the monitoring data to develop models. The modelling process entails first building on the hydro-meteorological model that was developed for the Naro Moru sub-catchment by M. Thomas and extend it within the Embori sub-catchment which is drier; and secondly widening of the scope to include soil erosion risk, primary production, soil moisture balance and water abstraction. This modelling is a part of the six specific doctoral research projects being undertaken within the NRMMM programme.

Apart from continuation of collecting data from the stations on behalf of LRP, the potential contribution by the NRMMM is to develop models which development agencies in the district and others can use for spatial and temporal extrapolation/interpolation and prediction of land use changes.

So far only one model on the hydro-meteorological characteristics of the Naro Moru sub-catchment has been developed. A similar one is in the process of being developed for the Embori sub-catchment. There is a possibility that two other models on the primary production - water use relations; and on the soil erosion risk of the upper Ewaso Ng'iro basin will be developed. One of the studies also intends to develop a quantified "Water Costing Manual" within the Nanyuki sub-catchment to rationalize surface water abstraction for different users.

### **4.2. THE ACTORS, STRATEGIES, AND PERCEPTIONS (ASP)**

The Actors, Strategies, and Perceptions for sustainable resource management and planning is a new project initiated through the collaboration of the University of Nairobi, and the University of Berne. The main philosophy behind this initiative is to facilitate resolution of conflicts relating to the use of natural resources by ensuring that the perceptions and strategies of both the external and internal actors in the development scene are better understood. This project has generated four PhD research scholarships for two Kenyans and two Swiss.

Although, as the Team was informed, the ASP was supposed to be executed under the auspices of the LRP, the project is actually being run by the Department of Urban and Regional Planning of the University of

Nairobi. The LRP is used for accounting purposes, a service it offers free, and has no say in the work plan or activities of the ASP. There is, therefore, currently no link, other than historical, between LRP and ASP. Without an operational link with the LRP, the chances of the ASP degenerating into a pedantic undertaking are real. This is so as both the students and their lecturers have the completion of post graduate research as priority.

#### **4.3. THE APPLIED RESEARCH UNIT (ARU)**

The Applied Research Unit was established by the Laikipia ASAL Programme in 1994. The stated major goal of ARU is to identify issues of adaptive research in the productive sector targeting especially the resource poor farmers by providing a platform for dialogue with the major actors, ie, researchers, extensionists and farmers, looking for possible sources of relevant technologies, and demonstration of such technologies to the farming community.

The ARU is therefore a transfer rather than a research programme. Like the Transfer programme of LRP, the ARU is expected to work closely with and assisting the district extension services and the farmers to evolve appropriate farming systems for the development and sustainability of the small scale farms in the settlement schemes. Although the ARU is housed in the same building and in close proximity to the LRP, it is funded entirely by the APL and is functionally and administratively independent from the LRP.

## **5. ASSESSMENT, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1. RESEARCH AND TRAINING**

The LRP was established originally as an integral part of the LRDP to conduct research that would contribute directly to the solution of developmental problems within the Laikipia District. However, in the absence of a cadre of full time research staff, the LRP decided to use postgraduate research projects to achieve the objectives of creation of baseline database on the district, technology development and the build up of scientific and technical capacity to address the problems of ASAL development. Under such circumstances, the LRP has been unable to evolve a long-term research programme and the research activities conducted under LRP have had short term objectives designed mainly to meet the academic requirements and funding arrangements of the University Postgraduate programmes at the Universities of Berne and Nairobi.

Efforts have nevertheless been made to select research topics, soil and water conservation, natural resources management and socio-economic

issues; that are relevant to the developmental needs of the immigrant farmers and pastoralists in the Laikipia settlement schemes. However, in the absence of a formal mechanism or incentives to establish demand-driven research, the topics for research have been, in the final analysis, based almost entirely on the perceptions of the academic supervisors at the universities.

### **5.1.1. Impact of Research**

The main output of the research activities under LRP (see section 3.1.2.) has been more in creating a better understanding of the socio-economic conditions and resource constraints facing the small scale farmers and pastoralists in the district, than in the evolution of new and proven technologies to solve the problems of improving stability and sustainability of the Laikipia ASALs under small scale agriculture.

Although one may argue that small scale farming is still too new in the district and the extension services are also inadequate, it is not surprising that even under the extreme hardships being experienced by the immigrant small holders. The Review Team was unable to identify significant technologies emanating from research activities under LRP that have been adopted by the farmers for improvement of productivity even within the vicinity of the two field research stations the Team was able to visit.

The improvement of the knowledge base from socioeconomic studies and natural resource data accumulating from research activities is however substantial and has already had a major impact on the planning processes at district and sub-regional levels. The contribution of LRP research should become even more important with improved management of and access to the database at LRP.

### **5.1.2. Capacity Development**

Considering the large number of Msc and PhD research programmes that have been successfully completed under the LRP, there is no doubt that LRP has made an important contribution in capacity building for technical support to ASAL programmes in Kenya and Switzerland. The impact of this training will emerge slowly as the graduates take their place in leadership of research, training and development programmes. The cadre of highly trained and experienced research assistants developed in LRP will also be a valuable asset for support to field research projects especially those related to ASAL development within or outside LRP.

The research facilities, including baseline database, developed in LRP are impressive and will continue to be in demand as a field base for

postgraduate training. The impact of the improved database is already being felt as the information is used to accelerate district planning, regulation of water utilization, prioritisation of development activities, and review of policies concerning subdivision of land in the ASALs. The Laikipia side of the Mt Kenya region has now the largest number of agro-climatological stations and standard run-off plots in Kenya, and most likely in the entire Eastern Africa Region. Since these installations cover a wide range of soils and agro-ecological zones, the facility provides a valuable opportunity for modelling catchment behaviour under different land use and for calibration of soil erosion models.

### **5.1.3. Future Research Needs**

The future development of the ASALs which occupy over 80% of Kenya's land resources is a major technological and socio-economic challenge which will intensify as more and more people move into these regions in search of basic subsistence and economic opportunities. Some of the pressing issues are:

- i) Local adaptation and extension of appropriate technologies, including crop and livestock breeds and management, that maximise water harvesting and water use efficiency at the farm, catchment and regional levels;
- ii) A more accurate understanding of the perceptions, aspirations and coping strategies of the small holder immigrant communities and development agencies;
- iii) Modelling of the behaviour of the agro-ecological system under the various land use and development and resource conservation scenarios;
- iv) Evolution of alternative livelihood systems, including wildlife management, especially for the pastoralists who may be forced to change their way of life and subsistence due to scarcity of land;
- v) Integration of socio-economic and natural resource modelling in specific catchments.

Some of these needs, especially those relating to natural resources management and utilization are being addressed for the lowland (warm) ASALs through the dryland programmes of the Kenya Agricultural Research Institute (KARI) and the Kenya Forestry Research Institute (KEFRI). These institutions have as yet to develop similar research programmes specific to the special needs of the highland ASALs such as Laikipia district which are characterised by low temperatures and hence technologies adapted to

cold, dry conditions. A further need is for development or adaptation of technologies for management of water which is the single most important problem in small holder settlement schemes in the ASAL environment.

Since both KARI and KEFRI have no immediate plans to extend their programmes to the cold ASALs due to resource constraints, the research platform developed under LRP will continue to be needed for adaptation of technologies for ASAL development. The LRP also provides a unique opportunity for integration of socio-economic and bio-physical information in the modelling of ASAL development options.

#### **5.1.4. Conclusions and Recommendations**

- i) The Review Team considers that although the research programme of the LRP has been mainly unstructured and of academic interest, some of the research has generated useful baseline data, especially on socio-economic issues, which have found immediate application in development planning at district level. The Team **recommends that LRP continues to encourage and to support postgraduate research in the highland ASALs but that the research topics should in future be selected to provide answers to specific developmental issues.**
- ii) The Review Team considers that although baseline studies should be continued within Laikipia District. However, in view of the dynamic settlement and resource use patterns, the Team **recommends that the LRP should extend its operations to similar environments in the country as resources permit.**

### **5.2. NATURAL RESOURCE MONITORING.**

#### **5.2.1. Scope and Coverage**

The aim of the resource monitoring activities is to generate information on the status of the natural resources in Laikipia, particularly water, soils and vegetation. In this respect, the monitoring is correctly biased (in the short term) towards surface water resources which have systematically come under steep demands for abstraction especially with introduction of more water demanding production systems such as floriculture and irrigated agriculture. Also, the shift from large scale livestock/wildlife ranching to small scale mixed agriculture and livestock rearing has put more pressure on land and hence the need to monitor its status with a view to assessing the possible impacts on soils especially soil erosion and loss of fertility.

Natural resource monitoring implies periodic assessment of the condition of

water, soils and vegetation, livestock and wildlife at specified intervals from spatially geo-referenced benchmark sites representative of the main natural resource categories. Such sites should therefore reflect the dynamic interactions between resource endowments and human activities which control demand. The Team is satisfied that the current spatial distribution of the stations in the monitoring network adequately cover the agro-ecological diversity within the district. The stations in small catchments also capture to a large extent types and dynamics of the rapidly changing production systems. The data generated, if adequately analyzed should therefore provide a fairly accurate picture of the status of the natural resources in Laikipia district.

While the network of monitoring stations for soil erosion is fairly good, there is always the possibility that the condition of the on-station trials may not be representative of the on-farm conditions, especially the rapidly changing land use patterns.

Monitoring of the vegetation has not started. The determinations and assessments of percentage cover at the stations cannot capture other useful variables such as change in spatial extent and species composition; factors which are connected with bio-diversity, soil protective cover and forage availability (in terms of pasture degradation). Changes in spatially restricted endemic ecotypes like swamps and gallery woodlands/forests along water channels cannot also be adequately covered by the existing monitoring system.

The Team therefore **recommends that:**

- i) A number of on-farm trials for soil erosion particularly in areas with rapidly changing land use patterns should be established. These should provide particularly a better insight on the status of soil loss.**
- ii) Capacity within the transfer programme be created to make assessments on status of the vegetation. There should also be a linkage with other departments specialized in such assessments such as the Range Unit in the Department of Livestock, KWS and DRSRS.**

### **5.2.2. Data Management**

Data from the monitoring system is of use only after it has been processed into information which is then disseminated to relevant users. Data processing requires a well structured database with capacity for data analysis, archiving and presentation of results. The monitoring programme so far entails field collection of data up to filing stage but has neither been

checked nor processed into computer readable formats. It therefore remains un-structured and un-analyzed. This means the data is not integrated within the other data sets that LRP has generated over time namely an integrated GIS based database, the socio-economic (ASP) and agro-hydro-meteorological (NRMMM) data sets.

Therefore the weakest part of the monitoring system is in the area of data management. Already a significant number of studies, surveys and research carried out by students and researchers between 1985 and 1993 (including monitoring data) both in bio-physical and socio-economic fields were integrated into a GIS based database using expert software systems that handle data processing (checking, interpolation, extrapolation, integration), analysis, presentation and archiving.

This database is not currently being updated along side further data generation from student research and monitoring. Instead the ASP and NRMMM are systematically developing separate and parallel data sets independent of the existing GIS database. One reason for this trend seems to be a weak scientific, technical and analytical capability within the GIS facility to process, analyze and integrate the bio-physical and socio-economic data. Despite the emergence of this divergent trend, the ASP and NRMMM data sets are in fact far less organized compared to the GIS database.

The Team therefore **recommends that a senior scientist with GIS oriented analytical skills be deployed within Core-LRP to organize and link the monitoring data to the existing GIS database within LRP.**

### **5.2.3. Dissemination of Information**

Dissemination of information arising from the monitoring activities has not been fully developed. Nevertheless, rainfall statistics are regularly transmitted to Meteorological Department in Nairobi as part of their national grid. Data on river flows are made available to the water departments staff in Laikipia and Isiolo as well as the ENNDA. The main uses of these data are sediment and surface water monitoring, planning for dams and rationalizing water abstractions in the respective districts and the Ewaso Ng'iro basin. Soil moisture data from the network is not utilized by anybody at the moment. The information generated from postgraduate research projects does however find its way out through scientific publications and theses.

The Team **recommends that packaging and dissemination of information from research projects should be one of the key activities of the transfer component of the LRP.**

#### **5.2.4. Sustainability**

The Team is of the view that the long term strategy of LRP should be to shift monitoring activities closer to the GOK departments who are the direct users of the data and hence will integrate the data collection in the existing extension network. A closer working relationship with the District Statistics Office, Department of Agriculture, Livestock, DRSRS and KWS will not only increase usage of information but will also ensure long term sustainability of the monitoring activity. The extension staff in agriculture and livestock development could take readings on a longer term basis. The KWS could utilize its biologists to assess vegetation. The DRSRS could provide the aerial photography to supplement extrapolation of models, and provide supplementary data on livestock and wildlife. The Range Unit of the Livestock Department could facilitate analysis of species composition and functional and genetic degradation of the vegetation. Maintenance of the field stations is therefore justifiable on account of having an early warning mechanism to detect deterioration within the natural resources.

### 5.3. MANAGEMENT, FUNDING AND INSTITUTIONAL LINKS

#### 5.3.1. The Burden of Past Structures and LRP Locale

The historical origins of LRP are detailed in Section 1.2. of this report. LRP was an afterthought of Swiss research in Laikipia. It was appended to the Laikipia Rural Development Programme (LRDP), also funded by the Swiss in 1984, eight years after the first research activities by Swiss students had started. By that time, institutionally speaking, the research activity had created a style and life of its own, an organisational culture. Appendages, who have a previous life, have a way of not fitting elegantly into new institutional designs. It is clear to this Team that there was no clear institutional design of the LRP even after specific objectives were enumerated during its term as a subordinate institution to the LRDP.

The burden of history was created by omission by the national GOK institutions responsible for ASAL policy and research. There is no evidence that the LRP was brought under the ambit of these institutions. The GOK has worked out a system of incorporating baseline district data collection, research and development in all ASALS. It is not clear to this mission why Laikipia was treated differently by allowing basic research to lead, lack of emphasis of applied research during LRDP.

Originally the scientist researchers who came to Laikipia seem to have worked pretty much on their own as most university based researchers are wont to do. Since most were graduate students, their primary concern was to get their qualifications. Since nobody in the GOK system insisted that their degree oriented research produce technologies for ASAL development, they did not focus on it. This tradition has been continued by the Kenyan graduate researchers for the same reasons. As a result there is little coordination within post-graduate research activities operating under the ambit of LRP, on the applied end of the research and the immediate application of results in extension and development. A number of demand-driven studies are however, now being contracted to the core programme of the LRP by the ASAL Laikipia Programme and others.

The second aspect of the LRP management was the internal differences within the various researchers and managers on who had authority especially with regard to issues which cut across the biophysical and social sciences. Ironically this has now been institutionalised by the creation of ASP and NRMMM staffed mainly by Kenyans! No institutional mechanism was created within LRP to assure that at the end of the university oriented research, the researchers were required to produce applied research.

Consequently, although Laikipia District is now the most researched district, the databases are not integrated from a biophysical and socio-

economic point of view. There is thus limited applied research data, and staffing and institutional capacity for managing research for development.

### **5.3.2. Relationship with UoN.**

Internally within the University of Nairobi, there seems to be need to regularise some contractual arrangements by specifying what are the roles of the individual Team leaders and what are the responsibilities of departments. The issue has been raised by members of departments who do not seem to know about what projects are negotiated in the name of the department but which seem to be individualised.

Future MOUs with University of Nairobi and indeed the current one, should add codicils spelling out that individual researchers are representatives of the particular departments and further what departments ought to know about programmes like ASP and NRMMM, manner of such departmental consultations, criteria for selecting students to participate in LRP related research and applied research expectations of LRP.

Further, to assure integration of biophysical and socio-economic concerns in developing recommendations out of the graduate students, consultations should be held across departments to locate researchers in subject and geographical areas leading to integration.

### **5.3.3. Managers, Management Systems and Personnel.**

The Team thinks it is fair to conclude that SDC and the GOK never gave much thought to the manner of general management of LRP, including setting up management systems, personnel systems and financial management systems, including budgeting and budget controls for the period under review.

Managing applied research is primarily about setting goals. Generation and Dissemination of Applied Research, one of the primary objectives of LRP, could not be systematic in these circumstance, for nobody was actively managing by setting this as a goal for the other primary component, production of university academic research, which was supposed to knock on to applied research. Some of the students interviewed by the Team, were not even aware that their academic work was supposed to lead to applied research for the development of Laikipia and its environs. Left to their academic supervisors, both parties totally ignored the needs of applied research.

Given that researchers generally pay little attention to management problems, the temporariness of research tenure meant that more often than not they did not see the need to concentrate on setting up research

management systems as a major programme leadership activity. Underlying this lack of long term strategic planning about the management of applied research was the failure to focus on it as a long term process.

Personnel were hired and promoted in haphazard ways. There is no staffing and personnel emoluments norms, including a rationalised training plan. Rewards cannot be based on performance for financial data to establish unit costs and outputs is lacking, with bits in Laikipia and others in Berne. Besides staff joined, moved or stayed based on personal whims and not because they fitted a designed long term appreciation of the needs of applied research in the cold and dry ASALs of Laikipia and its environs. As a result, currently the organisation is faced with overstaffing at some levels, eg. the research assistant level, while the work demand for adaptation and delivery of adapted applied research calls for personnel at much higher levels.

The current top managers (two) were internally promoted to their present levels. One of them comes out of the geography, physical planning tradition at Masters level. The other one was trained on the job on administration and accounts after high school.

Since development oriented adaptive research calls for managers who have ability to bridge the biophysical and the social sciences, clearly there is still need for improvement in management capacity.

At the departmental and section heads, hiring was at low professional qualifications. The new programmes of ASP and NRMMM do not appear to have contributed to thinking about personnel creatively for their staffing procedures seem to also concentrate at low formal qualification staff.

Underlying these inappropriate management activities seems to be a basic lack of appreciation that issues of adaptive research are perhaps more complex than narrow specialised management systems. They call for Management Teams totally at peace with the great divide between the biophysical and the socio-economic worlds. All LRP staff, donors and the GOK must learn to appreciate this. It should be the basis for restructuring staff and putting appropriate management teams in place in the future.

#### **5.3.4. Financial Management Systems and Transparency**

Given that the LRP top management was spastic and the lack of either short term or long term strategic thinking, no systematic electronic based financial management systems were put into place. Such systems are useful in evaluating activity costs and determining impacts of activities. They can also include time budgets to facilitate determination of individual outputs. Financial management systems these days also track exchange

rates daily.

The Review Team requested for complete data on budgets and expenditures for the period under review on day one of the review exercise. It did not exist. Bits were being imported from Berne. Bits were in odd files. Other bits needed translation. Bits were pencilled in. Recalculations on foreign exchange were also undertaken for some bits. Still incomplete data was provided on day 13 of a 18 day consultancy! This was not for lack of trying but it is totally unacceptable in the nineties. Perhaps it could have been tolerated in the seventies! Well managed programmes do not just keep accounting documents only but rather have financial management data facilitating management decision-making.

Central in managing finances is the now legally possible holding of funds in foreign currency to take advantage of changes in foreign exchange rates. One time lumpsum exchanges, particularly when they are quarterly, are not creative. Funds should be converted only if local currency is needed. Of course this calls for more active management of resources both at Laikipia and Berne levels than has been the case to date. **The Team recommends the establishment within the LRP of a comprehensive electronic based financial management system to facilitate better management of LRP. The Team recommends further that all top managers and department heads should train to be able to use such a system in management personally and not leave it to some junior personnel to handle bits and pieces.**

There has not been an agreed accounting manual. One is in draft. Consequently the NRMMM think they have a case for setting up theirs although the contractual obligations give LRP the financial disbursement responsibilities.

This Team does not agree in the decentralisation of the financial management system to all programmes of LRP as argued by ASP and NRMMM. LRP should finalise with the accounting manual and use it in managing the finances as mandated by the structure of funding discussed under 2.1. This will assure financial transparency for staff, GOK, the donor as well as the related programmes.

## **6. OVERALL ASSESSMENT AND RECOMMENDATIONS**

Since the NRMMM and ASP are too new and their impact is yet to be realised, it is logical to argue that all credit ascribed to the LRP till now, is basically the achievements of the original core Programme. Further, the fact that the two projects (NRMMM & ASP) are on the ground, is itself an achievement of the original core Programme through which they were conceived. Strictly speaking, the Programme does not undertake either primary or adaptive research which involves controlled and test case scenarios or simulations to generate replicable results. From interviews and field visits, it became clear that what is termed as research, is basically documentation and recording of the observable phenomena on the ground.

In its TOR, the Review Team was required to assess and evaluate the performance and impact of the LRP in the last four phases (IV-1988/89 to VII-1996/97). This could not be satisfactorily accomplished in the absence of systematic documentation of the activities of the Programme over the period in question. Further, the different phases of the Programme could not be determined as these were not documented.

In evaluating the impact of the Programme, therefore, the Review Team did not attempt to relate the activities, outputs, objectives in the traditional project logical framework approach, but rather on what was on the ground and the interviews held with present and potential stakeholders and collaborators in Laikipia and Nairobi.

According to the Annual Work Plan (July 1, 1992 - June 20, 1993), the priority objective for the Programme (Phase V) was to carry out research in order to support planning towards an optimal use of natural resources. To realise this objective, it is stated that the paramount aim for Phase V was to step up efforts to make available and transfer a large amount of results and data. In charting out the transfer activities, the Work Plan recognised the role to be played by research work on bio-physical and socio-economic data as the basis for transfer.

Most of the activities of Phase V could not be realised as a result of a split between the LRP and the bio-physical researchers (now NRMMM), and the socio-economic researchers (now ASP), both who were the source of the data and information for transfer. It is also noted that some of the activities which started in Phase V, are still not finalised. For example, the production of the District Atlas expected to be completed by June 1993, is still pending in Phase VII. Further, the documentation and production of materials for the DIDC, the main channel for transfer, aborted as the proposed office space was taken over by the Kenya National Library Services.

The Review Team has noted that there is no clarity on what the mission statement of the LRP is. The Team also noted that the demands on the Programme by collaborating agencies pose a potential conflict in formulation of approach and strategies. It is noted, for example, that whereas for the main activities to be implemented during Phase 7 (July 94 - June 97), it is stated that the main goal is the promotion of the sustainable use and management of the scarce and limited natural resources. The interests of collaborators are different, and as such, the strategy for their realisation differs. For example:-

- i) The main interest of the sponsor (SDC) is for the Programme to package and make available results of research for the implementation of development programmes. The strategy here involves emphasis on transfer processes, with monitoring being the main supporting activity.
- ii) The interest of the Institute of Geography, University of Berne is for the Programme to develop methodologies and strategies for sustainable use and management of natural resources. The approach here is planning and research.
- iii) The University of Nairobi and (lately the Egerton University) look at and expect the LRP to be a platform not only for scientific exchange of research activities, but also a place for training of students and lecturers. The emphasis is training.

There are also problems of implementation. The Annual Plan for Phase VII lists six outputs as follows:

- i) Policy paper on "River Water Use"; to be ready by August 1994;
- ii) LRP documentation and pamphlets presenting main activities and goals; to be ready by October, 1994;
- iii) Hydromet database; to be ready by November, 1994;
- iv) Report on "Problems for Development in Laikipia"; to be ready by December, 1994;
- v) District Atlas; to be ready by April, 1995;
- vi) GIS data base for DIDC; to be ready by June, 1995;
- vii) Support DIDC (Documentation, Training); by June 1995.

None of the above assignments were completed on schedule. They were

then pushed to the second part of Phase VII, and are still pending (though planned to end before 1995), while others were rescheduled.

The strategy used by the Programme at the district level has also evolved from presentation of information to the DDC, to the present position where the information is, for example, disseminated directly to the farmers during field days. This approach was adopted in 1996 after the realisation that information channelled through third parties, including divisional level officers did not reach the target beneficiaries.

It is the opinion of the Review Team that the function of direct transfer does not belong to the LRP. There are within the district, ministry extension officers whose mandate is to disseminate useful information irrespective of source.

It is also through departmental heads that the work of the LRP interfaces with the district policy making framework, and both stand to benefit by interacting. The LRP cannot afford to view the departmental heads as mere recipients of outputs. Further, the LRP cannot take up the function of direct transfer and be effective short of establishing a parallel system to extension services. Its role should be seen as complementary and facilitator. As such, it would have been desirable for the Programme to try and find out why the information did not reach the target beneficiaries, and not shoulder the direct transfer function. The Team was informed that the LRP now considers the transfer to farmers as a trial of methodological approach which, if successful, will be passed on to the extension services.

As the Programme does not carry out its own research, but relies on the research by M.Sc. and PhD students, the usefulness of such research studies to the policy maker (Government agencies) is limited firstly, as these agencies are not involved in determining the area of research, and secondly the completion date of the research is indeterminate. This type of set-up does not lend itself to short term flexibility to handle demand driven research as the researchers are bound into their degree programmes, leading to long delays in meeting research requests. The establishment of the Applied Research Unit (ARU) Programme by the Laikipia Development Programme (ASAL) was for this very reason.

There also arises the question of quality of research work and, therefore, its acceptability in terms of validity for application and use. Firstly, the absence of close supervision and guidance of the research students can lend itself to malpractice and loss of scientific professionalism and thus bring into question the quality of the research work. Although, therefore, it is innovative to have Kenyan researchers supervised by Swiss scientists and Swiss researchers supervised by Kenyan scientists, there is a big trade-off due to the distances involved, more so for scientific research which requires continuous consultation and guidance. Reports from some

students indicate that the supervisors make no more than one or two visits per year. Secondly, as the Programme does not have any legal status, reference cannot be made to its data and/or findings especially in Government documents. In this connection, we were informed that the district policy makers utilise data from the Programme to validate other data and do not use it on its own merit.

During field visits, however, it was clear that the LRP has high visibility, and we were impressed by the manner in which the farmers have accepted to try crop varieties recommended by the ARU. The team also noticed, however, that a better advice package could have been delivered had agriculturalists been involved during the Transfer. The issue of effectiveness and efficiency of the Transfer strategy, therefore arises, which directly reflects on the capacity of the LRP as currently organised to perform research, and also be the agent for grass-roots Transfer. As already indicated, the Transfer Project has ten members of staff, one of whom has a university degree. This is particularly limiting as the translation and adaptation of research findings into user friendly packages is technically involving. This could explain why the LRP has had more success in socio-economic and planning methodologies than in technological contributions.

### **6.1. IMPACT OF THE LRP**

Emanating from the outputs of the LRP, various interventions have been made. These are summarised below:

- i) Based on its monitoring and survey activities, the LRP documented the adverse effects of the uncontrolled activities on the Ewaso Ng'iro Catchment and sensitised the Government on the need to have an authority to manage this resource, leading to the formation of the ENNDA.
- ii) By providing the information to the ENNDA on the impact of uncontrolled river water abstraction, the ENNDA has managed to lobby the and influence the Water Boards and a reduction in the number of permits for water abstraction has been realised for the Ewaso Nyiro North river catchment. As a result, although the first quarter of this year (1996) was relatively dry, there was constant flow of the Ewaso in points where previously there was no flow.
- iii) The Water Awareness Creation Campaign organised in collaboration with the ENNDA was well received and three task forces (data and information, policy and law, and campaign promotion) were set up. The TOR for the task forces have been prepared, and the LRP is currently facilitating the work of the task forces.

- iv) The LRP has created the awareness within the district policy making machinery that there is data that can be used for improved planning of the district.
- v) The electrification of Kinamba versus Lamuria was accomplished after the LRP intervened to demonstrate that there was more merit in electrifying the former and not the latter. This was done through a socio-economic study of the two areas by the LRP.
- vi) The annual participation at the Nanyuki ASK Show has created awareness to the general public of the fragile environment of the district and the importance of proper land use.

#### **Recommendations:**

- i) **The LRP has an important role in the future development of the ASALs, especially in solving the peculiar problems posed by the highland ASALs small holders and pastoralists, as so vividly evident in Laikipia district. However for this role to be realised, a core resident adaptive research and technology development capacity must be institutionalised. This is particularly so, if the LRP is to be a self-sustaining demand driven institution.**
- ii) **Information transfer is the most critical component of the LRP. It is through this project that the goals of the other activities of the NRMMM and the ASP in terms of application of innovations are realised. Conversely, also, the justification for the Transfer project is fundamentally dependent on the performance of the NRMMM and ASP, and ideally these activities ought to be run under one organisational structure. Without the NRMMM and the ASP, the Transfer project will have very little to pass over to the users, and without the Transfer project, both the NRMMM and the ASP have no channel for disseminating their outputs, unless these become mere academic exercises.**

**It is thus recommended that NRMMM, ASP, and Transfer activities be managed under a unified but innovative structure.**

- iii) **The three sets of data - hydro-met, socio-economic, and GIS which currently exist separately need to be consolidated into an interactive database thus strengthening the justification of the Transfer project. This should be undertaken as a**

**priority activity.**

## **6.2. BEYOND THE LIMITS OF THE PLATFORM IDEA**

### **6.2.1. Conditionalities for LRP Support**

The provision of a research platform, by LRP, seems to have become an idea set in ferro-concrete and so fixed that it has led to distortion of the primary concern of LRP ie, to adapt technologies for cold and dry ASALS. It seems as if every Jack and Jill uses the LRP and moves on. This is true of the university based research students. Few have invested in LRP by either coming back to support its work or by systematically adapting their degree based research into adopted technologies LRP can pass on to small holders first and others later like stated in its objectives.

Even some of the institutions demanding linkage now specifically state that their interest is in terms of deriving national and global uses of the data. This should be possible as long as it does not detract from developing technologies for poor smallholder settlers and pastoralists of Laikipia and its environs.

Important also is the focus for integrating socio-economic and biophysical concerns for the derivation of useful technologies is dependent on such an integration.

**The Team recommends that the LRP state these objectives as conditionalities for both students who are to benefit from its scholarships and allied programmes like ASP and NRMMM. If these conditionalities are not met by individuals or institutions, LRP should withdraw supporting them. All individuals and institutions wanting to use LRP should sign legally binding MOUs and or contracts stating that they would reimburse LRP if they do not make the requisite contribution. This should be applied to those institutions with MOUs with LRP now and all the new ones.**

### **6.2.2. Integration into GoK ASAL Policy Making**

#### **LRP Ministerial Affiliation Policy.**

The Mission had extensive discussions with the ASAL Department of the Ministry of Land Reclamation, Regional and Water Development. Among the topics covered was the history of LRP, its current status within the GOK system and the ministry's future plans.

The Team was of the opinion that one of the missing ingredients in the management of LRP was the setting of a policy on its work. It was further the opinion of the Team that this could be most efficaciously done by setting up a policy supervision and reporting system into the ministry as shown in Figure 2.

The ASAL Department of the Ministry has two divisions, Extension and Technical. The Team position was that the natural affiliation of the LRP was with the extension division for it is under this division that an Adaptive Research Section headed by an Assistant Director is to be created presently. In the event of a delay, it is the opinion of the Team that the LRP could temporarily be housed under the Education and Information Management section.

At the national level, there is need for the Ministry to urgently constitute an Inter-Ministerial LRP Steering Committee. Since such a committee bring together all ministries and donors with interest in any of the activities of a Programme, for the LRP it will have to include at a minimum Ministries of Agriculture and Livestock Development and Marketing, Environment and Natural Resources, Planning and National Development(DRSRS), KARI, KEFRI, SDC, Rockefeller, SAREC and University of Nairobi.

**The Team recommends that projects associated with LRP should understand there really is no shortcut to participating on policy making about LRP however tedious this process may appear. Since many Departments of the University have a stake in LRP, they should, in a transparent manner, decide who their representatives in the PSC will be, perhaps on a rotating basis from department to department.**

### **Programme Officer for LRP.**

The Team is of the opinion that the Department of ASAL of the ministry should identify a Programme Officer for the LRP to be responsible for the management of the GOK aspects, including funding, within LRP.

The Programme Officer identified:

1. Must have a scientific background.
2. Must have proven experience in managing multi-disciplinary teams in a programme setting.
3. Must be computer literate and be able to personally use word processing, operate technical databases and electronic financial management systems.

4. Must have working knowledge of biophysical and social systems.
5. Must have experience in supervising cross cultural staff.

**The Team recommends that a Programme Officer should be put in place IMMEDIATELY to start work on the integration of the LRP to the national ASAL system and to take part in the management of the LRP as it charts out its future role.**

### **6.2.3 Proposed National Highland ASALs Technologies Centre.**

It is a conclusion of the Team that the LRP should evolve into a National Highland ASALs Technologies Centre. This is in line with the GOK commitment to developing the highland ASALs whose problems are not adequately handled by any other institution. This would be a centre for generating adaptive research from basic research conducted within and without the country.

There are several corollaries to this conclusion. The first is that it is the view of the Team that the Ministry should initiate discussions with donors and the GOK to raise funds for the LRP as the basic building bloc for this centre. Secondly, the Ministry in its forward budget should begin to allocate resources to LRP, with a commitment to building it up as the future centre. Some of the resources, like land for offices and research plots can be availed quickly so as to firm up the commitment to facilitate fund raising from donors. (See Annex VI).

#### **Integrating Core, ASP and NRMMM Processes.**

For a long time those of goodwill, associated with LRP, have recognised that integrating the Biophysical and the Socio-economic databases is crucial in facilitating applied research. To put it strongly, there has been major investment put in establishing the two separate databases. It is most essential that they be integrated or their value will diminish. If LRP is cut off in June 1997, this will be a probability.

The Team is of the opinion that UNEP and Rockefeller, who have expressed concern about this problem should be approached immediately by the Department of ASAL in consultation with LRP management, for assistance in finding ways of integrating these databases. The ministry on its part should seek to get a person competent in data integration seconded to the LRP on a long term basis. Such a person could also be the Programme Officer.

The Team is aware that proposals have been made to NRMMM about systematising the biophysical data to get it to the same condition the socioeconomic data is being put by one of the PhD students. The proposals were for one of the PhD. students to do similar work. This was a good idea and we believe the highest levels of LRP management should still pursue it with NRMMM. This needs to be done immediately to facilitate the secondary integration of the data. It should be done in Laikipia and not as a separate exercise in Nairobi.

**The Team is of the opinion that ASP and NRMMM should as a**

**matter of course come up with strategies ensuring that the collection and processing of future data is in a form it can be easily integrated. Such system should be able to fit into the DRSRS systems for national planning purposes. DRSRS should become a depository of such data and in turn it should provide LRP with data it collects routinely over the areas LRP is working.**

**The Team is of the opinion that the most efficacious system is a data base, preferably one based on DBASE and which is compatible with PC-ARC-INFO GIS already installed at LRP.**

### **DDC/DEC Based PSC for Implementation.**

It is the conclusion of this Team that there is urgent need to regularise the relations of the LRP and the DDC system. This will be achieved if the Ministry appoints a Programme Officer to be the legal representative in the relations. The institution for regularising and supervising the activities of the LRP at the district level is a LRP Programme Steering Committee. This should be activated immediately. Discussions held with the Ministry and Provincial Administration lead the Team to conclude that there is a high probability that this will be done expeditiously.

Over and above the usual line ministries, whose district heads form the bulk of Project Steering Committees, at the district level, two institutions need to be included. These are ENNDA and KWS. Since ENNDA is an interested party to the work of the LRP and has been an important partner it is important that it be included in the PSC. The other important actor in Laikipia development which also should have membership in the PSC is the KWS.

### **External Support for LRP for 1997-1999.**

Having established the impact - actual and potential- of the LRP, and the commitment of the GoK through the Land Reclamation Department to maintain the facility in the longer term, the Team recommends that in spite of the decision taken to terminate the SDC LRP Project in July, 1997, SDC should find ways and means of supporting LRP activities between July 1997 and June 1999. The reasons are simple.

First, such support will ensure that the data bases which have been developed so far are systematised and integrated. This will in turn assure that the database value added will be garnered.

Second, support during this period will enable the Department of ASAL to forward plan and raise the budget for not only supporting LRP as is but also putting into place an institution called by this mission National Highland

Technologies Centre. Conception of such an institution has been in the works within GOK for quite some time. LRP, as it is, provides an excellent beginning point for building such an institution.

Third, the period will allow time for the ASP and NRMMM to integrate their research. This is of particular importance given the lacunae to be filled in terms of the training needs of the students under the various programmes as well ensuring that such students generate applied research. Research needs also to cover west Laikipia which is understudied.

Fourth, such a period will allow LRP to systematise internal management especially with respect to putting into place, relevant personnel, financial management and administrative systems which serve the allied programmes as well as ensuring that students produce utilisable applied research.

Fifth, such a period will enable LRP to link the unified database with district, regional, national, East African, Africa and Global databases which can utilise it for the purposes of improving methodologies and systems of aiding development of Laikipia and its environs first and similar regions elsewhere.

Finally , the period should enable both SDC and GOK to negotiate with other donors for support to the LRP activity on long term basis. The LRP effort so far has made impact at many levels about how one thinks, plans and develops highland ASALs. Short term constraints in resources by the two partners should not lead to missing the value added. Some of the donors who have been associated with the activity so far have declared interest in thinking about support. They also seek guidance and plans on this issue from the GOK.

### **6.3. SLIMMED LRP: JULY 1997.**

#### **6.3.1. Staffing**

Since current LRP staff are contracted up to June 30, 1997, the Team recommends that they are kept and/or terminated as contracted or as need arises as is usual in any organisations management.

**However, the Team recommends that the GOK Programme Officer be posted to LRP immediately so as to begin to work out an Inception Report for the period July 1997-July 1999 utilising the current LRP staff and resources.**

See Annex VII for details of the TOR for the Programme Officer.

As on July 1, 1997 the slimmed down LRP will come into operation. The Team recommends that LRP be organised as shown in Figure 3 LRP: July, 1997. Obviously interviewing and hiring will have to be done before then.

The management of the slimmed LRP will NOT be a SDC provided Programme Adviser since SDC has made it clear they do not intend to run a project. It will be a GOK provided Programme Officer.

The activities currently undertaken by LRP fall under TTMI, ASP, NRMMM and Transfer. Each of these programmes should appoint personnel with professional qualifications to head the activity in LRP before July 1, 1997. These four individuals and the PO will form the Internal Programme Steering Committee. They are financed entirely by these programmes and thus are not costed below.

The other envisaged staff are:

- 1 GIS Professional
- 1 Socio-economist
- 1 GIS Assistant
- 1 Accountant III
- 1 Accounts Clerk
- 1 Personnel Assistant
- 3 Secretaries
- 3 Drivers
- 1 Store keeper
- 1 Messenger/tea person

On July 1, 1997, the total staff will be: 5 management and 14 others for a total compliment of 20 staff.

### **6.3.2. Budget.**

In the indicative budget, as shown in Annex 6, the Review Team costs only the items which are not covered by the existing programmes of ASP and NRMMM funded up to 1999 or existing LRP core funded till June 30, 1997. Further, since the GOK forward budget, under structural adjustment, militate against allocating financial resources before 1998, some of the costs for the PO and a personnel assistant are requested from donors.

For the long term, it is important to point out that there will be need for supplementation of LRP, salaries in a manner to be determined from time to time by the GOK if top professionals are to be attracted to it.

## **6.4. POSSIBLE SOURCES OF SUPPORT**

The Team got very positive indications from officials of the GOK, SDC, Rockefeller Foundation, DGIS and UNEP, that they would be willing to consider seriously supporting various aspects of LRP work. The Team did not get a chance to discuss with SAREC officials, but indications from the managers of the SAREC funded Centre of Excellency programme are that this programme may be interested in extending support to LRP.

Other interested parties would be institutions already involved in supporting ASAL development in Kenya among which are the Capacity Building Programme of the UNDP, UNSO, IGAD, Roosevelt Programme of the Sahara and Sahel Observatory (SSO), the Arid Lands Project of the World Bank Mission to East Africa/DGIS/WFP,GTZ, IFAD,and the ASAL Water Technology Programme of the USAID.

It therefore seems to the Team that the GOK should convene a meeting to discuss possible funding of LRP with all interested parties.

## **Annexes:**

### **Annex I. Terms of Reference of the Review Team**

#### **Scope of Review**

The Review Team will be expected to carry out a comprehensive review exercise of LRP in its major objectives and methodology of undertaking its activities. The current review exercise will only focus on those activities which are funded by SDC and RF. Thus the review exercise affects the Core-LRP(LTP) and parts of the NRMMM operations. ARU will also be touched in terms of collaboration and synergy etc.

#### **Broader Frame of the Task**

The Review Team is expected to;

1. Assess and evaluate the performance of LRP ,in the last four phases (IV-1988/89 to VII-1996/97) in accordance with the Programme's set objectives, strategies, annual work plans and budgets.
2. Assess the impact of LRP (LTP/NRMMM) in its areas of operations. Impact assessment should focus on the following areas:
  - Dissemination of research findings to the target groups on local, district, regional, national and international levels;
  - Dissemination and transfer of the basic approach and methodology of LRP in view of sustainable regional development to the different target groups and partners;
  - Support of project planning and implementation at district, regional and national levels;
  - Capacity Building and Human Resource Development, at regional and national levels.
3. Make recommendations on the future of the Programme after the expiry of the present phase (end of SDC funding). These recommendations should take into account the potential role LRP could play in arid and semi arid lands within Kenya as a whole (and not only in Laikipia district), and especially in the

area of demand-driven and integrated research for sustainable development. These recommendations should further be detailed in a ToR for the future programme, its institutional setting and organization.

4. It may be that organizationally and /or strategically, changes will have to be made as soon as possible to prepare the programme for changes expected in the future phase (after June 1997). In view of this, the Review Team should make short term recommendations (for the June 1996 - June 1997 period) on the basis of the recommendations made in 3 above.

### **Areas to be Considered**

In addressing the needs of the review task, the Team is required to consider the following areas;

1. the plausibility and appropriateness of the strategies put in place to achieve the set objectives, especially in the fields of information transfer, capacity building and planning support.
2. the potential of the programme to function as a training ground for students, a research platform for other institutions and demand-driven integrated research from collaborating organizations such as the ASAL Programme, Laikipia. Given the current administrative and operational structure and existing infrastructure and technical personnel, is the programme well placed to pursue these functions competitively? What can be done to improve on these areas?
3. the management and decision making structures and their suitability and competence in running the Programme. What would be the best organization to ensure efficient running of the Programme?.
4. technical capacity of the programme and its ability and competence to meet, efficiently, the set objectives and strategies, and implement its projects effectively as per its annual work plans. Ways on how the capacity can be improved should be suggested.
5. the financial efficiency of the programme in meeting the set objectives. What are the activities in the Programme which do not lead to useful output ?
6. the strategies to guide preparations for the anticipated necessary changes and adoption of proposed options. Programme Continuity and Sustainability: In line with the current activities of LRP, the Review Team should determine the kind of activities LRP could undertake, to contribute to sustainable development of the area under its jurisdiction, after June 1997. The Team should generate realistic and possible

options to be adopted to guide operations indicating clearly the following aspects:

- Nature, form and extent of activities.
- Institutional set up - within the national or regional framework.
- Institutional collaboration.
- Funding and fund raising.

**Annex II. Students/Researchers Trained by or through LRP**

## **Annex III. Human Resource Development**

**1. Martin Kamau** Trained the Institute of Cultural Affairs, International in Brussels, Belgium, 1995. The training was offered through an International Training Programme for Development Practitioners. The training programme focused on: Technology of Participation, Basic Group Facilitation Methods(Level One); and Technology of Participation, Philosophy of Participation. A Certificate of Completion was awarded.

**2. Bernard M. Gitari:** Has been training in the Royal Statistical Society and has so far trained and attained an Ordinary Certificate and a Higher Certificate in Statistics. He is scheduled to sit for Graduate Diploma Certificate in two weeks time. He has also been trained in Kenya Meteorological Department and attained a World Meteorological Organisation Class Four Certificate.

**3. Joseph Ndungu:** Trained at the Kenya Meteorological Department at two levels: Firstly, a two weeks attachment for agrometeorological observations, data collection and analysis. Secondly, a four months training as a Meteorological Assistant after obtaining a World Meteorological Organisation Class Four Certificate. During the training the following courses were offered: Meteorological Instrumentation, Meteorology Theory, Observations and Agrometeorology.

**4. Grace Nyaruai:** Trained as a Social Worker at the Government Training Institute, Maseno. The course that took three months was on Basic Social Development and covered the following units: Sociology, Social Policy, Human Growth and Development, Counselling, Social Legislation, Methods of Social Work, Introduction to Social Research, Criminology, Economics and Kiswahili. She has also been trained on Leadership Training at the Institute of Cultural Affairs, Nairobi.

**5. Geoffrey Kimathi:** Trained at Thunder and Associates in GIS, for two weeks. The training focused on ARC-INFO and ARC-VIEW and covered data/map digitising, editing, creating maps, use of arc plots/ creation of Simple Micro Language(SMLs). In arcview training on data importation(from Arcinfor to arcview), data modification, analysis, joining items, data creation and analysis, and layouts was covered. A Certificate of Attendance was issued.

**6. William Wachira George:** Underwent similar training as above(GIS). However, this was conducted at ICRAF. He has also been trained on Geographical Positioning System(GPS). The GPS training was basic and covered General Introduction, Designing a net-work, Running a Survey and dealing with signal related problems.

**7. Grace Wangui Ndungu:** Attended a five days course on Senior Secretary Course which focused on senior secretary's skills development.

It is important to note that all the other staff have been internally trained in basic computer use and application on various spreadsheets and word processing packages, notably, Lotus 123, D-Base, Excel, Word, Corel-Draw Havard Graphics. These occasional internal training have improved the capacity and efficiency of the performance of the ones trained.



#### **Annex IV. Transfer Workshops/Seminars Held**

1. 18/10/93 - 19/10/94 Small Ruminants Workshop held where some economic factors affecting decisions on small ruminant production by small scale farmers in West Laikipia were presented and discussed.
2. 30/11/93 - 2/12/93 Small scale Manufacturing Enterprises Workshop where the potential of small scale manufacturing enterprises in West Laikipia and the training of Jua Kali artisans were discussed.
3. 2/2/94 - 3/2/94 River Water Abstraction Workshop where water abstraction, use and management, water laws, rights and allocation and alternatives were discussed.
4. 23/2/94 - 26/2/94 Tour of rivers forming the North Ewaso Ng'iro catchment was organised on recommendations made during the Water Abstraction Workshop.

## **Annex V. An Inventory of Laikipia RPP Publications: Use and Circulation**

### **I B Series: Laikipia - Mt. Kenya Papers:**

1. Wiesmann, U., 1991. *Water supply systems in small-scale farms and pastoralist areas of Laikipia district, Kenya*. Laikipia - Mt. Kenya Papers B 1  
Copies made /availed: 93  
Copies distributed: 80  
Copy recipients: 35
2. Taiti, S. W., 1992. *The vegetation of Laikipia district, Kenya*. Laikipia - Mt. Kenya Papers B 2  
Copies made /availed: 78  
Copies distributed: 72  
Copy recipients: 53
3. Berger, P., 1987. *Rainfall data until 1982: Laikipia district and western and northern slopes of Mt. Kenya - selected high quality and long-term stations*. Laikipia - Mt. Kenya Papers B 3  
Copies made /availed: 5  
Copies distributed: 5  
Copy recipients: 5
4. Liniger, H. P. and Mike K. Thomas, 1994. *Rainfall data 1983 - 1992: Laikipia district and western and northern slopes of Mt. Kenya - selected high quality and long-term stations*. Laikipia - Mt. Kenya Papers B 4  
Copies made /availed: 5  
Copies distributed: 5  
Copy recipients: 4
5. Liniger, H. P. and Mike K. Thomas, 1994. *Rainfall summary, analysis and trend: Laikipia district and western and northern slopes of Mt. Kenya - selected high quality and long-term stations*. Laikipia - Mt. Kenya Papers B 5  
Copies made /availed: 5  
Copies distributed: 5  
Copy recipients: 5
6. Liniger, H. P. and Mike K. Thomas, 1994. *Rainfall data: Additional stations of good quality in the Upper Ewaso Ng'iro Basin and the Mt. Kenya area*. Laikipia - Mt. Kenya Papers B 6  
Copies made /availed: 5  
Copies distributed: 5  
Copy recipients: 4
7. Liniger, H. P. and Mike K. Thomas, 1994. *Rainfall summary, analysis and trend: Additional stations of good quality in the Upper Ewaso Ng'iro Basin and the Mt. Kenya area*. Laikipia - Mt. Kenya Papers B 7

Copies made /availed: 5  
Copies distributed: 5  
Copy recipients: 4

8. Mbuvi, J. P. and Geoffrey Kironchi, 1994. *Explanations and profile descriptions to reconnaissance soil survey of Upper Ewaso Ng'iro Basin (Laikipia East and slopes West to the North of Mt. Kenya)*. Laikipia - Mt. Kenya Papers B 8  
Copies made /availed: 20  
Copies distributed: 12  
Copy recipients: 11
9. Mainga, P. M. and J. P. Mbuvi, 1994. *Preliminary soil conditions of Ngenia, Rumuruti, Mukogodo and Sirima catchment sites*. Laikipia - Mt. Kenya Papers B 9  
Copies made /availed: 20  
Copies distributed: 11  
Copy recipients: 9
10. Mainga, P. M. and J. P. Mbuvi, 1994. *Preliminary soil conditions of Embori, Kalalu and Mukogodo sites*. Laikipia - Mt. Kenya Papers B 10  
Copies made /availed: 20  
Copies distributed: 9  
Copy recipients: 8

## **II C Series: Laikipia - Mt. Kenya Papers:**

1. Liniger, H. P., 1991. *Methods and recordings in agro-ecology and water conservation*. Laikipia - Mt. Kenya Papers C 1  
Copies made /availed: 54  
Copies distributed: 53  
Copy recipients: 46
2. Sottas, B., 1994. *Qualitative research and actor-oriented participatory techniques*. Laikipia - Mt. Kenya Papers C 2  
Copies made /availed: 30  
Copies distributed: 21  
Copy recipients: 18
3. Wiesmann, U., 1995. *A concept of sustainable use and its implications for research in a dynamic regional context*. Laikipia - Mt. Kenya Papers C 3  
Copies made /availed: 30  
Copies distributed: 14  
Copy recipients: 14
4. Yvan Droz, 1995. *Anthropological outline of a Kikuyu community, Laikipia district, Kenya*. Laikipia - Mt. Kenya Papers C 4  
Copies made /availed: 30  
Copies distributed: 11  
Copy recipients: 11

## **III D Series: Laikipia - Mt. Kenya Papers:**

1. Herren, U. J., 1991. *Socioeconomic stratification and small stock*

- production in Mukogodo division, Kenya. Laikipia - Mt. Kenya Papers D 1*  
 Copies made /availed: 93  
 Copies distributed: 81  
 Copy recipients: 40
2. Sottas, B., 1991. *Aspects of a peasant mode of production, exchange and the extent of sufficiency among small-holder in West Laikipia. Laikipia - Mt. Kenya Papers D 2*  
 Copies made /availed: 73  
 Copies distributed: 52  
 Copy recipients: 22
3. Liniger, H. P., 1991. *Water conservation for rain-fed farming in the semi-arid footzone northwest of Mt. Kenya (Laikipia highlands), consequences on the water balance and the soil productivity. Laikipia - Mt. Kenya Papers D 3*  
 Copies made /availed: 59  
 Copies distributed: 59  
 Copy recipients: 34
4. Kithinji, G. R. M. and Hanspeter Liniger, 1991. *Strategy for water conservation in Laikipia district: Water conservation seminar, Nanyuki 7 - 11 August 1989 organized and financed by LRDP /SDC. Seminar proceedings part 1. Laikipia - Mt. Kenya Papers D 4*  
 Copies made /availed: 74  
 Copies distributed: 73  
 Copy recipients: 58
5. Liniger, H. P., (ed.) 1991. *Water conservation in Laikipia district: Papers seminar proceedings part 2. Laikipia - Mt. Kenya Papers D 5*  
 Copies made /availed: 91  
 Copies distributed: 73  
 Copy recipients: 62
6. Mucuthi, M. M., Munei, K. and K. Sharma, 1992. *The contribution of small ruminant production to household incomes for small-scale farmers in Laikipia West (an ASAL). Laikipia - Mt. Kenya Papers D 6*  
 Copies made /availed: 90  
 Copies distributed: 70  
 Copy recipients: 44
7. Liniger, H. P., 1993. *Water and soil resource conservation and utilization on the north-west side of Mt. Kenya. Laikipia - Mt. Kenya Papers D 7*  
 Copies made /availed: 50  
 Copies distributed: 40  
 Copy recipients: 31
8. Kiteme, B. P., 1993. *The potential of small-scale enterprises in West Laikipia - Kenya. Laikipia - Mt. Kenya Papers D 8*  
 Copies made /availed: 80  
 Copies distributed: 32  
 Copy recipients: 21

9. Mucuthi, M. M. and K. Munei, 1993. *Socio-economic factors which affect decisions on small ruminant production by small-scale farmers in West Laikipia*. Laikipia - Mt. Kenya Papers D 9  
Copies made /availed: 20  
Copies distributed: 6  
Copy recipients: 5

10. Sottas, B. and Urs Wiesmann, 1993. *Practices of assistance among small-scale farmers of Marura: Directions, extent and relevance.* Laikipia - Mt. Kenya Papers D 10  
Copies made /availed: 80  
Copies distributed: 39  
Copy recipients: 18
11. Thomas M. K., 1994. *Development of stream-flow model for rural catchments in Kenya.* Laikipia - Mt. Kenya Papers D 11  
Copies made /availed: 30  
Copies distributed: 16  
Copy recipients: 15
12. Mucuthi, M. M. and K. Munei, 1993. *Some constraints to small ruminant production for small-scale farmers in Laikipia West (an ASAL).* Laikipia - Mt. Kenya Papers D 12  
Copies made /availed: 30  
Copies distributed: 10  
Copy recipients: 8
13. Liniger, H. P., 1994. *Development of a stream-flow model for rural catchments in Kenya.* Laikipia - Mt. Kenya Papers D 13  
Copies made /availed: 20  
Copies distributed: 14  
Copy recipients: 14
14. Liniger, H. P., I. Mulagoli and H. Sieber, 1991. *Approach and constraints for the implementation of water conservation in the Laikipia highlands.* Laikipia - Mt. Kenya Papers D 14  
Copies made /availed: 20  
Copies distributed: 17  
Copy recipients: 17
15. Mbuvi, J. P., Hanspeter Liniger and Geoffrey Kironchi, 1992. *Soil type and land-use effects on infiltration in Sirima and Mukogodo catchments, Laikipia district.* Laikipia - Mt. Kenya Papers B 15  
Copies made /availed: 20  
Copies distributed: 16  
Copy recipients: 16
16. Njeru, J. L. and Hanspeter Liniger, 1994. *The influence of vegetation on the water resource of Naro Moru - A water balance approach.* Laikipia - Mt. Kenya Papers B 16  
Copies made /availed: 20  
Copies distributed: 22  
Copy recipients: 19
17. Leiser, F., 1994. *Central places and transport system in Laikipia, Kenya.* Laikipia - Mt. Kenya Papers D 18  
Copies made /availed: 100  
Copies distributed: 19  
Copy recipients: 8

18. Leiser, F., 1994. *Central places and transport system in Laikipia, Kenya - Maps.*  
Copies made /availed: 697  
Copies distributed: 491  
Copy recipients: 54
19. Liniger, H. P. and Francis N. Gichuki, 1994. *Simulation models as management tools for sustainable use of natural resources from the top of Mt. Kenya to the semi-arid lowlands.* Laikipia - Mt. Kenya Papers D 19  
Copies made /availed: 30  
Copies distributed: 8  
Copy recipients: 7
20. Masindano, W. P., 1995. *Security of subsistence among small-scale migrant farmers: The case study of Thome settlements schemes in Laikipia district.* Laikipia - Mt. Kenya Papers D 21  
Copies made /availed: 20  
Copies distributed: 7  
Copy recipients: 5
21. Bachmann, F., 1995. *Small-holders in Laikipia district, Kenya: Land use systems and perceptions of water conservation and agro-forestry.* Laikipia - Mt. Kenya Papers D 22  
Copies made /availed: 30  
Copies distributed: 17  
Copy recipients: 16
22. Peter Moor, 1995. *Aspects of livestock production and livestock husbandry in three small-scale farming areas in Laikipia district.* Laikipia - Mt. Kenya Papers D 23  
Copies made /availed: 30  
Copies distributed: 12  
Copy recipients: 11

#### **IV Laikipia - Mt. Kenya Reports:**

1. Gerber, B., 1984. *Land cover and land use in Laikipia district, Kenya: Preliminary map based on the interpretation of land sat images.* Laikipia - Mt. Kenya Reports 2 (maps)  
Copies made /availed: 35  
Copies distributed: 14  
Copy recipients: 8
2. Schotterer, U. and I. Muller, 1985. *The use of isotopes, hydrochemistry and geophysics in the ground water research in Laikipia district, Kenya.* Laikipia - Mt. Kenya Reports 4  
Copies made /availed: 8  
Copies distributed: 7  
Copy recipients: 5
3. Kohler, T., 1987. *Wiumiririe - Portrait of a small-scale farming community in Laikipia district, Kenya.* Laikipia - Mt. Kenya Reports

- 7  
 Copies made /availed: 13  
 Copies distributed: 11  
 Copy recipients: 12
4. Kohler, T., 1987. *West Laikipia - Report on small-scale farming and how it could be assisted in development.* Laikipia - Mt. Kenya Reports 8  
 Copies made /availed: 23  
 Copies distributed: 23  
 Copy recipients: 10
5. Keter. S., 1988. *Youth polytechnic trained craftsmen's training and work experience. A tracer study of school leavers from youth polytechnics in Laikipia district, Kenya.* Laikipia - Mt. Kenya Reports 11  
 Copies made /availed: 54  
 Copies distributed: 49  
 Copy recipients: 30
6. Rheker. J. R., S. W. Taiti and M. Winiger, 1989. *Bibliography of East African mountains.* Laikipia - Mt. Kenya Reports 13  
 Copies made /availed: 61  
 Copies distributed: 59  
 Copy recipients: 27
7. Ayiemba, E. H. O., 1990. *The population situation in Kenya: An overview and the effects of population growth on the environment.* Laikipia Reports - lecture series. Laikipia - Mt. Kenya Reports 14  
 Copies made /availed 200  
 Copies distributed 164  
 Copy recipients: 45
8. Obara, D. A., 1991. *Urban agriculture in the third world: A study of Nairobi and its environs and constraints on small-holder horticultural production: A case study of Mwea division, Southern Kirinyaga district, Kenya.* Laikipia Reports - lecture series. Laikipia - Mt. Kenya Reports 15  
 Copies made /availed 18  
 Copies distributed 18  
 Copy recipients: 16
9. Rheker. J. R., 1992. *Forest management and timber industry at Mount Kenya.* Lecture series. Laikipia - Mt. Kenya Reports 16  
 Copies made /availed: 160  
 Copies distributed: 91  
 Copy recipients: 64
10. Hoesli, Th. and T. Klingl, 1995. *A GIS database design for district and rural development planning in Laikipia district.* Laikipia - Mt. Kenya Reports 17  
 Copies made /availed: 280  
 Copies distributed: 12  
 Copy recipients: 7

11. Hoesli, Th., 1995. *GIS based impact monitoring of a development programme*. Laikipia - Mt. Kenya Reports 18  
Copies made /availed: 252  
Copies distributed: 9  
Copy recipients: 8

12. Huber, M. and Chris J. Opondo, 1995. *Land use change scenarios for subdivided ranches in Laikipia district, Kenya*. Laikipia - Mt. Kenya Reports 19  
Copies made /availed: 240  
Copies distributed: 11  
Copy recipients: 8
13. Liniger, H. P., 1993. *Excursion guide to Mt. Kenya, Maralal and Samburu areas*. Prepared for African Mountain Association, 3rd International Workshop, Kenya, 4th - 14th March, 1993.  
Copies made /availed: 20  
Copies distributed: 17  
Copy recipients: 11
14. Herren, U. J., 1993. *Resource limitations and landuse in Laikipia district. Contributions from LRP. Prepared for Laikipia landuse planning seminar. Naro Moru River Lodge*,  
Copies made /availed: 29  
Copies distributed: 19  
Copy recipients: 12
15. Herren, U. J., 1991. *Socio-economic strategies of pastoral Maasai households in Mukogodo, Kenya*. Ph.D dissertation, University of Berne.  
Copies made /availed: 14  
Copies distributed: 13  
Copy recipients: 11

## **V Geographica Bernensia - African Studies**

1. Winiger, M., (ed.) 1985. *Mount Kenya Area - contribution to ecology and socio-economy*. African Studies A1  
Copies made /availed: 23  
Copies distributed: 21  
Copy recipients: 17
2. Leibundgut, C., 1986. *Hydrogeographical map of Mount Kenya Area: 1:50,000 map & explanatory text*. African Studies A3  
Copies made /availed: 30  
Copies distributed: 28  
Copy recipients: 28
3. Kohler, T., 1987. *Land-use in transition. Aspects and problems of small-scale farming in a new environment: The example of Laikipia district (with -use - Land ownership 1:250,000 map)*. African Studies A5  
Copies made /availed: 63  
Copies distributed: 63  
Copy recipients: 35
4. Kohler, T., 1987. *Land-use in transition. Aspects and problems of small-scale farming in a new environment: The example of Laikipia*

- district - Land-use ownership maps 1:250,000*  
 Copies made /availed: 339  
 Copies distributed: 174  
 Copy recipients: 79
5. Flury, M., 1987. *Rainfed agriculture in the Central division, Laikipia district, Kenya. Suitability, constraints and potential for providing food.* African Studies A6  
 Copies made /availed: 19  
 Copies distributed: 16  
 Copy recipients: 13
6. Berger, P., 1989. *Rainfall and agroclimatology of the Laikipia plateau, Kenya.* African Studies A7  
 Copies made /availed: 63  
 Copies distributed: 63  
 Copy recipients: 38
7. Decurtins, S., 1992. *Hydrogeographical investigations in the Mount Kenya sub-catchment of the Ewaso Ng'iro river.* African Studies A10  
 Copies made /availed: 150  
 Copies distributed: 55  
 Copy recipients: 49
8. Berger, P., 1989. *Maps*  
 Copies made /availed: 170  
 Copies distributed: 87  
 Copy recipients: 25

## **VI Other Publications**

1. Liniger, H. P., *Endangered water*  
 Copies distributed: 30
2. Douglas, M., *Sustainable use of agricultural soils*  
 Copies distributed: 25
3. *Proceedings of the international African Mountain Association workshop held at Nanyuki, Kenya, 5th - 12th March, 1989.*  
 Copies made /availed: 179  
 Copies distributed: 146  
 Copy recipients: 68

## ANNEX VI. BUDGET

LAIKIPIA RESEARCH PROGRAMME				
1996 BUDGET (1/7/96 - 31/12/96)				
		SOURCE	SOURCE	TOTAL
		GOK	DONORS	
	PO AND OPERATION			
1	PO Salary	120000		120000
2	PO Operational		150000	150000
	1996 TOTAL	120000	150000	270000
	PERCENTAGES	44	56	100
1997 BUDGET 1/197-31/12/97				
	PERSONNEL			
1	PO Salary	240,000		240,000
2	GIS Prof Salary	120,000		120,000
3	GIS Asst Salary	90,000		90,000
4	Accountant Salary	180,000		180,000
5	Accounts Clerk Salary	72,000		72,000

6	Personnel Asst. Salary	144,000		144,000
7	3 Secretaries Salaries	180,000		180,000
8	3 Drivers Salaries	180,000		180,000
9	Store Person Salary	72,000		72,000
10	Messenger/Tea Salary	24,000		24,000
11	Socio-Econ. Salary	120,000		120,000
	TOTAL	1,422,000		1,422,000
	PERCENTAGE	100		0
	OPERATION AND MAINTENANCE			
1	Vehicle Maintenance		250,000	250,000
2	Vehicle Running		150,000	150,000
3	Computer Maintenance		50,000	50,000
4	Computers Running		250,000	250,000
5	Office Rentals		90,000	90,000
6	Utilities		200,000	200,000
7	Postage and Telephone		100,000	100,000
8	Stationery/Office supplies		200,000	200,000

	TOTAL		1,290,000	1,290,000
	PERCENTAGE	0	100	100
	TRANSFER			
1	Modelling: Biophysical and and Socio Economic Catchments		2,000,000	2,000,000
2	Publications		1,000,000	1,000,000
3	Degradation Indicators		1,000,000	1,000,000
4	Farmers/Pastoralism Seminars		600,000	600,000
5	District Seminars		60,000	60,000
6	Regional Seminars		60,000	60,000
7	National Seminars		60,000	60,000
8	NGO Seminars		60,000	60,000
9	International Seminars		60,000	60,000
10	Farmer to Farmer visits		500,000	500,000
11	Consultancies		300,000	300,000

	TOTAL		5,700,000	5,700,000
	PERCENTAGE		100	100
	LAND/SURVEY			
1	Research Sites	1,000,000		
2	Office Sites	750,000		
3	Land survey	200,000		
	TOTAL	1,950,000	0	1,950,000
	PERCENTAGE	100		
	1997 GRAND TOTAL	3,372,000	6,990,000	10,362,000
	PERCENTAGE	33	67	100
	1998			
	PERSONNEL			

1	PO Salary	240,000		240,000
3	GIS Salary	240,000		240,000
5	GIS Asst. Salary	180,000		180,000
7	Accountant Salary	360,000		360,000
9	Accounts Clerk Salary	144,000		144,000
11	Personnel Asst. Salary	144,000		144,000
13	3 Secretaries Salaries	360,000		360,000
15	3 Drivers Salaries	360,000		360,000
7	Store Person Salary	144,000		144,000
19	Messenger/tea Salary	48,000		48,000
21	Social-Econ. Salary	240,000		240,000
	TOTAL	2,460,000		2,460,000
	PERCENTAGE	100		100
	OPERATION AND MAINTENANCE			
1	Vehicle Maintenance		250,000	250,000
2	Vehicle Running		150,000	150,000
3	Computers Maintenance		50,000	50,000

4	Computers Running		250,000	250,000
5	Office Rentals		90,000	90,000
6	Utilities		200,000	200,000
7	Postage and Telephones		100,000	100,000
8	Stationery/Office supplies		200,000	200,000
	TOTAL		1,290,000	1,290,000
	PERCENTAGE	0	100	100
	TRANSFER			
1	Integrated Modelling:Biophysical and Social Economic Catchment		2,000,000	2,000,000
2	Publications.		1,000,000	1,000,000
3	Degradation Indicators		1,000,000	1,000,000
4	Farmers/Pastoralism Seminars		300,000	300,000
5	District Seminars		30,000	30,000
6	Regional Seminars		60,000	60,000
7	National Seminars		60,000	60,000
8	NGO Seminars		60,000	60,000
9	International Seminars		60,000	60,000

10	Farmer to Farmer Visits		200,000	200,000
11	Consultancies		100,000	100,000
	TOTAL		4,870,000	4,870,000
	PERCENTAGE	0	100	100
	OFFICE DESIGN AND CONSTRUCTION			
1	Design and Supervision	500,000		500,000
2	Construction	5,500,000		5,500,000
3	Fitting and Furnishing	2,000,000		2,000,000
	TOTAL	8,000,000		8,000,000
	PERCENTAGE	100	0	100
	1998 GRAND TOTAL	10,460,000	6,160,000	16,620,000
	PERCENTAGE	63	37	100
1996-1998	GRAND TOTAL	13,953,000	13,300,000	27,253,000

	PERCENTAGE	51	49	100
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## **Annex VII TOR: PROGRAMME OFFICER: HATC:- LAIKIPIA**

The current LRP has to evolve into a national centre whereby technologies suitable for both highland as well as lowland ASALs are tested and adapted. The Centre will generate adaptive research technologies from basic research conducted within and without the country and test methods and approaches of incorporating them in extension. This evolution will also facilitate the integration of the current LRP programmes into the GOK policies, strategies and management structures. To facilitate this type of transformation, MLRRWD will post a senior officer to be the Programme Officer (PO) for the HATC. The Programme officer will be responsible to the Permanent Secretary, MLRRWD through the Director ASAL:

A: In the short term for:

1. Institutionalizing LRP by:
  - a. setting up a financial management system,
  - b. setting up a personnel management system,
  - c. regularising Memoranda of Understanding,
  - d. organising research, survey and monitoring data sets; and integrating them to, and updating the GIS Database.
2. Preparing an inception report for the next phase (After July, 1997) stating:
  - a. administrative structure;
  - b. functions of the Transfer component including GIS, ARU, and the critical research mass;
  - c. financing mechanisms of the HATC.

B: In the long term for:

3. Coordinating the planning, implementation and monitoring of HATC activities in close liaison with heads of institutions participating in HATC.
4. Coordinating the proper management of project personnel, finances and procurement according to laid down GOK procedures (and as agreed between donors and GOK).
5. Compilation, analysis and distribution of monthly financial statements; quarterly and annual progress reports.
6. Assessing ASAL research needs and identifying viable projects compatible with ASAL development policies.

7. Compiling Annual workplans and budgets in close liaison with heads of institutions participating in HATC.
8. Supervising the maintenance of the GIS database as well as the transfers of technologies to development agencies.
9. Dissemination of research results to users including organising of study tours.
7. Membership of Laikipia DDC, DEC and DPU; and liaison officer to other DDCs, and to regional, national and international organisations.
10. Chairmanship of the Project Management Unit and Project Steering Committee meetings of the HATC.

The Programme Officer identified must:

1. Have scientific academic background especially in natural resources management.
2. Have experience in managing integrated multi-disciplinary teams in a programme setting.
3. Be computer literate and be able to personally use word processing, operate databases and financial management systems.
4. Have thorough knowledge of biophysical and social systems in ASAL.

## **Annex IX Workshops Held Since 1985**

- |      |      |   |
|------|------|---|
| 1985 | 1985 | - The water resource of the Ewaso Ng'iro river with implications of the river water use.  |
|      | 1986 | - The water resource of the Ewaso Ng'iro: Possibilities for reducing domestic water supply shortages in Laikipia by sustainable utilization of the water resources. |
|      | 1989 | - The water conservation strategies in Laikipia district.   |
|      | 1993 | - Laikipia landuse leaders seminar.   |
|      | 1993 | - Potentials and performance of small-scale enterprises in Laikipia district.   |
|      | 1993 | - The contributions to the socio-economic development of small ruminants at the household level, Laikipia district.   |
|      | 1994 | - Water abstraction in the upper Ewaso Ng'iro basin.  |
|      | 1995 | - Water use and management in the Ewaso Ng'iro basin.   |
|      | 1996 | - Water allocation and administration procedures seminar.   |

## **Annex X. List of Maps Produced by LRP.**

1. Land Use and Land Ownership, 1982.
2. Soil Map of the Mt. Kenya area.
3. The Seasonal Availability of River Water.
4. Total Annual Rainfall, Laikipia District, Kenya - Distribution, Variability and Trends.
5. Rainfall Regimes and Rain Phases.
6. Rainfall and Crop Production, Laikipia District.
7. Central Places, Laikipia District.
8. Transport Capacity, Laikipia District.
9. Means of Transport and Fares (inventory, 1987).
10. Administration Units, Laikipia District.
11. Vegetation Map, Laikipia District.
12. Drainage Network, Laikipia District.
13. Land Use/Land Cover, North and Northwest of Mt. Kenya.
14. Main Rivers within the Upper Ewaso Ng'iro Basin.
15. Market Study of Goat Meat Provision (inventory, 1987).
16. Market Study of Cabbage Provision (inventory, 1987).
17. Hydrogeographical Map of Mt. Kenya Area.
18. Topographical Map, Laikipia District.

## **Annex XI. Programme of Activities of the Review Team**

- Tuesday 16th April: Introductory and planning meeting between the Review Team and the Programme Adviser. Nairobi.
- Wednesday 17th April: Visit to Department of Meteorology, Univ Of Nairobi. Meeting with the TTMI Team - Prof Stigter, Prof. Ng'ang'a and Mr. Oteng'i.
- Saturday, 20th April: Meeting between Team Leader, Programme Adviser and Programme Responsible (Dr U. Wiesmann) Nairobi.
- Sunday 21st April: Travel to Nanyuki.
- Monday 22nd April: LRP Offices. Briefings and literature search. Discussion with the following persons in the office:  
B. Kiteme  
A. Kiarie  
E. Kunzi  
M.K. Thomas  
Martin Kamau
- Tuesday 23rd April: Discussions with:  
Joseph Ndungu, Representative of NRM  
District Commissioner  
ASAL Programme  
Water Engineer, Laikipia  
District Agricultural Officer
- Wednesday 24th April: Field visits to Matanya, Weruini, Kariunga/Mutirithia, Mia-moja/Ngenia
- Thursday, 25th April: Morning - Meeting with Prof G. Kingoria in Nanyuki  
Afternoon- travel to Nairobi.
- Friday 26th April: Visit to the Dept of Resource Survey and Remote Sensing: Meeting with Director, Mr. H. Mwendwa.
- Monday 29th April: Visit to KARI HQ Nairobi: Meeting with Assistant Director, Soil and Water Management, Dr. Kiome.
- Visit to the Ministry of Land Reclamation, Regional and Water Development: Meeting with Director, ASAL Dept. Mr. Chesinya.
- Visit to Rockefeller Foundation: Meeting with Dr. John Lynam.
- Visit to the Ministry of Research, Technical Training and

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Tuesday 30th April: Visit to Department of Urban and Regional Planning, University of Nairobi: Meeting with Dr. Ndegwa, Coordinator of ASP.  
Visit to UNEP: Meeting with Prof. Barry L. Henricksen and M. Hernandez, GRID/UNEP.

Wednesday 1st May: Travel to Nanyuki.

Thursday 2nd May: Visit to ARU: Meeting with Mr. Ngethe, Head of Programme.  
Visit to LRP stand at the Nanyuki ASK Show.

Friday 3rd May: Meeting with Mr. Kironchi, Postgraduate student, NRMMM.

Monday 6th May: Visit to Ewaso Ng'iro North Development Authority (ENNDA) HQ, Isiolo. Meeting with Executive Director, Mr H. Guleid.

Thursday 8th May: Meeting with Mr J. Kariuki, Programme Officer, ASAL Laikipia.

Saturday 4th to Friday 10th May: Internal Team Consultations and Report Preparation.

## **Annex XII. People Met.**

### **Swiss Embassy/ SDC.**

1. Ms. Ines Islamshah, Swiss Development Cooperation, Embassy of Switzerland, Nairobi.
2. Dr. Urs Wiesmann, Centre for Development and Environment, University of Bern.

### **Government Ministries.**

1. Ministry of Land Reclamation, Regional and Water Development.

Mr. E.C. Chesiyana, Director, ASAL.  
Mr. M.O. Makunda, Deputy Director, ASAL.  
Mr. D.M. Katiku, Economist, ASAL.  
Mr. D.K. Kiragu, AS ASAL.  
Mr. M.D. Osiemo, Economist.  
Mrs Esther Murimi, Economist.  
Mr. S.A. Nyamanga, Economist.

2. Ministry of Research, Technical Training and Technology

Mr. G.M. Mailu, Principal Research Officer.

### **Laikipia Research Programme.**

1. Mr. B. Kiteme, Programme Adviser, LRP.
2. Mr. V. Kiarie, Programme Administrator, LRP.
3. Mr. M. Kamau, Section Head, Research Assistants Pool.

### **Laikipia District Administration and Technical Services.**

1. Mr. M.A. Saleh, District Commissioner, Laikipia.
2. Mr. T. Henderickson, Programme Adviser, ASAL Laikipia Project.
3. Mr. Robinson Ngethe, Coordinator, ARU.
4. Mr. J.K. Cheruiyot, District Agricultural Officer.
5. Mr. J. Wainaina, District Water Engineer.
6. Mr. O. Gathogo, Assistant Chief, Mutirithia sub-Location.
7. Mr. D. Njagi Kariuki, Chief, Segera Location.
8. Mr. Z.M. Michuki, District Development Officer.
9. Mr. J. Kariuki, Programme Officer, ASAL Laikipia.

### **Collaborating Institutions and Programmes.**

1. Prof. C.J. Stigter, TTMI Project Coordinator.
2. Prof. J. Ng'ang'a, TTMI Coordinator, Dept of Meteorology, UoN.
3. Prof. G. Kingoria, Coordinator ASP, Dept. of Urban and Regional Planning, UoN.
4. Dr. Ndegwa, Coordinator, ASP, Dept. of Urban and Regional Planning, UoN.
5. Mr. E. Kunzi, PhD Researcher and Representative, ASP Programme.
6. Mr. M.K. Thomas, PhD researcher, NRMMM.
7. Mr. J. Ndungu, Representative, NRMMM.
8. Mr. G. Kironchi, PhD student, NRMMM.
9. Mr. S.S.B. Oteng'i, PhD researcher, University of Nairobi.
10. Mr. Hussein Guleid, Executive Director, ENNDA.

### **Land Users**

Mr. Maina, Farmer, Matanya.

**Annex VIII. ASSETS OF LRP**

LAIKIPIA RESEARCH PROGRAMME					
P. O BOX 144					
NANYUKI					
Laikipia Research Programme Holdings in Nanyuki office Block A and B					
	CODE	ASSET	VALUE (KSHS.)		
1	LRP/01/32/ALT1/AR4	Altimeter			
2	LRP/01/32/ALT2/AR4	Altimeter			
3	LRP/01/45/BCR/BR2	Battery Charger	13,800		
4	LRP/01/05/BM/AR4	Binding Machine	37,000		
5	LRP/01/56/BC/AR4	Binocular	40,000		
6	LRP/01/07/BL/AR4	Blower	15,000		
7	LRP/02/04/BS1/AR6	Bookshelve 1	1,500		
8	LRP/02/04/BS1/AR5	Bookshelve 1	1,500		
9	LRP/02/04/BS1/AR2	Bookshelve 1	1,500		
10	LRP/02/04/BS1/AR7	Bookshelve 1	1,500		

11	LRP/02/04/BS/BR5	Bookshelve 1	1,500		
12	LRP/02/04/BS/BR4	Bookshelve 1	1,500		
13	LRP/02/04/BS1/BR8	Bookshelve 1	1,500		
14	LRP/02/04/BS1/BR3	Bookshelve 1	1,500		
15	LRP/02/04/BD/BR9	Bookshelve 1	1,500		
16	LRP/02/04/BS1/BR10	Bookshelve 1	1,500		
17	LRP/02/04/BS/BR6	Bookshelve 1	1,500		
18	LRP/02/04/BS/BR11	Bookshelve 1	1,500		
19	LRP/02/01/BS2/AR9	Bookshelve 2	1,500		
20	LRP/02/04/BS2/AR2	Bookshelve 2	1,500		
21	LRP/02/04/BS2/AR6	Bookshelve 2	1,500		
22	LRP/02/04/BS2/BR8	Bookshelve 2	1,500		
23	LRP/02/04/BS2/BR3	Bookshelve 2	1,500		
24	LRP/02/04/BS2/BR10	Bookshelve 2	1,500		
25	LRP/01/17/CL2/AR4	Calculator	5,000		
26	LRP/01/17/CL1/AR4	Calculator	5,000		
27	LRP/01/17/CL1/AR1	Calculator	5,000		
28	LRP/01/17/CL2/AR1	Calculator	5,000		
29	LRP/01/17/CL/BR4	Calculator	5,000		
30	LRP/01/20/CA/AR4	Camera	5,000		
31	LRP/01/22/CB/AR1	Cash Box	3,000		

32	LRP/01/30/CO/AR4	Compass	4,600		
33	LRP/01/04/KB/AR7	Compuer key board	20,000		
34	LRP/01/04/KB1/AR1	Compuer key board	20,000		
35	LRP/01/04/KB1/AR6	Compuer key board	20,000		
36	LRP/01/04/KB2/AR6	Compuer key board	20,000		
37	LRP/01/01/C1/AR1	Computer	130,000		
38	LRP/01/01/C/BR3	Computer	130,000		
39	LRP/01/01/C1/AR4	Computer	130,000		
40	LRP/01/01/C1/AR6	Computer	130,000		
41	LRP/01/01/C1/AR8	Computer	130,000		
42	LRP/01/01/C1/AR10	Computer	130,000		
43	LRP/01/01/C2/AR8	Computer	130,000		
44	LRP/01/01/C2/AR6	Computer	130,000		
45	LRP/01/01/C2/AR4	Computer	130,000		
46	LRP/01/01/C2/AR10	Computer	130,000		
47	LRP/01/01/C3/BR6	Computer	130,000		
48	LRP/01/01/C3/AR8	Computer	130,000		104900
49	LRP/01/01/C3/AR4	Computer	130,000		
50	LRP/01/01/C3/AR10	Computer	130,000		
51	LRP/01/01/C4/AR10	Computer	130,000		
52	LRP/01/01/C4/AR4	Computer	130,000		

53	LRP/01/04/KB1/AR10	Computer key board	20,000		
54	LRP/01/04/KB1/AR8	Computer key board	20,000		
55	LRP/01/04/KB2/AR10	Computer key board	20,000		
56	LRP/01/04/KB2/AR8	Computer key board	20,000		
57	LRP/01/04/KB3/AR10	Computer key board	20,000		
58	LRP/01/04/KB3/AR8	Computer key board	20,000		
59	LRP/01/04/KB4/AR10	Computer key board	20,000		
60	LRP/01/04/KB3/BR6	Computer key board	20,000		
61	LRP/01/03/CP1/AR1	Computer printer	40,000		
62	LRP/01/03/CP/AR8	Computer printer	30,000		
63	LRP/01/03/CP/AR4	Computer printer	50,000		
64	LRP/01/03/CP/BR6	Computer printer	50,000		
65	LRP/01/03/CP1/BR8	Computer printer	40,000		
66	LRP/01/03/CP1/AR10	Computer printer	70,000		
67	LRP/01/03/CP2/BR8	Computer printer	40,000		
68	LRP/01/03/CP2/AR10	Computer printer	40,000		
69	LRP/01/03/CP3/AR10	Computer printer	120,000		
70	LRP/01/02/CS/AR4	Computer Screen	50,000		
71	LRP/01/02/CS/AR7	Computer Screen	50,000		
72	LRP/01/02/CS1/AR1	Computer Screen	50,000		
73	LRP/01/02/CS1/AR6	Computer Screen	50,000		

74	LRP/01/02/CS1/AR8	Computer Screen	50,000		
75	LRP/01/02/CS1/AR10	Computer Screen	50,000		
76	LRP/01/02/CS2/AR10	Computer Screen	50,000		
77	LRP/01/02/CS2/AR8	Computer Screen	50,000		
78	LRP/01/02/CS2/AR6	Computer Screen	50,000		
79	LRP/01/02/CS3/BR6	Computer Screen	50,000		
80	LRP/01/02/CS3/AR8	Computer Screen	50,000		
81	LRP/01/02/CS3/AR10	Computer Screen	50,000		
82	LRP/01/02/CS4/AR10	Computer Screen	50,000		
83	LRP/01/01/C/BR8	Computer (Laptop)	40,000		
84	LRP/01/01/C1/BR9	Computer (Laptop)	40,000		
85	LRP/01/26/CVM1/BR7	Conductivity meter	50,600		
86	LRP/01/26/CVM2/BR7	Conductivity meter	50,600		
87	LRP/02/02/CD/AR8	Cupboard	7,000		
88	LRP/02/02/CD/AR10	Cupboard	7,000		
89	LRP/02/02/CD/AR1	Cupboard	7,000		
90	LRP/02/02/CD/AR4	Cupboard	7,000		
91	LRP/02/02/CD1/AR6	Cupboard	7,000		
92	LRP/02/02/CD2/AR6	Cupboard	7,000		
93	LRP/01/22/CM1/BR7	Current Meter 1	100,000		
94	LRP/01/22/CM2/BR7	Current Meter 2	100,000		

95	LRP/02/03/DK/AR3	Desk	4,500		
96	LRP/02/03/DK/AR5	Desk	4,500		
97	LRP/02/03/DK/AR6	Desk	4,500		
98	LRP/02/03/DK/AR2	Desk	4,500		
99	LRP/02/03/DK/BR11	Desk	4,500		
100	LRP/02/03/DK/BR3	Desk	4,500		
101	LRP/02/03/DK/BR5	Desk	4,500		
102	LRP/02/03/DK1/BR10	Desk	4,500		
103	LRP/02/03/DK1/BR9	Desk	4,500		
104	LRP/02/03/DK/BR4	Desk	4,500		
105	LRP/02/03/DK1/AR9	Desk	4,500		
106	LRP/02/03/DK1/AR1	Desk	4,500		
107	LRP/02/03/DK/BR11	Desk	4,500		
108	LRP/02/03/DK2/BR10	Desk	4,500		
109	LRP/02/03/DK2/BR9	Desk	4,500		
110	LRP/02/03/DK2/AR9	Desk	4,500		
111	LRP/02/03/DK2/AR1	Desk	4,500		
112	LRP/02/03/DK3/AR1	Desk	4,500		
113	LRP/01/39/DM1/AR4	Digital Multimeter			
114	LRP/01/39/DM2/AR4	Digital Multimeter			
115	LRP/01/06/DGT/AR10	Digitizer	300,000		

116	LRP/01/32/DMR/BR2	Discharge Measuring Rod			
117	LRP/01/50/DI/AR4	Drawing Instrument	7,000		
118	LRP/02/11/DT/AR8	Drawing Table	3,000		
119	LRP/01/41/DO/BR7	Drying Oven 1	184,000		
120	LRP/01/16/DP/AR8	Duplicating Machine	250,000		
121	LRP/01/09/EB/BR7	Electric Balance 1	34,500		
122	LRP/01/27/EC/BR7	Epson Computer 1	69,000		
123	LRP/01/14/FM/AR1	Fax Machine	150,000		
124	LRP/01/29/FSA/BR2	Field Stirring Apparatus			
125	LRP/01/51/FP/BR2	Firm Press			
126	LRP/02/12/FT/BR8	Fixed Table 1	3,000		
127	LRP/02/12/FT/BR6	Fixed Table 1	3,000		
128	LRP/02/12/FT/AR8	Fixed Table 1	9,000		
129	LRP/02/16/FC/BR1	Flip chart	5,000		
130	LRP/01/38/HSR/BR2	Humidity Slide Rule			
131	LRP/02/71/KX/BR9	Keydex	15,000		
132	LRP/01/71/KX/AR10	Keydex	15,000		
133	LRP/02/13/LK1/BR9	Locker	1,500		
134	LRP/02/13/LK/BR6	Locker	1,500		
135	LRP/02/13/LK1/BR8	Locker	1,500		
136	LRP/02/13/LK1/AR7	Locker	1,500		

137	LRP/02/13/LK2/BR9	Locker	1,500		
138	LRP/02/13/LK2/BR8	Locker	1,500		
139	LRP/02/13/LK2/AR7	Locker	1,500		
140	LRP/02/13/LK3/BR8	Locker	1,500		
141	LRP/02/08/MMC/AR8	Map Cabinet	60,000		
142	LRP/01/07/MC/AR8	Metal Cabinet	15,000		
143	LRP/02/07/MC/BR5	Metal Cabinet	15,000		
144	LRP/02/07/MC1/AR1	Metal Cabinet	24,000		
145	LRP/02/07/MC1/AR5	Metal Cabinet	15,000		
146	LRP/02/07/MC2/AR5	Metal Cabinet	15,000		
147	LRP/02/07/MC2/AR1	Metal Cabinet	24,000		
148	LRP/02/07/MC3/AR1	Metal Cabinet	15,000		
149	LRP/02/07/MC4/AR1	Metal Cabinet	15,000		
150	LRP/02/05/MCR2/AR9	Metal Chair	1,200		
151	LRP/02/05/MCR/BR4	Metal Chair	1,200		
152	LRP/02/05/MCR1/BR10	Metal Chair	1,200		
153	LRP/02/05/MCR1/BR11	Metal Chair	1,200		
154	LRP/02/05/MCR/BR3	Metal Chair	1,200		
155	LRP/02/05/MCR/BR5	Metal Chair	1,200		
156	LRP/02/05/MCR1/BR9	Metal Chair	1,200		
157	LRP/02/05/MCR1/BR8	Metal Chair	1,200		

158	LRP/02/05/MCR1/AR4	Metal Chair	1,200		
159	LRP/02/05/MCR1/AR10	Metal Chair	1,200		
160	LRP/02/05/MCR1/AR7	Metal Chair	1,200		
161	LRP/02/05/MCR1/AR5	Metal Chair	1,200		
162	LRP/02/05/MCR1/AR1	Metal Chair	1,200		
163	LRP/02/05/MCR1/AR9	Metal Chair	1,200		
164	LRP/02/05/MCR1/AR8	Metal Chair	1,200		
165	LRP/02/05/MCR1/AR6	Metal Chair	1,200		
166	LRP/02/05/MCR1/AR2	Metal Chair	800		
167	LRP/02/05/MCR2/BR11	Metal Chair	1,200		
168	LRP/02/05/MCR2/BR10	Metal Chair	1,200		
169	LRP/02/05/MCR2/BR9	Metal Chair	1,200		
170	LRP/02/05/MCR2/BR8	Metal Chair	1,200		
171	LRP/02/05/MCR2/AR6	Metal Chair	1,200		
172	LRP/02/05/MCR2/AR8	Metal Chair	1,200		
173	LRP/02/05/MCR2/AR7	Metal Chair	1,200		
174	LRP/02/07/MCR2/AR1	Metal Chair	1,200		
175	LRP/02/05/MCR2/AR5	Metal Chair	1,200		
176	LRP/02/05/MCR2/AR10	Metal Chair	1,200		
177	LRP/02/05/MCR2/AR2	Metal Chair	800		
178	LRP/02/05/MCR2/AR4	Metal Chair	1,200		

179	LRP/02/05/MCR3/BR10	Metal Chair	1,200		
180	LRP/02/05/MCR3/BR9	Metal Chair	1,200		
181	LRP/02/05/MCR3/BR8	Metal Chair	1,200		
182	LRP/02/05/MCR3/AR7	Metal Chair	1,200		
183	LRP/02/05/MCR3/AR10	Metal Chair	1,200		
184	LRP/02/07/MCR3/AR1	Metal Chair	1,200		
185	LRP/02/07/MCR4/AR1	Metal Chair	1,200		
186	LRP/02/07/MCR5/AR1	Metal Chair	1,200		
187	LRP/02/05/MCR1/BR1	Metal Chair	1,200		
188	LRP/02/05/MCR1/BR6	Metal Chair	1,200		
189	LRP/02/05/MCR10/BR1	Metal Chair	1,200		
190	LRP/02/05/MCR11/BR1	Metal Chair	1,200		
191	LRP/02/05/MCR12/BR1	Metal Chair	1,200		
192	LRP/02/05/MCR2/BR1	Metal Chair	1,200		
193	LRP/02/05/MCR2/BR6	Metal Chair	1,200		
194	LRP/02/05/MCR3/BR1	Metal Chair	1,200		
195	LRP/02/05/MCR4/BR1	Metal Chair	1,200		
196	LRP/02/05/MCR5/BR1	Metal Chair	1,200		
197	LRP/02/05/MCR6/BR1	Metal Chair	1,200		
198	LRP/02/05/MCR7/BR1	Metal Chair	1,200		
199	LRP/02/05/MCR8/BR1	Metal Chair	1,200		

200	LRP/02/05/MCR9/BR1	Metal Chair	1,200		
201	LRP/02/15/SCR/AR3	Metal chair secretarial	3,500		
202	LRP/01/37/RM/BR2	Multirange Meter			
203	LRP/01/24/NP1/BR7	Neutron Probe 1	690,000		
204	SPPU/LRP/01/24/NP2/BR7	Neutron Probe 2 (for LRPandSPPE)	338,914		
205	LRP/01/11/OP/AR4	Overhead Projector	120,000		
206	LRP/01/49/DD/AR4	Pair of dividers	200		
207	LRP/01/52/SS1/AR4	Pair of Scissors	200		
208	LRP/01/52/SS2/AR4	Pair of Scissors	200		
209	LRP/01/63/PSS/AR3	Panasonic Switch board	62,800		
210	LRP/01/21/PC/AR3	Paper cutter	2,000		
211	LRP/01/18/PP2/BR3	Paper Punch	2,000		
212	LRP/01/18/PP/BR3	Paper Punch	2,000		
213	LRP/01/18/PP/AR4	Paper Punch	2,000		
214	LRP/01/18/PP/AR5	Paper Punch	2,000		
215	LRP/01/18/PP/AR1	Paper Punch	3,000		
216	LRP/01/18/PP/AR10	Paper Punch	2,000		
217	LRP/01/46/PS/BR2	Paper Sealer	2000		
218	LRP/01/25/PHM/BR7	PH Meter 1	50,600		
219	LRP/01/31/PN/BR2	Planimeter	4,600		

220	LRP/01/61/PT/AR10	Plotter	120,000		
221	LRP/01/62/PR/AR1	Power regulator	21,000		
222	LRP/01/62/PR/AR8	Power regulator	21,000		
223	LRP/01/62/PR/BR6	Power regulator	21,000		
224	LRP/01/62/PR1/AR10	Power regulator	21,000		
225	LRP/01/62/PR2/AR10	Power regulator	21,000		
226	LRP/01/36/SYM/BR2	Psychometer	55,200		
227	LRP/01/48/QD1/BR2	Quick Draw 1	222,500		
228	LRP/01/48/QD2/BR2	Quick Draw 2	225,000		
229	LRP/01/53/SR1/AR4	Scale ruler	300		
230	LRP/01/53/SR2/AR4	Scale ruler	300		
231	LRP/01/10/SP/AR4	Slides projector	40,000		
232	LRP/01/35/SR/BR2	Soldering Rod	800		
233	LRP/01/34/SMB/BR2	Spanners in a Metal Box	4,200		
234	LRP/01/43/SB1/BR2	Spring Balance 1	300		
235	LRP/43/SB2/BR2	Spring Balance 2	300		
236	LRP/01/66/TSG/AR4	Staff gauge			
237	LRP/01/19/ST/AR5	Stapler	2,000		
238	LRP/01/19/ST/AR10	Stapler	2,000		
239	LRP/01/19/ST/AR7	Stapler	2,000		
240	LRP/01/19/ST/AR1	Stapler	2,000		

241	LRP/01/19/ST1/BR3	Stapler	2,000		
242	LRP/01/19/ST1/AR4	Stapler	2,000		
243	LRP/01/19/ST2/BR3	Stapler	2,000		
244	LRP/01/19/ST2/AR4	Stapler	4,000		
245	LRP/02/10/SL/AR5	Stool	150		
246	LRP/02/10/SL/BR10	Stool	150		
247	LRP/02/10/SL/BR7	Stool	150		
248	LRP/02/10/SL1/BR9	Stool	150		
249	LRP/02/10/SL/BR5	Stool	150		
250	LRP/02/10/SL1/BR1	Stool	150		
251	LRP/02/10/SL/BR6	Stool	150		
252	LRP/02/10/SL1/AR4	Stool	150		
253	LRP/02/10/SL2/BR1	Stool	150		
254	LRP/02/10/SL2/BR9	Stool	150		
255	LRP/02/10/SL2/AR4	Stool	150		
256	LRP/02/10/SL3/BR1	Stool	150		
257	LRP/02/10/SL3/AR4	Stool	150		
258	LRP/02/10/SL4/BR1	Stool	150		
259	LRP/02/10/SL5/BR1	Stool	150		
260	LRP/02/10/SL6/BR1	Stool	150		
261	LRP/01/64/SW1/AR4	Stop Watch	3,680		

262	LPR/01/64/SW2/AR4	Stop Watch	3,680		
263	LRP/02/01/TB/BR6	Table	2,200		
264	LRP/02/01/TB1/BR1	Table	2,200		
265	LRP/01/TB1/BR8	Table	2,200		
266	LRP/02/01/TB1/BR9	Table	2,200		
267	LRP/02/01/TB/BR3	Table	2,200		
268	LRP/02/01/TB1/BR7	Table	2,200		
269	LRP/02/01/TB1/AR7	Table	2,200		
270	LRP/02/01/TB1/AR4	Table	2,200		
271	LRP/02/01/TB/AR9	Table	2,200		
272	LRP/02/01/TB1/AR1	Table	3,000		
273	LRP/02/01/TB1/AR3	Table	2,200		
274	LRP/02/01/TB1/AR2	Table	2,200		
275	LRP/02/01/TB1/AR10	Table	2,200		
276	LRP/02/01/TB1/AR10	Table	2,200		
277	LRP/O2/01/TB1/AR5	Table	2,200		
278	LRP/02/01/TB2/BR3	Table	2,200		
279	LRP/02/01/TB2/BR7	Table	2,200		
280	LRP/02/01/TB2/BR9	Table	2,200		
281	LRP/02/01/TB2/BR8	Table	2,200		
282	LRP/02/01/TB2/BR10	Table	2,200		

283	LRP/02/01/TB2/BR1	Table	2,200		
284	LRP/02/01/TB2/AR6	Table	2,200		
285	LRP/02/01/TB2/AR5	Table	2,200		
286	LRP/02/01/TB2/AR10	Table	2,200		
287	LRP/02/01/TB2/AR4	Table	2,200		
288	LRP/02/01/TB2/AR3	Table	2,200		
289	LRP/02/01/TB2/AR9	Table	2,200		
290	LRP/02/01/TB2/AR2	Table	2,200		
291	LRP/02/01/TB3/BR9	Table	2,200		
292	LRP/02/01/TB3/BR1	Table	2,200		
293	LRP/02/01/TB3/AR10	Table	2,200		
294	LRP/02/01/TB3/AR6	Table	2,200		
295	LRP/02/01/TB3/BR1	Table	2,200		
296	LRP/02/01/TB4/AR10	Table	2,200		
297	LRP/02/01/TB5/AR10	Table	2,200		
298	LRP/02/01/TB3/AR3	Table small	1,500		
299	LRP/02/01/TB2/AR1	Table small	1,500		
300	LRP/01/15/TH/BR3	Telephone Head	7,850		
301	LRP/01/15/TH2/AR1	Telephone Head	8,000		
302	LRP/01/15/TH/AR5	Telephone Head	7,850		
303	LRP/01/15/TH1/AR1	Telephone Head	8,000		

304	LRP/01/15/TH1/AR3	Telephone Head	7,850		
305	LRP/01/15/TH2/AR3	Telephone Head	7,850		
306	LRP/01/28/TR/BR2	Temperature Recorder	46,000		
307	LRP/01/47/TSM/BR2	Tension meter	66,700		
308	LRP/01/12/T/AR4	Theodolite			
309	LRP/01/65/TS/AR4	Theodolite Stand			
310	LRP/01/40/THG1/BR2	Thermohygrograph	57,151		
311	LRP/01/40/THG2/BR2	Thermohygrograph	57,151		
312	LRP/01/40/THG3/BR2	Thermohygrograph	57,151		
313	LRP/01/13/TMS/BR2	Topcon Mirror Stereo Scope	138,000		
314	LRP/01/42/TBB/BR2	Tripple Beam Balance	23,000		
315	LRP/01/08/TW1/AR4	Typewriter	15,000		
316	LRP/01/08/TW2/AR4	Typewriter	15,000		
317	LRP/01/08/TW3/AR4	Typewriter	15,000		
318	LRP/01/08/TW4/AR4	Typewriter	15,000		
319	LRP/01/08/TW5/AR4	Typewriter	15,000		
320	LRP/01/08/TW6/AR4	Typewriter	15,000		
321	LRP/01/44/WR1/BR2	Wind Run 1	40,480		
322	LRP/01/44/WR2/BR2	Wind Run 2	40,480		
323	LRP/01/44/WR3/BR2	Wind Run 3	40,480		
324	LRP/02/06/WCR/AR3	Wooden Chair	500		

325	LRP/02/06/WCR/AR5	Wooden Chair	500		
326	LRP/02/06/WCR/AR6	Wooden Chair	500		
327	LRP/02/06/WCR/AR9	Wooden Chair	500		
328	LRP/02/06/WCR/BR4	Wooden Chair	500		
329	LRP/02/06/WCR1/BR1	Wooden Chair	500		
330	LRP/02/06/WCR/BR5	Wooden Chair	500		
331	LRP/02/06/WCR/BR7	Wooden Chair	500		
332	LRP/02/06/WCR1/AR10	Wooden Chair	500		
333	LRP/02/06/WCR2/BR1	Wooden Chair	500		
334	LRP/02/06/WCR2/AR10	Wooden Chair	500		
335	LRP/02/06/WCR3/BR1	Wooden Chair	500		
336	LRP/02/06/WCR3/AR10	Wooden Chair	500		
337	LRP/02/14/ACR1/AR3	Wooden Chair	4,000		
338	LRP/02/14/ACR2/AR3	Wooden Chair	2,000		
339	LRP/02/09/WMP1/AR3	Wooden Map Cabinet	3,000		
340	LRP/02/09/WMP2/AR3	Wooden Map Cabinet	3,000		
	Total		8,335,468		
	STATIONS COMBINED				

	CODE:	ASSETS	VALUE (KShs.)		
1	LRP/01/24/NP/SKL	NEUTRON PROBE 1	690,000		
2	LRP/01/83/WLR/SMD	WATER LEVEL RECORDER 1	600,000		
3	LRP/01/83/WLR/SAP	WATER LEVEL RECORDER 1	600,000		
4	LRP/01/83/WLR/SMY	WATER LEVEL RECORDER	600,000		
5	LRP/01/83/WLR/SNG	WATER LEVEL RECORDER	600,000		
6	LRP/AA	LIKII	600,000		
7	LRP/AB	ONTULILI	600,000		
8	LRP/01/83/WLR2/SE	" " " 2	600,000		
9	LRP/AC	SIRIMON	600,000		
10	LRP/AD	TELESWANI	600,000		
11	LRP/A5	NARO MORU FOOTZONE (UPPER)	600,000		
12	LRP/A7	NARO MORU (MWICHUIRI)	600,000		
13	LRP/A6	NARO MORU SAVANNAH	600,000		
14	LRP/A5B	NARO MORU FOOTZONE (LOWER)	600,000		
15	LRP/A4	NARO MORU FOREST (S)	600,000		
16	LRP/01/83/WLR1/SE	WATER LEVEL RECORDER 1	600,000		
17	LRP/A3	NARO MORU FOREST (N)	600,000		
18	LRP/A2	NARO MORU (MOORLAND)	600,000		

19	LRP/A1	NARO MORU (ALPINE)	600,000		
20	LRP/A9	NANYUKI	600,000		
21	LRP/A8	BURGURET	600,000		
22	LRP/AE	TIMAU	600,000		
23	LRP/AF	NKI/TIMAU CONFLUENCE	600,000		
24	LRP/AG	EWASO NG' IRO (HULME'S)	600,000		
25	LRP/AM	LOWER LOGILADO	600,000		
26	LRP/AL	UPPER LOGILADO	600,000		
27	LRP/AN	SIRIMA	600,000		
28	LRP/AH	SEGERA / SUGUROI	600,000		
29	LRP/AK (WD)	E. NAROK (JUNCTION)	600,000		
30	LRP/AS	V. ITUURI (TREELINE)	600,000		
31	LRP/AQ	MID. ITUURI	600,000		
32	LRP/AR	L. ITUURI	600,000		
33	LRP/AP	L. TELESWANI	600,000		
34	LRP/01/77/ARR1/SMT.T K	AUTOMATIC RAIN RECORDER	303,600		
35	LRP/01/77/ARR/SMD	AUTOMATIC RAIN RECORDER 1	303,600		
36	LRP/01/77/ARR/SS	AUTOMATIC RAIN RECORDER	303,600		
37	LRP/01/77/ARR/SNR.MK	AUTOMATIC RAINFALL RECORDER 1	303,600		
38	LRP/01/77/ARR/SMY	AUTOMATIC RAIN RECORDER 1	303,600		

39	LRP/01/77/ARR/SKL	AUTOMATIC RAIN GAUGE 1	303,600		
40	LRP/01/77/ARR1/SNR.M T	AUTOMATIC RAIN RECORDER (BELL FAULT)	303,600		
41	LRP/01/77/ARR4/SKR	" 4	303,600		
42	LRP/01/77/ARR2/SKR	" 2	303,600		
43	LRP/01/77/ARR2/SNR.M T	AUTOMATIC RAIN RECORDER( HELLMEN 2)	303,600		
44	LRP/01/77/ARR2/SMT.T K	AUTOMATIC RAIN RECORDER 2	303,600		
45	LRP/01/77/ARR3/SKR	" 3	303,600		
46	LRP/01/77/ARR/SE	AUTOMATIC RAINFALL RECORDER 1	130,011		
47	LRP/01/81/R1/SAP	RADIATION INTERGRATER 1	128,800		
48	LRP/01/81/R1/SMY	RADIATION INTERGRATOR 1	128,800		
49	LRP/01/81/R1/SKL	RADIATION INTERGRATOR 1	128,800		
50	LRP/01/84/ANP/SKL	ACTONOGRAPH 1	70,000		
51	LRP/01/40/TMG/SMY	THERMOHYGROGRAPH 1	59,800		
52	LRP/01/40/THG/SKL	HAENI HYGROGRAPH	59,800		
53	LRP/01/40/THG/SMT.TK	THERMOHYGROGRAPH	57,151		
54	LRP/01/40/THG/SL	THERMOHYGROGRAPH 1	57,151		
55	LRP/01/84/ANP/SSMY	ACTINOGRAPH	50,000		
56	LRP/01/85/SSR/SMY	SUNSHINE RECORDER	45,800		
57	LRP/01/44/WR/SL	WIND RUN 1	44,258		

58	LRP/01/44/WR/SAP	WIND RUN 1	44,258		
59	LRP/01/89/WV/SAP	WIND VANE 1	44,258		
60	LRP/01/89/WR/SNR.MK	WIND RUN 1	44,258		
61	LRP/01/44/WR1/SMY	WIND RUN 1	40,480		
62	LRP/01/44/WR2/SMY	" " 2	40,480		
63	LRP/01/44/WR/SS	WIND RUN 1	40,480		
64	LRP/01/44/WR/SKL	(ANANOMETER)-WINDRUN 1	40,480		
65	LRP/01/44/WR/SMD	WIND RUN 1	40,480		
66	LRP/01/44/WR/SR	WIND RUN 1	40,480		
67	LRP/01/40/THG/SNR.MK	THERMOHYGROGRAPH 1	40,000		
68	LRP/01/89/WV/SKL	WIND VANE	20,000		
69	LRP/01/76/EP/SAP	EVAPORATION PAN+CUP 1	15,000		
70	LRP/01/76/EP/SR	EVAPOARTION PAN/CUP	15,000		
71	LRP/01/76/EP/SMD	EVAPORATION PAN/CUP	15,000		
72	LRP/01/76/EP/SL	EVAPORATION PAN+CUP 1	15,000		
73	LRP/01/76/EP/SKR	EVAPOARATION PAN+CUP 1	15,000		
74	LRP/01/76/EP/SKL	EVAPORATION PAN/CUP 1	15,000		
75	LRP/01/76/EP/SE	EVAPORATION PAN/CUP	15,000		
76	LRP/01/76/EP/SMY	EVAPORATION PAN 1	15,000		
77	LRP/01/76/EP/SNR.MK	EVAPORATION PAN+CUP 1	15,000		
78	LRP/01/76/EP/SNR.MT	EVAPORATION PAN/CUP 1	15,000		

79	LRP/11/76/EP/ST	EVAPORATION PAN+CUP	15,000		
80	LRP/01/76/EP/SS	EVAPORATION PAN/CUP	15,000		
81	LRP/01/76/EP/ST	EVAPORATION PAN+CUP	15,000		
82	LRP/01/76/EP/SMT.TK	EVAPORATION PAN/CUP 1	15,000		
83	LRP/01/75/STS/SMD	STEVENSON SCREEN 1	10,000		
84	LRP/01/75/STS/SMK TH	STEVENSON SCREEN 1	10,000		
85	LRP/01/75/STS/SR	STEVENSON SCREEN 1	10,000		
86	LRP/01/75/STS/SMY	STEVENSON SCREEN 1	10,000		
87	LRP/01/75/STS/SMT.TK	STEVENSON SCREEN 1	10,000		
88	LRP/01/75/STS1/SAP	STEVENSON SCREEN 1	10,000		
89	LRP/01/78/MMT1/SKL	MAX/MIN THERMOMETER 1	10,000		
90	LRP/01/75/STS/SKR	STEVENSON SCREEN 1	10,000		
91	LRP/01/75/STS2/SAP	" 2	10,000		
92	LRP/01/75/STS/SL	STEVENSON SCREEN 1	10,000		
93	LRP/01/75/STS/SKL	STEVENSON SCREEN 1	10,000		
94	LRP/01/75/STS/SE	STEVENSON SCREEN	10,000		
95	LRP/01/78/MMT/SKR	MAX-MIN THERMOMETER 1	10,000		
96	LRP/01/78/MMT1/SMY	MIN/MAX THERMOMETER 1	10,000		
97	LRP/01/78/MMT2/SKL	" " 2	10,000		
98	LRP/01/78/MMT/SS	MAX-MIN THERMOMETER	10,000		
99	LRP/D1/78/MMT2/SE	" " 2	10,000		

100	LRP/D1/78/MMT1/SE	MAX-MIN THERMOMETER 1	10,000		
101	LRP/01/88/STM/SR	STATION THERMOMETER	10,000		
102	LRP/01/88/STM/SKL	STATION THERMOMETRE 1	10,000		
103	LRP/01/40/THG/SNR.MT	MAX/MIN THERMOMETER	10,000		
104	LRP/75/STS/SNR.MK	STEVENSON SCREEN 1	10,000		
105	LRP/01/78/MMT/ST	MAX/MIN THERMOMETER 1	10,000		
106	LRP/01/78/MMT/SR	MAX/MIN THERMOMETRE 1	10,000		
107	LRP/01/78/MMT2/SMY	" " 2	10,000		
108	LRP/01/78/MMT/SNR.MT	STEVENSON SCREEN 1	10,000		
109	LRP/01/78/MMT/SNR.MK	MAX-MIN THERMOMETER	10,000		
110	LRP/01/78/MMT/SMT.TK	MIN/MAX THERMOMETER 1	10,000		
111	LRP/01/78/MMT/SMK TH	MAX/MIN THERMOMETER 1	10,000		
112	LRP/01/78/MMT/SMD	MAX/MIN THERMOMETER 1	10,000		
113	LRP/01/75/STS/ST	STEVENSON SCREEN 1	10,000		
114	LRP/01/78/MMT/SAP	MIN/MAX THERMOMETRE 1	10,000		
115	LRP/01/75/STS/SS	STEVENSON SCREEN 1	10,000		
116	LRP/01/72/RGM4/SE	" " 4	7,500		
117	LRP/01/72/RGM4/SS	" " " 4	7,500		
118	LRP/01/72/RGM4/SR	" " " 4	7,500		
119	LRP/01/72/RGM3/SNG	" " " 3	7,500		
120	LRP/01/72/RGM2/SS	" " " 2	7,500		

121	LRP/01/72/RGM2/SR	" " " 2	7,500		
122	LRP/74/RGM/SNR.MK	RAIN GAUGE MANUAL 1	7,500		
123	LRP/01/72/RGM3/SMD	" 3	7,500		
124	LRP/01/72/RGM3/SR	" " " 3	7,500		
125	LRP/01/72/RGM4/SNG	" " " 4	7,500		
126	LRP/01/72/RGM3/SS	" " " 3	7,500		
127	LRP/01/72/RGM5/SMY	" " " 5	7,500		
128	LRP/01/72/RGM4/SMD	" 4	7,500		
129	LRP/01/72/RGM4/SMY	" " " 4	7,500		
130	LRP/01/72/RGM5/SMD	" 5	7,500		
131	LRP/01/72/RGM2/SMY	" " " 2	7,500		
132	LRP/01/72/RGM5/SNG	" " " 5	7,500		
133	LRP/01/72/RGM5/SS	" " " 5	7,500		
134	LRP/01/72/RGM1/SS	RAIN GAUGES MANUAL 1	7,500		
135	LRP/01/72/RGM2/SNG	" " " 2	7,500		
136	LRP/01/72/RGM2/SMY	" " " 3	7,500		
137	LRP/01/72/RGM2/SMD	" 2	7,500		
138	LRP/01/72/RGM2/SE	" " 2	7,500		
139	LRP/01/72/RGM1/SNG	MANUAL RAIN GAUGE 1	7,500		
140	LRP/01/72/RGM1/SR	RAIN GAUGES MANUAL 1	7,500		
141	LRP/01/72/RGM/SKL	RAIN GAUGE MANUAL	7,500		

		RECORDER			
142	LRP/01/72/RGM1/SMD	RAIN GAUGES 1	7,500		
143	LRP/01/72/RGM1/SE	RAIN GAUGE MANUAL	7,500		
144	LRP/01/72/GRM1/SMY	RAIN GAUGE MANUAL 1	7,500		
145	LRP/01/87/SMP/SKL	SPRAYING PUMP 1	7,500		
146	LRP/01/74/RGM1/ST	RAIN GAUGES MANUAL 1	7,500		
147	LRP/01/74/RGM2/ST	" 2	7,500		
148	LRP/01/74/RGM3/SL	" " 3	7,500		
149	LRP/01/74/RGM3/ST	" 3	7,500		
150	LRP/01/74/RGM/SKR	RAIN GAUGE MANUAL	7,500		
151	LRP/01/74/RGS2/SL	MANUAL RAIN GAUGE 2	7,500		
152	LRP/01/74/RGM/SNR.MT	RAIN GAUGE MANUAL 1	7,500		
153	LRP/01/74/RGM/SMT.TK	RAIN GAUGE MANUAL 1	7,500		
154	LRP/01/74/RGM4/ST	" 4	7,500		
155	LRP/01/74/RGM/SL	MANUAL RAIN GAUGE 1	7,500		
156	LRP/01/74/RGM/SAP	MANUAL RAIN GAUGE 1	7,500		
157	LRP/01/74/RGM6/ST	" 6	7,500		
158	LRP/01/72/RGM3/SE	" " 3	7,500		
159	LRP/01/74/RGM5/ST	" 5	7,500		
160	LRP/01/30/CO/ST	COMPASS 1	4,600		
161	LRP/01/82/PE/SS	PICHE EVAPORIMETER	4,500		

162	LRP/01/82/PE2/SMD	" " 2	4,500		
163	LRP/01/73/MCD2/SKR	" 2	4,500		
164	LRP/01/82/PE1/SAP	PICHE EVAPORIMETER 1	4,500		
165	LRP/01/82/PE1/SMD	PICHE EVAPORIMETER 1	4,500		
166	LRP/01/82/PE2/SAP	" 2	4,500		
167	LRP/01/73/MCD2/SKL	" " 2	4,500		
168	LRP/01/73/MCD1/SMD	MEASURING CYLINDER 1	4,500		
169	LRP/01/73/MCD1/ST	MEASURING CYLINDER 1	4,500		
170	LRP/01/73/MCD/SR	MEASURING CYLINDER 1	4,500		
171	LRP/01/73/MCD/SS	MEASURING CYLINDER X2 1	4,500		
172	LRP/01/73/MCD2/SE	" " 2	4,500		
173	LRP/01/73/MCD1/SKR	MEASURING CYLINDER 1	4,500		
174	LRP/01/73/MCD1/SMY	MEASURING CYLINDER 1	4,500		
175	LRP/01/73/MCD/SNR.MK	MEASURING CYLINDER 1	4,500		
176	LRP/01/73/MCD1/SKL	MEASURING CYLINDER 1	4,500		
177	LRP/01/73/MCD1/SE	MEASURING CYLINDERS 1	4,500		
178	LRP/01/75/MCD2/SMD	" 2	4,500		
179	LRP/01/73/MCD/SNR.MT	MEASURING CYLINDER 2	4,500		
180	LRP/01/73/MCD/SNR.MT	MEASURING CYLINDER 1	4,500		
181	LRP/01/73/MCD/SMT.TK	MEASURING CYLINDER	4,500		
182	LRP/01/73/MCD/SL	MEASURING CYLINDER	4,500		

183	LRP/01/73/MCD2/SMY	" " 2	4,500		
184	LRP/01/73/MCD3/ST	" 3	4,500		
185	LRP/01/73/MCD/SAP	MEASURING CYLINDER	4,500		
186	LRP/01/73/MCD2/ST	" 2	4,500		
187	LRP/01/73/MCD2/SS	MEASURING CYLINDER 2	4,500		
188	LRP/01/80/TK3/SMD	" 3	3,000		
189	LRP/01/80/TK3/SMY	TANK 3	3,000		
190	LRP/01/80/TK3/SKL	" 3	3,000		
191	LRP/01/80/TK2/SE	" 2	3,000		
192	LRP/01/80/TK8/SMD	" 8	3,000		
193	LRP/01/80/TK4/SE	" 4	3,000		
194	LRP/01/80/TK2/SKL	" 2	3,000		
195	LRP/01/80/TK2/SMD	" 2	3,000		
196	LRP/01/80/TK2/SMY	TANK2	3,000		
197	LRP/01/80/TK2/SNR.MT	" 2	3,000		
198	LRP/01/80/TK3/SNR.MT	" 3	3,000		
199	LRP/01/80/TK3/SE	" 3	3,000		
200	LRP/01/80/TK4/SKL	" 4	3,000		
201	LRP/01/80/TK4/SMD	" 4	3,000		
202	LRP/01/80/TK6/SMD	" 6	3,000		
203	LRP/01/80/TK7/SMD	" 7	3,000		

204	LRP/01/80/TK7/SKL	" 7	3,000		
205	LRP/01/80/TK6/SMY	" 6	3,000		
206	LRP/01/80/TK1/SMY	TANK1	3,000		
207	LRP/01/80/TK6/SKL	" 6	3,000		
208	LRP/01/80/TK4/SMY	" 4	3,000		
209	LRP/01/80/TK5/SMY	TANK 5	3,000		
210	LRP/01/80/TK5/SMD	" 5	3,000		
211	LRP/01/80/TK5/SKL	" 5	3,000		
212	LRP/01/80/TK1/SNR.MT	TANK 1	3,000		
213	LRP/01/80/TK7/SMY	TANK 7	3,000		
214	LRP/01/80/TK1/SMD	TANKS1	3,000		
215	LRP/01/80/TK8/SKL	" 8	3,000		
216	LRP/01/89/WV/SE	WIND VANE	3,000		
217	LRP/01/89/WV/SNR.MK	WIND VANE 1	3,000		
218	LRP/01/89/WV/SNR.MT	WIND VANE	3,000		
219	LRP/01/89/WV/SL	WIND VANE 1	3,000		
220	LRP/01/80/TK1/SKL	TANKS 1	3,000		
221	LRP/01/80/TK9/SKL	" 9	3,000		
222	LRP/01/80/TK9/SMD	" 9	3,000		
223	LRP/01/89/WV/SS	WIND VANE	3,000		
224	LRP/01/80/TK10/SMD	" 10	3,000		

225	LRP/01/80/TK11/SMD	" 11	3,000		
226	LRP/01/80/TK1/SE	TANKS 1	3,000		
227	LRP/01/80/TK15/SMD	" 15	3,000		
228	LRP/01/80/TK14/SMD	" 14	3,000		
229	LRP/01/80/TK13/SMD	" 13	3,000		
230	LRP/01/80/TK12/SMD	" 12	3,000		
231	LRP/01/82/PE/SMY	PITCH EVAPOREMETER 1	2,500		
232	LRP/01/90/SPL/SS	SPIRIT LEVEL	2,300		
233	LRP/01/18/PP/SMY	PAPER PUNCH 1	2,000		
234	LRP/01/18/PP/SKL	PAPER PUNCH	2,000		
235	LRP/02/17/BED/SMD	BED 1	1,500		
236	LRP/02/17/BED/SL	BED 1	1,500		
237	LRP/02/17/BED/SAP	BED 1	1,500		
238	LRP/02/17/BED3/ST	BED 3 KAMWARO	1,500		
239	LRP/02/17/BED3/SE	" 3	1,500		
240	LRP/02/17/BED2/ST	BED 2 LOGILADO	1,500		
241	LRP/02/17/BED1/SMD	BED 2	1,500		
242	LRP/02/04/BS3/SKL	" 3	1,500		
243	LRP/02/04/BS3/SMY	" 3	1,500		
244	LRP/02/04/BS/SS	BOOK SHELVE 1	1,500		
245	LRP/02/04/BS/ST	BOOKSHELVE 1	1,500		

246	LRP/02/17/BED1/SE	BEDS 1	1,500		
247	LRP/02/17/BED1/SKL	BED 1	1,500		
248	LRP/02/17/BED1/SMY	BEDS 1	1,500		
249	LRP/02/04/BS2/SKL	" 2	1,500		
250	LRP/02/17/BED1/SR	BED 1	1,500		
251	LRP/02/17/BED1/ST	BED 1	1,500		
252	LRP/02/17/BED2/SE	" 2	1,500		
253	LRP/02/17/BED2/SKL	" 2	1,500		
254	LRP/02/17/BED3/SKL	" 3	1,500		
255	LRP/02/17/BED2/SMY	" 2	1,500		
256	LRP/02/04/BS2/SMY	" 2	1,500		
257	LRP/02/04/BS1/SMY	BOOKSHELVES 1	1,500		
258	LRP/02/01/TB1/SKL	TABLE 1	1,500		
259	LRP/02/01/TB2/SMD	" 2	1,500		
260	LRP/02/01/TB1/SL	TABLE 1	1,500		
261	LRP/02/01/TB1/SMD	TABLE 1	1,500		
262	LRP/02/01/TB1/SMY	TABLE 1	1,500		
263	LRP/02/01/TB1/ST	TABLES 1	1,500		
264	LRP/02/01/TB2/SKL	" 2	1,500		
265	LRP/02/01/TB2/SL	" 2	1,500		
266	LRP/02/01/TB2/SMY	" 2	1,500		

267	LRP/02/04/BS1/SKL	BOOKSHELVES 1	1,500		
268	LRP/02/01/TB2/ST	TABLES 2	1,500		
269	LRP/02/01/TB3/SKL	" 3	1,500		
270	LRP/02/01/TB3/SMY	" 3	1,500		
271	LRP/02/01/TB3/ST	COFFEE TABLE	1,500		
272	LRP/02/01/TB4/SMY	" 4	1,500		
273	LRP/02/01/TB/SS	TABLE 1	1,500		
274	LRP/02/17/BED2/SMD	" 3	1,500		
275	LRP/01/79/DR5/SKL	" 5	1,500		
276	LRP/01/79/DR2/SE	" 2	1,500		
277	LRP/01/74/MR/SMD	METRE RULE	1,500		
278	LRP/01/74/MR/SS	METRE RULE	1,500		
279	LRP/01/74/MR/SNR.MT	METRE RULE 1	1,500		
280	LRP/01/74/MR/SMY	METER RULE 1	1,500		
281	LRP/01/74/MR1/SKL	METRE RULE 1	1,500		
282	LRP/01/74/MR2/SKL	METRE RULE 2	1,500		
283	LRP/01/79/DR10/SKL	" 10	1,500		
284	LRP/01/79/DR1/SR	DRUMS 1	1,500		
285	LRP/01/79/DR2/SR	" 2	1,500		
286	LRP/01/79/DR2/SNR.MT	" 2	1,500		
287	LRP/01/74/MR/ST	METRE RULE	1,500		

288	LRP/01/79/DR11/SMD	" 11	1,500		
289	LRP/01/79/DR10/SMD	" 10	1,500		
290	LRP/01/79/DR2/SMD	" 2	1,500		
291	LRP/01/79/DR1/SMD	DRUMS 1	1,500		
292	LRP/01/79/DR1/SMY	DRUMS 1	1,500		
293	LRP/01/79/DR1/SMD	DRUM 1	1,500		
294	LRP/01/79/DR3/SE	" 3	1,500		
295	LRP/01/79/DR1/SE	DRUMS 1	1,500		
296	LRP/01/79/DR1/SKL	DRUMS 1	1,500		
297	LRP/01/79/DR12/SMD	" 12	1,500		
298	LRP/01/79/DR15/SMD	" 15	1,500		
299	LRP/01/79/DR14/SMD	" 14	1,500		
300	LRP/01/79/DR13/SMD	" 13	1,500		
301	LRP/01/79/DR2/SMY	" 2	1,500		
302	LRP/01/79/DR2/SMD	" 2	1,500		
303	LRP/01/79/DR3/SKL	" 3	1,500		
304	LRP/01/79/DR3/SMD	" 3	1,500		
305	LRP/01/79/DR9/SMD	" 9	1,500		
306	LRP/01/79/DR7/SMY	" 7	1,500		
307	LRP/01/79/DR8/SKL	" 8	1,500		
308	LRP/01/79/DR8/SMD	" 8	1,500		

309	LRP/01/79/DR9/SKL	" 9	1,500		
310	LRP/01/79/DRS/SMY	" 5	1,500		
311	LRP/01/79/DR7/SKL	" 7	1,500		
312	LRP/01/79/DR/SE	DRUMS 1	1,500		
313	LRP/01/79/DR/ST	DRUM 1	1,500		
314	LRP/01/80/DR1/SAP	DRUMS 1	1,500		
315	LRP/01/80/DR2/SAP	" 2	1,500		
316	LRP/01/79/DR7/SMD	" 7	1,500		
317	LRP/01/79/DR6/SMD	" 6	1,500		
318	LRP/01/79/DR6/SMY	" 6	1,500		
319	LRP/01/79/DR3/SMD	" 3	1,500		
320	LRP/01/79/DR6/SKL	" 6	1,500		
321	LRP/01/79/DR3/SMY	" 3	1,500		
322	LRP/01/79/DR3/SNR.MT	" 3	1,500		
323	LRP/01/79/DR4/SE	" 4	1,500		
324	LRP/01/79/DR4/SKL	" 4	1,500		
325	LRP/01/79/DR4/SMD	" 4	1,500		
326	LRP/01/79/DR4/SMY	" 4	1,500		
327	LRP/01/79/DR2/SKL	" 2	1,500		
328	LRP/01/79/DR5/SMD	" 5	1,500		
329	LRP/01/79/DR1/SNR.MT	DRUMS 1	1,500		

330	LRP/01/54/TM/SMY	TAPE MEASURE 1	1,200		
331	LRP/01/54/TM/SKL	TAPE MEASURE 1	1,200		
332	LRP/01/86/BCY/SMY	BICYCLE 1	600		
333	LRP/01/86/BCY/SKL	BICYCLE 1	600		
334	LRP/01/17/CL/SS	CALCULATOR	500		
335	LRP/01/17/CL/SR	CALCULATOR 1	500		
336	LRP/01/17/CL/SMY	CALCULATOR 1	500		
337	LRP/01/17/CL/SMD	CALCULATOR	500		
338	LRP/01/17/CL/SL	CALCULATOR	500		
339	LRP/01/17/CL/SKR	CALCULATOR	500		
340	LRP/01/17/CL/ST	CALCULATOR 1	500		
341	LRP/01/17/CL/SE	CALCULATOR 1	500		
342	LRP/02/14/AC/SMY	ARMCHAIR 1	500		
343	LRP/02/06/WCR2/SS	WOODEN CHAIR	500		
344	LRP/02/14/AC/SKL	ARMCHAIR 1	500		
345	LRP/02/06/WCR3/SMD	" 3	500		
346	LRP/02/06/WCR2/SMD	" 2	500		
347	LRP/02/06/WCR1/SS	WOODEN CHAIR	500		
348	LRP/02/06/WCR1/SMD	WOODEN CHAIR 1 1	500		
349	LRP/01/17/CL/SKL	CALCULATOR 1	500		
350	LRP/01/43/SB2/SMY	" " 2	300		

351	LRP/01/43/SB/SNR.MT	SPRING BALANCE 1	300		
352	LRP/01/43/SB/SMD	SPRING BALANCE	300		
353	LRP/01/43/SB/SKR	SPRING BALANCE 1	300		
354	LRP/01/43/SB1/SE	SPRING BALANCE 1	300		
355	LRP/01/43/SB2/SKL	" " 2	300		
356	LRP/01/43/SB1/SMY	SPRING BALANCE 1	300		
357	LRP/01/43/SB1/SKL	SPRING BALANCE 1	300		
358	LRP/02/10/SL1/SKL	STOOLS 1	150		
359	LRP/02/10/SL1/SMD	STOOL 1	150		
360	LRP/02/10/SL1/SMY	STOOLS 1	150		
361	LRP/02/10/SL1/ST	STOOL 1	150		
362	LRP/02/10/SL2/SKL	" 2	150		
363	LRP/02/10/SL4/SMD	" 4	150		
364	LRP/02/10/SL/SS	STOOL 1	150		
365	LRP/02/10/SL6/SMY	" 6	150		
366	LRP/02/10/SL6/SKL	" 6	150		
367	LRP/02/10/SL5/SMY	" 5	150		
368	LRP/02/10/SL5/SKL	" 5	150		
369	LRP/02/10/SL4/ST	STOOL 4	150		
370	LRP/02/10/SL4/SMY	" 4	150		
371	LRP/02/10/SL4/SKL	STOOLS 4	150		

372	LRP/02/10/SL2/SMD	" 2	150		
373	LRP/02/10/SL3/ST	STOOL 3	150		
374	LRP/02/10/SL3/SMY	" 3	150		
375	LRP/02/10/SL3/SMD	" 3	150		
376	LRP/02/10/SL3/SKL	" 3	150		
377	LRP/02/10/SL2/ST	STOOL 2	150		
378	LRP/02/10/SL2/SMY	" 2	150		
379	LRP/02/10/SL7/SMY	" 7	150		
380	LRP/01/52/SS/SMY	SCISSORS 1	70		
	TOTAL		26,222,994		
1	ROCK/01/40/THG/SE	THERMOHYGROGRAPH 1	57,151		
2	ROCK/01/40/THG/ST	THERMOHYGROGRAPH 1	57,151		
3	ROCK/01/43/SB/SL	SPRING BALANCE	300		
4	ROCK/01/43/SB/SS	SPRING BALANCE 1	300		
5	ROCK/01/43/SB/ST	SPRING BALANCE 1	300		
6	ROCK/01/44/WR/SE	WIND RUN 1	44,258		
7	ROCK/01/44/WR/SKR	WIND RUN 1	44,258		
8	ROCK/01/44/WR/ST	WIND RUN	44,258		
9	ROCK/01/77/ARR1/SKR	AUTOMATIC RAIN RECORDER 1	130,011		

10	ROCK/01/77/ARR/ST	AUTOMATIC RAIN RECORDER 1	130,011		
11	ROCK/01/79/DR1/SKR	DRUMS 1	1,500		
12	ROCK/01/79/DR1/SS	DRUMS 1	1,500		
13	ROCK/01/79/DR1/ST	DRUMS 1	1,500		
14	ROCK/01/79/DR2/SKR	" 2	1,500		
15	ROCK/01/79/DR2/SS	" 2	1,500		
16	ROCK/01/79/DR2/ST	" 2	1,500		
17	ROCK/01/79/DR3/SKR	" 3	1,500		
18	ROCK/01/79/DR3/SS	" 3	1,500		
19	ROCK/01/79/DR3/ST	" 3	1,500		
20	ROCK/01/79/DR4/SKR	" 4	1,500		
21	ROCK/01/79/DR4/ST	" 4	1,500		
22	ROCK/01/80/TK1/SKR	TANK 1	3,000		
23	ROCK/01/80/TK1/SS	TUNKS 1	3,000		
24	ROCK/01/80/TK1/ST	TUNKS 1	3,000		
25	ROCK/01/80/TK2/SKR	" 2	3,000		
26	ROCK/01/80/TK2/SS	" 2	3,000		
27	ROCK/01/80/TK2/ST	" 2	3,000		
28	ROCK/01/80/TK3/SKR	" 3	3,000		
29	ROCK/01/80/TK3/SS	" 3	3,000		
30	ROCK/01/80/TK3/ST	" 3	3,000		

31	ROCK/01/80/TK4/SKR	" 4	3,000		
32	ROCK/01/80/TK4/ST	" 4	3,000		
33	ROCK/01/80/TK5/SKR	DRUM 5	1,500		
	TOTAL		558,998		
1	TTMI/01/24/NP/SMY	NEUTRON PROBE 1	690,000		
2	TTMI/01/24/NP2/SMY	NEUTRON PROBE 2	552,000		
3	TTMI/01/44/WR/SE	WIND RUN 2	225,400		
4	TTM1/01/85/SSR/SMD	SUNSHINE RECORDER 1	45,800		
5	TTM1/01/85/SSR/SNR.M T	SUNSHINE RECORDER 1	45,800		
6	TTMI/01/85/SSR1/KL	SUNSHINE RECORDER 1	45,800		
7	TTMI/01/85/SSR/SNR.M K	SUNSHINE RECORDER 1	45,800		
	TOTAL		1,650,600		
1	WD/01/77/ARR/SAP	AUTOMATIC RAIN RECORDER	303,600		