

Soil and Water Conservation Research Project

at Kari, Muguga – Kenya

**Kamugisha, JR
Semu, E**

**Department for Natural
Resources and the
Environment**

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**Sida Evaluation 96/26
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Authors: Kamugisha, JR Semu, E

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SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Address: S-105 25 Stockholm, Sweden. Office: Sveavägen 20, Stockholm

Telephone: +46 (0)8-698 50 00. Telefax: +46 (0)8-20 88 64

Telegram: sida stockholm. Telex: 11450 sida sthlm. Postgiro: 1 56 34-9

Homepage: <http://www.sida.se>

CONTENTS

CHAPTER ONE: INTRODUCTION

	ACKNOWLEDGEMENTS	I
	ACRONYMS	II
	EXECUTIVE SUMMARY	III
1.1	Background	Page 1
1.2	Evaluation Purpose and Methodology	Page 5

CHAPTER TWO: FINDINGS, ANALYSIS, CONCLUSIONS AND RECOMMENDATIONS

2.1	Research Activities	Page 7
2.1.1	Diagnosis of Catchments and Design of Research	Page 7
2.1.2	Evaluation and Utilization of Manures and Their Interaction with Inorganic Fertilizers in Smallholder Farms	Page 9
2.1.3	Improvement of the Quality and Quantity of Fodder Grown on Terraces in Smallholder Farms	Page 11
2.1.4	Impact of Soil Conservation Measures on Soil Productivity on Steep Slopes	Page 12
2.2	Linkages and Interaction with other Relevant Agencies	Page 13
2.3	Programme Management	Page 15
2.3.1	Administration	Page 15
2.3.2	Finances and Material Inputs	Page 16
2.3.3	Monitoring and Evaluation	Page 19
2.4	Concluding Remarks and Recommendations	Page 19
2.4.1	General	Page 19
2.4.2	Research Activities	Page 21
2.4.3	Linkages and Interactions	Page 21
2.4.4	Programme Management	Page 22
2.4.5	Monitoring	Page 23
2.4.6	Motivation	Page 23

Bibliography & Documents Consulted

Annex 1

Annex 2

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ACRONYMS

PRA	Participatory Rural Appraisal
SWCRP I	Soil & Water Conservation Research Programme: Phase 1
SWCRP II	Soil & Water Conservation Research Programme: Phase 2
SWCRP	Soil and Water Conservation Research Programme
OF	On-Farm
OS	On-station
MPTS	Multi-Purpose Trees
KARI	Kenya Agricultural Research organisation
SIDA	Swedish International Development Authority
SEK	Swedish Kronor
PPP	Pre-pilot Phase
TOR	Terms of Reference
KSHS	Kenya Shillings
NARL	National Agricultural Research Laboratories
GIS	Geographical Information Systems
MOALDM	Ministry of Agriculture, Livestock Development and Marketing
KEFRI	Kenya Forestry Research Institute
FYM	Farmyard Manure
FTC	Farmers Training Centre
PIT	Project Implementation Team
NARC	National Agricultural Research Centre
SWM	Soil and Water Management
DIVSCO	Divisional Soil Conservation Officer
DAEO	District Agricultural Extension officer
DAO	District Agricultural Officer
DSWCO	District Soil and Water Conservation Officer
DIVAE0	Divisional Agricultural Extension Officer
ICRAF	International Centre for Research in Agroforestry
SWCB	Soil and Water Conservation Branch

EXECUTIVE SUMMARY

The broad aim of the proposed research is to determine ways of strengthening soil and water conservation, thereby increase land productivity, through on-farm research and using the catchment approach. The immediate goals as executed in the pre-pilot phase were to characterize land resources in the research areas and to set up the stage for addressing the objectives in the second phase proposal. The Catchment approach and out of 90 Catchments, 4 representative ones were selected as sites for the research through a scoring exercise.

Reconnaissance surveys were conducted in Catchments, and the status of soil and water conservation established. PRAs were undertaken in the 4 Catchments to identify farmers' problems, research gaps, and to select farmers to collaborate with during on-farm research. More groundwork was done to obtain some baseline data and to set up on-farm trials. Only one out of four projects was scheduled to be completed in the pre-pilot phase and indeed it was completed. Head-start activities were also successfully initiated and most of the activities are underway.

The positive achievements notwithstanding, there were a number of problems including delays, shortage of funds, material supplies and logistics. A new and capable team of scientists has been installed in the programme and they have moved fast to restore the technical and operational image of the programme. Close horizontal and vertical linkages have also been forged with relevant institutions.

Given the circumstances under which the activities have been undertaken, it has been concluded that the targets that were set for the pre-pilot phase have been successfully achieved. Accordingly, it has been recommended that:

- * external and SIDA financed final evaluation of phase 1 and appraisal of phase 2 be concurrently undertaken to recast the activities given the challenges and opportunities unveiled by the pre-pilot phase. The bulk of the needed information is already available and the exercise should, therefore, not take more than twenty days;
- * financing of phase 2 should in principle be continued but SIDA should maintain the cautious approach. In this regard, funds should continue to be available under the current modality until the appraisal and workplan are available;
- * to avoid unnecessary delays, funds should in future be disbursed directly to the NARC (Muguga) bank account and the Programme Head should be the mandatory signatory for the funds;
- * SIDA should devise means of pro-active evaluation and monitoring and should do regular audits. In this regard, the services of the consultant currently backstopping for the project should continue to be enlisted. The programme should also produce a mandatory progress report every six months; and
- * project staff should be paid a "project performance allowance" as an incentive to not only attract and retain competent staff but also as a token of appreciation for the work being done.

CHAPTER ONE:

INTRODUCTION

1.1 Background

Kenya Agricultural Research Institute (KARI) was reorganised in the mid-1980s. During the process, it was stressed that Kenya's agricultural productivity relies upon the proper management of the country's soil and water resources. However, the high and medium potential areas which are the mainstay of agricultural production in the country are already under intensive utilization as a result of a long history of dense human settlement. Thus, these regions are characterised by soil erosion, loss of organic matter and mining of nutrients by crops all of which have led to severe depletion of the soil's natural fertility. An almost geometric increase in human population in these regions has forced people to settle on steep slopes and land holdings have been sub-divided to very small parcels that can hardly meet even the subsistence needs of most of the peasant farm families.

The rapid population growth has also led to deforestation and recruitment of watersheds for cultivation hence accentuating the soil erosion and land degradation problem complex. The recent "*development*" of transferring forested areas to human settlement and cultivation, moreover in rugged terrains, has exacerbated the problems as the change of land use has resulted in reduction of vegetation cover, hence leading to increased runoff, impaired soil moisture relationships and stream flow and ubiquitous soil erosion in the affected areas. Fallowing is impossible and very few farmers can afford inorganic fertilizers. Declining soil fertility is thus fast becoming a national problem and not everyone is yet aware of the enormity of the problem. In addition to the foregoing, water deficits in and out of the growing seasons are becoming another major constraint on production potential.

There is now ample evidence that most of the researched technologies are commodity based and do not adequately address themselves to the real needs of the smallholder peasant farmers. More often than not, the technologies do not incorporate the necessary soil and water conservation practices for the needed sustainability and hence do not solve the real problems of the peasants. There is thus still a very wide gap between the researcher and the farmer.

In view of the foregoing, it was realised that if the state of affairs was left to continue, the basic elements of life and hence food production would decrease to dangerously low levels and the country would slide in an environmental and food emergency spiral. The paucity of adequate qualitative and quantitative baseline information and data on these had accentuated these problems and curtailed development of soil and water management regimes responsive to the needs of the regions, hindered objective evaluation and adaptation of proven technologies and curtailed efforts to rehabilitate already degraded land. Accordingly, KARI placed high priority on soil and water management research in the high and medium potential regions of the country occurring in "*agro-climatic zones*" I to III. These are the key to sustained agricultural production because of favourable soils and climate, implying low unit costs but best prospects for high economic returns.

Accordingly, in 1987 KARI through its National Agricultural Research Centre (NARC) at Muguga proposed a three-year *"Soil and Water Conservation Research Programme"* (SWCRP I) with a main goal of developing a more stable form of land use that could preserve, maintain and better utilise the productive capacity of the available soil and water resources. The project was to be located within the Muguga Research Station *"mandate area"* in Kiambu District.

The programme aimed at:

- * coordinating, training in and providing technical backstopping and oversight to soil and water conservation and management projects in the country;
- * creating a vegetation cover data bank and disseminating techniques in its use;
- * assessing the impact of erosion on soil productivity and economics of rehabilitation thereof;
- * modelling of an improved agricultural production through both "on-station" (OS) and "on-farm" (OF) trials; and
- * undertaking research in farming systems including evaluation of agronomically and socio-economically feasible cropping systems, determination of effectiveness of different infiltration strips and other structures in the control of soil erosion and development of suitable design standards thereof, determination of vegetation cover for stabilising terrace banks and identification of the roles of agroforestry in soil and water management.

The Swedish International Development Authority (SIDA) was approached and in February 1988 agreed to finance the activities with a grant of SEK 8 000 000. Between the expiry of the first *"Specific Agreement Between Kenya and Sweden"* for implementation of the programme in mid-1990 and now (November, 1995), the project has been extended five times.

The programme has been reviewed every year before approval of the annual workplan and budget. In late 1990, mid-1992 and mid-1993, the programme was reviewed by external evaluators. The external reviews were all largely negative and critical, citing complete lack of achievements and/or extremely slow progress due to a wide range of causes, total utilisation of the approved budget notwithstanding. In a nutshell, the causes mentioned include, *inter alia*:

- * absence of a consensus on priorities, scope and procedures among the programme staff;
- * failure to recruit suitably qualified and experienced professional and technical staff;
- * absence of agreed workplans and hence failure to discern mainstream project work and support activities thereof;

- * absence of formal linkages between the programme and other relevant projects, agencies and ministries;
- * overestimation at the design stage of the availability in KARI of the needed human resources capacity in terms of numbers and sophistication;
- * intense conflict of interest between the national scientists and their expatriate counterparts in the programme;
- * an overly ambitious agenda of research objectives each of which entailed tremendous volumes of work in absolute terms;
- * absence of transparency, accountability and clear operational chain of command with regard to action or inaction; and
- * a very high turn-over rate of national scientists posted to the project.

These adverse observations and conclusions notwithstanding, KARI and SIDA remained committed and willing to pursue the basic principles and mission that inspired their original involvement. Thus, in November 1994, KARI submitted to SIDA a proposal for the second phase of the programme (SWCRP II). In descending order of priority, the programme aimed at:

- * generation of technologies for the protection of the highly erodible or susceptible soils from accelerated erosion;
- * adoption and testing of already developed soil and water conservation technologies to rehabilitate eroded soils while averting their future degradation;
- * developing efficient water use strategies and practices to increase total water yield;
- * determining the role of agroforestry practices and systems in erosion control and maintenance of soil fertility by:
 - identification of suitable woody species for different cropping systems;
 - evaluation of the most appropriate ways of managing the woody species in the farming systems to obtain the maximum benefits; and
 - determination of the most efficient ways of managing the woody species in the farming systems to obtain the maximum benefits; and
- * development of soil and water conservation technologies that protect the quality of surface and ground water from sediments and agricultural chemicals.

A number of the aims in SWCRP I were dropped in SWCRP II although the overarching goal remained the same. The programme also had a sharper focus and was strongly biased towards OF research.

The aims of the SWCRP II are to be achieved through implementation of four projects with separate and quite distinct objectives. The projects include:

- * *diagnosis of catchments and design of OF research;*
- * *evaluation and utilisation of manure and interactions with inorganic fertilizers;*
- * *improvement of quality and quantity of fodder grown on terraces in smallholder farms; and*
- * *the impact of soil conservation measures on soil productivity on steep slopes.*

These projects were deemed to be adequately responsive to the priority concerns of the programme. Zeroing in on the four was also intended to match the tasks with the resources available and results were considered to have a potential for a strong ripple effect that would elucidate entry points into the rest of the objectives.

Under the auspices of the programme, a number of staff will receive support for further training. These will include 2 Ph.Ds, 1 MSc and computer operators. SIDA agreed to fund implementation of the proposed activities with a grant of SEK 1 700 000 covering the period July, 1994 - December, 1996. An agreement between Sweden and Kenya for implementation of the programme was concluded and initialled in January, 1995.

While discussions on phase 2 were going on between SIDA and KARI during late 1994, an idea of a "pre-pilot" phase (PPP) emerged from SIDA quarters. Accordingly, in November 1994 SIDA requested KARI to implement the PPP over a six month period. From SIDA's point of view, this was to be a diagnosis phase of the already approved SWCRP II during which a foundation for the establishment of experiments would be laid. It was envisaged that the PPP would give KARI a kick-start on the programme in a direction that would not only hedge it against failure again but would demonstrate that KARI had a capacity to absorb aid and hence the flow of funds for the SWCRP II could be resumed in earnest. It was made abundantly clear that actual resumption of support for the SWCRP II was subject to successful and concrete achievements in the PPP and that the activities would have to be evaluated and declared to have successfully achieved the stated objectives prior to such resumption.

The technical goal of the PPP phase was stated as the identification of adoptable systems that can permit optimum levels of production consistent with the sustainability ethos. The goal was to be achieved through undertaking some head-start activities under the same four discrete but inter-related projects proposed for the SWCRP II. With the exception of Project 4, the PPP was actually an abridged version of the second phase programme, the only difference being one of intensity and extent and hence a reduced budget.

SIDA also wanted to ascertain whether KARI now had the ability and commitment to assemble a capable programme implementation team (PIT) before committing itself fully to the SWCRP II.

Conceptually, the PPP phase was to apply the catchment approach. From a methodology point of view, the PPP was to adopt a participatory and more interactive approach to research and was to forge strong linkages between the key players, particularly between the researchers themselves, extensionists and farmers with emphasis being put on of research.

The primary reasons behind the sudden demand by SIDA for the PPP are not immediately obvious. Its first appearance in official documents is in the minutes of a meeting held in November, 1994 between KARI and SIDA. In absence of a formal terminal evaluation of the SWCRP I, probably it was instinctively deemed imperative that the adverse observations and conclusions on SWCRP I by the various reviews should not be simply shunted aside or ignored lest the proposed SWCRP II is unable to avoid the same pitfalls that beleaguered the former. It could also have been the feeling that KARI needed a rude reminder of its professional and contractual obligations rather than taking SIDA's support for granted. While it could even be the combination, there is evidence that SIDA, while still maintaining a strong interest in the programme, it also wanted to take a more cautious approach this time round.

1.2 Evaluation Purpose and Methodology

The PPP spanned the period April - September, 1995. SIDA has generously agreed to avail funds for a further 3 months to avoid harmful breaks in activities, a number of which are sensitive to seasonal variations, and meanwhile the process of releasing the funds for the SWCRP II being finalised. As alluded to earlier, one key element in this process is the evaluation of the PPP and it is under the aegis of this conditionality that the evaluation is being undertaken. For this purpose a two-man team was assembled and charged with the task of undertaking this evaluation over a ten-day period. The team was briefed and provided with a list of terms of reference (TORs) which were followed strictly and translated into mission research objectives (ANNEX 1).

The primary goal of this evaluation is to ascertain whether KARI now has the professional, technical and managerial capacity to handle the OF research proposed in the SWCRP II. The specific objectives of the evaluation include:

- * reviewing the achievements during the PPP; and
- * based on the findings, making recommendations regarding SIDA's support to the SWCRP II after the PPP.

Accomplishment of these objectives has been approached through an in-depth assessment of the:

- activities undertaken during the PPP;

- material, technical/professional and financial inputs made available by SIDA and KARI during the phase;
- mechanisms and extent of internal and external monitoring and evaluation; and
- modalities and form of the interaction that there has been between the projects and other relevant institutions.

The main thrust of the methodology used in this evaluation was comprised of a thorough study of all the available relevant documents, correspondences, official agreements and progress reports since the SWCRP I started in 1988 to date and analysis of the data and information contained therein (see bibliography). Discussions were also held with qualified informants and other relevant individuals and groups at the Swedish Embassy (SIDA) in Nairobi, KARI headquarters, the NARC (Muguga), District authorities (Kiambu), Waruhiu Farmers Training Centre, Divisional headquarters (Lari and Githunguri), farmers in Kijabe, Kinale I and Kiamathare Catchments and the Department of Agricultural Engineering of Nairobi University at Kabete Campus. The two-day field trip to three of the Catchments in which the projects are located also assisted in making on-spot assessments and diagnosis (ANNEX 2).

CHAPTER TWO:

FINDINGS, ANALYSIS, CONCLUSIONS AND RECOMMENDATIONS

2.1 Research Activities

2.1.1 Diagnosis of Catchments and Design of OF Research

The *diagnosis of catchments and design of OF research project* (Project 4 or P4) of the PPP was perceived as a prerequisite for the other three projects. Its main goal was to use the catchment approach to improve planning and implementation of OF research in soil and water conservation. The specific objectives included:

- * determining the status of soil and water conservation in the existing catchments and identify farms for OF research;
- * describing the natural resources base of the selected catchments for OF research; and
- * identifying the relevant socio-economic issues in soil and water conservation in the selected catchments.

Activities were to include selection of catchments and conducting participatory rural appraisals (PRA), characterising the catchments in terms of land forms, slopes, soils and land use, holding sizes and ownership and identifying farms on which to conduct OF research. It was planned that these activities would be completed within three months at a cost of Kshs 718 500 (100% of the budget proposed for the project in the phase 2 budget). The project sought to use the catchment approach as a basis to planning and implementing OF research in soil and water conservation in Kiambu District.

i) *Selection of Catchments*

The research group selected catchments which had an urgent need for conservation and which would, therefore, benefit from the proposed research efforts. This work was undertaken in collaboration with the Kiambu District Soil Conservation Officer (DSCO), Divisional Soil and Water Conservation staff of the Ministry of Agriculture, Livestock Development and Marketing (MOALD&M) and Kenya Soil Survey staff from the National Agricultural Research Laboratories (NARL), Kabete. Out of some 90 catchments in Kiambu district, 18 catchments were pre-selected for reconnaissance survey. The criteria used for the pre-selection included:

- presence of steep slopes of at least 20%;
- catchments with intensive systems of crop and livestock production in small scale farms; and
- those catchments which have intensified soil erosion, soil degradation and soil fertility problems, as well as shortages of livestock fodder and presence or absence of MPTs.

This is a rational approach because the steeper the slopes the greater the potential for soil erosion, the existing intensive agricultural production systems could accelerate such erosion and it is catchments with such problems which would urgently need corrective and/or preventive measures.

ii) *Status of Soil and Water Conservation in the Catchments*

The survey of the status of soil conservation in those catchments indicated presence of different types of conservation measures in fields in those catchments. The array included, inter alia, fanya juu terraces and cut-off drains which were planted with grass to stabilize them, as well as grass strips, contour farming, strip cropping, bench terraces, crop rotation, grassed waterways and concrete waterways. This implies farmer awareness of the need to conserve the soils. Yet, the observation by the PIT that some soil conservation structures were poorly covered by vegetation (Gatundu), some terraces had broken down and had not been repaired (Kiamathare) and that some farmers did not engage in soil conservation (Ndamagugu) offers a compelling argument that justifies research and extension efforts to be directed into such areas. Four sample catchments were selected for this work on the basis of the high scores they got.

iii) *PRA and Farmer Selection for OF Research*

The four catchments chosen were Kiamathare, Kijabe Escarpment, Kinale 1, and Kinyogori. PRA conducted in these catchments, resulted in identification of problems which have a bearing on execution of soil and water conservation activities, identification of research gaps and selection of farmers for OF.

It is important to note that while many problems were common across the catchments, the ratings of their relative importance were different between the catchments and that soil erosion/degradation/fertility problems did not always feature highest in the farmers prioritizing. Socio-economic problems were rated high. This probably explains the observed inadequacies in or neglect of existing soil and water conservation structures. The socio-economic setting directs energies and resources by the farmers towards more compelling or urgent needs.

The PRAs have been of immense value in identifying many research gaps. For example the need to identify adaptable tree/grass species for each area was evident (eg. in Kinale where frost kills Napier grass). Similarly, ways of safe disposal of runoff water, effective ways of rehabilitating damaged soil conservation structures, and comparative effectiveness of manure deposited in situ in the kraal (which is eventually planted with crops) compared to that hauled in, are among the few issues brought up which were otherwise taken for granted heretofore.

The PRAs facilitated identification and selection of farmers for OF research. The main criterion used was willingness and interest of the prospective farmers themselves. This approach seems more appropriate as it offers more promise when compared to the situation where a farmer is enlisted on the basis of interest as perceived by another party, usually the local extension agent.

It has been observed that there was not much analysis devoted to the problems identified in the PRAs. This was attributed to the absence within the PIT of a fulltime socio-economist/sociologist. The programme depends on one who, though stationed at Muguga, is shared with other programmes and cannot, therefore, offer much service to the programme.

iv) *Description of the Natural Resource Base of the Catchments*

This was carried out in collaboration with the Kenya Soil Survey section of the NARL in Kabete. The description included summarizing of information on the geology, physiography and climate of the areas from existing records, digitizing and printing of catchment maps on Geographical Information System (GIS) and assessment of land use. For each catchment the soil resource characterization was done using field as well as laboratory methods. Field procedures involved soil auguring, up to a depth of 1.2 metres, coupled with examining of such soil properties as colour, texture, mottling, consistence and salinity. On the basis of the properties observed, delineation of different soil mapping units was done and the soil maps drawn. Representative soil profiles were excavated in the soil mapping units. A total of 122 auger holes and 17 profiles were dug for all the catchments. Surface and profile/horizon soils were sampled for physico-chemical analysis at Muguga.

At the laboratory the entire range of the routine soil analyses was undertaken. This provided information on the general properties of the soils including types and fertility status. This information was used to classify the land into agricultural suitability classes, based on such characteristics as the moisture holding capacity, depth, drainage, resistance to erosion, chemical fertility and possibilities for mechanization on the land.

I was noted that although the soil resources of the catchments were characterized, the soils of the designated farmers' fields where OF trials will be sited were not analysed. This is a serious failure as it has led to the absence of baseline data upon which the effects of planned interventions will be gauged.

2.1.2 **Evaluation and Utilisation of Manures and Their Interaction with Inorganic Fertilisers in Smallholder Farms**

The main goal of the *evaluation and utilisation of manure and interactions with inorganic fertilizers on smallholder farms project* (Project 5 or P5) was to increase soil fertility and hence productivity of smallholder farms in Kiambu District. The specific objectives included:

- * conducting a diagnosis of catchments and designing OF research in conjunction with P4;
- * determining the quality of animal manure in use;
- * establishing experiments on farmers' fields to determine the response of crops to animal manure from different sources in combination with inorganic fertilisers; and

- * establishing suitable application rates of compost, farmyard manure (FYM) and inorganic fertilisers and combinations thereof.

Activities were to include PRAs, collection and characterisation of manure by source and type, investigation of rates of manure application, laboratory analysis of the quality of the manure and establishment of experiments on farms for determination of response to different rates of manure application. The project was to last for 6 months at a cost of Kshs 445 571 (28% of the budget proposed for the project in phase 2).

The research was undertaken by the PIT in collaboration with the soil and water conservation staff of the MOALD&M of the Githunguri, Limuru, and Lari Divisions.

i) *PRA*

In order to diagnose the Catchments, PRA was undertaken in conjunction with P4. Information was obtained pertaining to manure use, including farmers' ranking of quality and hence preference of the various manures and methods of application.

ii) *Manure Collection*

A total of 282 manure samples were collected from all the four catchments according to source (kraal/boma, compost, or whether it was bought from elsewhere), type of animal (cow, sheep, goat, poultry, donkey, rabbit, and pig) and handling and storage practices (e.g. wet vs. dry manure and that from zero-grazed, semi zero-grazed or tethered animals).

iii) *Chemical Analysis to Determine Manure Quality*

The parameters analysed were pH, carbon, nitrogen, ash content, and phosphorus. Analysis for ash content is not yet finalised due to constraints in the laboratory. The samples have been taken to the Kenya Forestry Research Institute (KEFRI), due to lack of crucibles at the Muguga laboratory. The general quality of the manure used is now known.

iv) *Greenhouse Experiment*

This experiment was conducted to evaluate the effect of compost, FYM, inorganic fertilizers, and their combinations on maize growth. The results will form a basis/guide for on-farm trials. The data are yet to be analysed statistically to reveal the trends and some plant samples are yet to come out of the laboratory. It is worth noting that although establishment of on-farm trials is a major objective of P5, this is still the long-term objective to be executed over a proposed period of two years.

It should, therefore, be viewed in this perspective and not within the six-month pre-pilot phase. It will suffice it to note, however, the PRA exercise and the chemical characterization of the manures as alluded to earlier provide good groundwork.

2.1.3 Improvement of the Quality and Quantity of Fodder Grown on Terraces in Smallholder Farms

The third project in the PPP was Project 6 (P6) on *"improvement of the quality and quantity of fodder grown on terraces in smallholder farms"*. The main goal of this project was as its title goes. The specific objectives were to:

- * determine the quantities and quality of forages grown on soil conservation structures on smallholder farms;
- * improve the forages by intercropping with forage legumes and multipurpose trees (MPTs);
- * determine the effect of forages on the physical and chemical properties of soil; and
- * study the effect of forages on adjacent crops.

Activities for attainment of these objectives were to include raising of MPTs for planting out on farms, designation of catchments and selection of farmers that would participate in the project, demarcation of plots, harvesting of existing forage for dry matter determination and chemical analysis, undertaking degradability trials on Napier grass and planting out of herbaceous legumes and MPTs. The project was to span six months at a cost of Kshs 319 750 (29% of the budget for the project proposed in phase 2). The activities were done in collaboration with extension personnel from the MOALD&M.

i) *Quality and Quantity of Forage*

Sample farmers were selected during the PRA exercise in conjunction with P4. About 18 forage samples have been collected in Kinale 1 Catchment and the analysis is complete. This is still an on-going exercise as the tests require several seasons of data collection.

ii) *Establishment of MPTS Seedlings*

Seedlings were raised OS at Muguga and OF in Kinale 1. Species include *Leucaena diversifolia* (2,500 seedlings), *Calliandra calothyrsus* (1,000), *Sesbania sesban* (2,000) and *Albizia lymphantha* (5). Another 2,500 seedlings of *A.lymphantha* were raised at Lari. Some of these seedlings have already been planted in three farmers' fields as well as at the Waruhiiu FTC farm site, which has been earmarked for detailed and controlled experiments for the Kiamathare Catchment. Some 3 000 seedlings are reported to have been given to farmers in October. The remaining stock is now overgrown . This is because their disposal had to await completion of P4 and the right season. This is another on-going exercise and it will take time to complete the agronomic studies and identification of management packages for inter-cropping.

iii) *Effect of Forage on Soils*

Work has just started and soil samples from the Catchments are being collected. Most of the activities have to await establishment of the forage legumes.

iv) *Effect of Forage on Adjacent Crops*

Activities have not started as this has to await selection of farmers, planting and establishment of forage legumes.

2.1.4 Impact of Soil Conservation Measures on Soil Productivity on Steep Slopes

The fourth and last project was Project 7 (P7) on "*the impact of soil conservation measures on soil productivity on steep slopes*". The main goal of P7 is to develop guidelines for cheap, viable, practical and effective soil conservation techniques that can be used on smallholder farms on steep cultivated slopes. The specific objectives included:

- * identification and evaluation of effectiveness of the existing soil conservation methods (engineering and biological) in soil erosion control on steep slopes;
- * characterisation of the Catchments in terms of soil types, slopes, landforms and land use systems; and
- * OF trials to evaluate effect of MPTs in conserving soil and water on steep slopes.

Activities were to include conducting of a survey to identify soil and water conservation practices and problems in selected catchments, analysis and prioritisation of the practices and problems, identification of the of the potential intervention measures, selection of contact farmers for OF research and establishment of OF trials on comparative effects of MPTs on soil and water conservation. Accomplishment of these activities was to take six months at a cost of Kshs 753 000 (30% of budget proposed for the project in phase 2). The activities were undertaken in collaboration with extension and soil conservation personnel of the MOALD&M.

i) *PRA*

This was done in order to identify existing soil conservation practices and associated problems and to select collaborating farmers. It was conducted in conjunction with P4. Soil survey and catchment land characterization were also done in conjunction with P4. The major soil types, slopes and landforms in the selected Catchments have been mapped. Activities have been completed.

ii) *Establishment of OF Trials to Evaluate the Effect of MPTS on Erosion Control*

Preparatory work was done to establish four trials in Kinale 1 Catchment. Work was done only in this area because during the period of the PPP it was only this Catchment that was receiving rains.

About 400 seedlings of the MPTS (*Calliandra calothyrsus*, *Sesbania sesban*, and *Albizia lymphantha*) were supplied to the designated farmers and planted on fanya juu terrace risers. The seedlings are still small and hence no measurements have been taken yet to assess their rate of growth and biomass production. These parameters will indicate levels of adaptability and effectiveness in soil conservation. These are goals whose attainment cannot be realised during the six months of the PPP but commendable groundwork has been started.

It was observed that the MPTs seedlings had been planted on the existing terraces made by the farmers. There was no attempt to establish the optimum terrace/contour interval as derived from vertical interval considerations.

iii) *Topographic survey of Waruhiu Farmers Training Centre (FTC) Site for Controlled Research on Soil Erosion Control*

The PIT will undertake detailed investigations which require a high degree of control and statistical design, or those aimed at testing new or little-known measures before proceeding to test them on the farm. The Waruhiu FTC near Kiamathare Catchment was selected for this purpose. Working from the centre has the advantage that the centre is regularly visited by farmers and any successful demonstration will thus have a high adoption rate.

Topographic survey has been undertaken on one hectare of land at a scale of 1:2,500 on which the controlled trials will be conducted. This land exhibits slope and associated features as could be found in other locations in the programme area.

2.2 Linkages and Interaction with other Relevant Agencies

One of the main criticisms of SWCRP I was that it failed to forge linkages with other agencies involved in soil and water conservation especially with regard to OF research. The PIT was keenly aware of this and its performance on this front has been positively different. During the PRAs, the team worked hand-in-hand with the MOALDM and the Soil and Water Conservation Branch (SWCB) officers at headquarter, District and Divisional levels. There was collaboration with Kenya Soil Survey in land and soil characterisation of P4 and there is a firm link with Waruhiu FTC where the programme has been allocated land for some OS field trials.

The PIT also participated in the *Farmers Field Day* of 23.6.1995 and also visited the agroforestry projects at Maseno. Its various members have attended the monthly and fortnightly extension meetings at various levels in Kiambu District. On invitation by the Divisional Extension staff the PIT has also participated in the activities in Kikuyu Division in 3 other non-target Catchments. It also participated in the World Food Day shows. Given the volume of work and available resources, the team has collaborated as much as is humanly possible under the prevailing circumstances.

There was collaboration with local universities, Agricultural Colleges and Technical Institutes. The PPP hosted 4 students who worked with the technicians and technologists attached to the programme.

It should be noted, however, that in addition to consolidating the linkages, the offensive will have to be intensified during SWCRP II. Of concern is the *centre-to-centre* collaboration within KARI. It is apparent that there has not been real collaboration between the PPP and other KARI centres. While there are structural and functional arrangements within KARI for effective collaboration, the intermittent nature of the meetings and the apex locus of the arrangements does not render these go beyond thematic reconciliation of projects. If duplication of effort and wastage of resources are to be avoided, it is vital that more formal arrangements are made to enable direct contact and regular interaction between the scientists in the various KARI centres. There is also an immense fund of knowledge and experience at these centres the sharing of which is essential and useful.

Of particular concern is the collaboration between this programme and the National Agroforestry Research Project (NAFRP) at Embu. What the NAFRP is doing in soils in Embu could benefit from the probably more robust experiences within the SWCRP at Muguga while agroforestry elements within the SWCRP can definitely borrow a leaf from experiments like the *"assessment of soil and water conservation in East African Highlands"*, *"the role of farmyard manure in improving soil and crop productivity in the highlands of Kenya"* and other experiments such as # KEB/OF/92-1/4, KEB/OF/93-1/8, KEB/OS/92-1/4, KEB/OS/92-1/3, KEB/OS/92-2/5 and KEB/OF/92-1/2 at Embu. This is particularly imperative since both the SWCRP and the NAFRP are within the same agency (KARI) and they get budgetary support from a common source (SIDA). It is very true that the two programmes have different focal concepts but it is equally true that they have a lot in common and closer contact would be mutually beneficial. Any indifference to this reality is difficult to justify.

2.3 Programme Management

2.3.1 Administration

The PPP is affected directly by three levels of management namely at KARI headquarters by the office of the Assistant Director (AD) in charge of Soil and Water Management, at the NARC (Muguga) level by the Centre Director (CD) and at the PIT level which is headed by a "*Programme Head*" (PH). The AD/SWM provides overall technical and policy oversight, coordinates the programme with other relevant activities at other KARI centres, represents the programme to agencies outside of KARI including donors, chairs the "*specialist*" committee and other meetings including those with donors and receives and disburses the finances of the programme.

The CD is the custodian of the programme and has overall administrative and functional responsibility for its implementation. As the accounting officer of the Centre, the CD has the responsibility for receipt and expenditure of the programme funds, equipment, vehicles and staff assigned to the programme. On a day-to-day basis, these duties are supposed to be performed by the PH on behalf of the CD.

The PIT is comprised of five scientists namely three "*senior research officers*" and two "*research officers*" (RO 1).

Within the PIT are 3 Ph.Ds (2 in Agronomy and 1 in Agricultural Engineering) and 2 MScs (1 in Soil Science and 1 in Agricultural Engineering). The current PH took over office just one month towards the end of the PPP, after the then PH was transferred to other duties in KARI. There are 2 research officers (RO 1) that work with the programme part-time on P6 and the Regional Programme Coordinator is also available on a need basis. There are also 3 Laboratory Technologists, 7 Laboratory Technicians, 1 Technical Officer, 2 Technical Assistants, 1 Typist and 7 auxiliary permanently posted to the programme.

Right from the beginning of SWCRP I, it was noted that out of the total requirement of 9 only 3 scientists were available. This implied that the rather ambitious programme could not be implemented and it was suggested that a more modest scope be adopted but with all efforts being put in building the human resources capacity as soon as possible. In the meantime, Technical Assistance, through long term expatriates and short term consultants, was to be used to bridge the professional gap.

It is now evident that the PIT is comprised of well qualified and experienced personnel. They are charismatic and eager to get the work done. Provided that the volume and pace of work are kept within limits set by the available resources and that no more staff are abruptly transferred from the programme, the range of aptitudes seems adequate save for the absence of a socio-economist. They are a competent team and should be able to deliver. It was noted, however, that while adequate responsibility has been delegated to the PIT, this has not yet been matched by an equal dose of authority. There are still many decisions that directly impinge on the smooth and affective function of the programme tasks that are taken without the PIT's input.

2.3.2 Finances and Material Inputs

According to the available information, in March 1995 SIDA disbursed to KARI HQ a total of SEK 462 928 for the PPP. About SEK 577.94 of this were bank charges. This was the total amount of funds that had been budgeted for implementation of the PPP (KSH 2 803 831). There were reported a number of problems relating to "*availability of funds*".

The issue does not seem to be the adequacy of absolute amounts but rather that the money was not available to the PIT when it was needed. The reason for this is given as "delays" in the disbursements and each respective administrative level seems to hold the one immediately above responsible. For the six months, it appears that the bottlenecks have been at the KARI HQ to NARC (Muguga) link and from here to the PIT. For instance, although KARI HQ was aware of the PPP budget and expenditure schedules, it decided to disburse the funds to the NARC (Muguga) as follows:

DATE	AMOUNT (IN KSHS)
March, 1995	300 000.00
April, 1995	200 000.00
May, 1995	300 000.00
May, 1995	200 000.00
May, 1995	079 625.90
June, 1995	230 292.20
June, 1995	200 000.00
July, 1995	550 000.00
Sept., 1995	459 000.00
.....	202 220.00
Bal. Still at KARI/HQ	181 982.00
TOTAL	2 804 121.00

It is not clear why KARI HQ did not disburse the funds to the programme in consonance with its expenditure requirements, given especially that the implementation period was very short and sensitive to seasonal variation and there was kind of an ultimatum from SIDA. On reaching Muguga, moreover, the Centre has at times had its own other emergencies that have not always coincided with those of the programme, hence causing even more delays to the understandably "*impatient*" PPP!

There is ample evidence that this manner of handling funds was very inefficient as is evidenced by the uncommitted balance still at KARI HQ almost two months after end of activities and yet SIDA has already committed "*bridging funds*" to the programme. There is no doubt that this inefficiency had a negative effect on the efficiency with which the PPP was implemented.

There was a general shortage of analytical reagents and this is why some samples are yet to be analysed. Shortages of glassware and enamelware were also reported to be a serious and characteristic constraint in the progress of laboratory analytical work. The PIT indeed anticipated that a large number of samples (120 soil, 300 manure, and 18 forage samples) would have to be handled and that is why 12.3% of the total budget had been earmarked for purchase of laboratory supplies. Records show that nearly 94% (KShs 2 622 138) of the budgeted funds were disbursed to Muguga. About 12% of this is indicated to have been spent on purchase of laboratory stores. This is quite close to the original amount in the budget and hence problems of the magnitude as were experienced should not have arisen.

Fluctuations in the exchange rates are said to have been partly responsible but if there had been better planning, probably this should have had only a tangential effect since there was only one disbursement and the interval between submission of the budget to SIDA and the actual release was only 3 months. It seems also that most of the costs, especially of commodities, were under-priced in a budget that had no contingency allowance and was subject to a bureaucratic strangulation.

Other constraints in the laboratory included the lack of a fume hood and a water distiller, which usually are essential standard equipment in a laboratory. The existing pieces, though serviceable, are old and in a sorry state of disrepair. The laboratories also lack other important equipment like the pressure chamber, core samplers and rings and equipment for measuring hydraulic conductivity. In all instances where such equipment has been needed, samples have had to be taken to other laboratories which would normally have their own priorities, hence leading to serious delays.

There were budget provisions for *"purchase of plant and equipment, maintenance of plant and equipment and miscellaneous charges"*. Between these was a total expenditure of KShs 416 199 (16% of the total of funds disbursed to Muguga). It has been reported that this money was used to hire labour. But given the vital and central nature of the equipment in question, it is still unclear why these did not figure high among the priorities.

Transport has also been a serious constraint. There is an old fleet of five vehicles inherited from the SWCRP I (one petrol 110 Landrover, two 4x4 Suzuki Sierra cars, one 4x4 Toyota Hilux double cabin pick-up and one Peugeot station wagon car). The reliability of this fleet during the PPP has been poor due to frequent breakdowns and lack of good tyres. As alluded to earlier, funds for handling these problems and even to purchase fuel have not been readily available. Even when the vehicles have been in good running order and fuel has been available, it seems the PIT has not had control over their use and this presented a planning and scheduling problem for field operations. All these caused harmful delays and disruptions.

Expenditures and approvals thereof are handled by the CD and the Centre Accountant. At the operational level the individual scientist requests and accounts for funds from and to the CD through the PH.

Disbursement depends on whether there is cash in the Centre bank account and whether the previous imprest has been exhausted and accounted for. A similar situation seems to obtain when the Centre requests for money from KARI HQ. The actual amount released seems to largely depend on the "*availability*" of funds in the KARI bank account and not so much on the requirement in the field. It was reported that the perennial shortage of funds causes programmes in the field to "*borrow*" from each other in order to keep going and this has its own unique problems. In any case it is never possible to borrow as much as is required for the programmes are almost equally afflicted by this problem.

The expenditure profile as of 2.10.1995 was as follows:

ITEM	EXPEND.(KSHS)	% A G E O F BUDGET
Transport Ops.	660 367	23.5
Travel & Acc.	478 159	17.0
Purch./ Prod.	123 770	4.4
Lab. Stores	327 718	11.7
Printing	141 720	5.1
Fungicide	30 170	1.1
Training	106 679	3.8
Build. Mtnc.	136 311	4.9
Postal	12 000	0.4
Tel.	10 300	0.4
Uniform	15 000	0.5
Library	35 384	1.3
Station.	49 246	1.8
Computer Chgs.	79 113	2.8
Purch. Equip.	149 325	5.3
Maint. Equip.	150 571	5.4
Misc. Chgs	116 303	4.2

The indicated expenditures were generally according to the budgeted amounts. The most important point to note here is that these figures are not an audit account. The idea is to simply show the budget elements and their share.

It was noted that during the period January - July 1995, funds would be required for "*general institution support*" which would include servicing the existing laboratory equipment, casual labour costs and purchase of some laboratory equipment and miscellaneous stores. It was estimated that this would cost a total of Kshs 567 300 (28% of the budget proposed for this item in the SWCRP II). This budget head should have provided an adequate "*exit valve*" in case of unexpected and contingency expenditures, hence cushioning the PPP against budgetary stress. It is not clear why this was not the case.

2.3.3 Monitoring and Evaluation

The PPP was supposed to be monitored and evaluated continuously. However, there is no indication in the proposal how this was to be accomplished and by whom. There have been visits to the project by SIDA officials but it is not clear whether these were routine monitoring visits or ad hoc. The PIT has so far produced 9 reports specific on the PPP activities. They have also produced the SWMRP general report in September, 1995. Reports are not mentioned anywhere in the available documents as being a requirement and it appears it was the PIT's initiative arising from the normal requirements in their career. The scientific standard of these reports and the value of the information therein are very high.

At the beginning of the PPP, SIDA appointed an *"external"* consultant to provide backstopping services for a total period of two months, evenly spread over the six months. According to the TORs, he was to offer his services upon request by KARI. This consultant participated in the planning of the PPP activities, especially P4. He has also read and edited the PRA reports. He has all along been waiting to be requested for his services in vain. Although the PIT requested for his participation in the above two cases, they were not aware that he was an appointed consultant to the programme! Neither the PIT nor the CD have received copy of the TORs. The consultant reckons that his input in the six months is not more than two man-days!

2.4 Concluding Remarks and Recommendations

2.4.1 General

Chapter One depicts a chronological evolution of the SWCRP of KARI at Muguga and its surrogate, the PPP, the object of this evaluation. Six months was quite short a time for any of the players to exonerate themselves of the ills of the SWCRP I. Secondly, while there is a conceptual justification for OF participatory research, this does not negate the value, validity and importance of some of the activities that had been undertaken under that phase. Thus plunging in OF could easily have had the same mixed results. KARI as an organisation probably needed this kind of pressure. However, given the bureaucratic fiat under which the PIT operated vis-a-vis the expectations, the pressure was probably too much for the PIT and for better understanding, failures on their part should be mirrored against this background.

The overriding dynamic that has guided implementation of the PPP has been the realisation by the PIT of the need for holistic and balanced production within the production potential of the natural resource base. To be responsive to this reality, the PIT has adopted a *"whole farm and catchment approach"* and for this a multidisciplinary/interdisciplinary team has been mobilised into action to consider all facets of catchment and unit production systems. Research is no longer *"discipline oriented"* but is now *"resource-base oriented"*. The researchers are no longer writing for important scientific journals but simple extension messages for simple manageable tasks on the peasants farms.

This approach has unveiled the wide array of stakeholders within and between whom both vertical and horizontal operational linkages have been forged. Researchers, extensionists, administrators and farmers are now engaged in a functional *dialogue* and there is a two-way flow of information. This has in turn expedited the identification of problems, opportunities, priorities, research needs and dissemination of extension messages. An integration of interests is now possible and the budding rapport between the stakeholders will soon make it easy to strike the much needed symbiotic balance between OS and OF research.

There is no doubt that the approaches during the PPP are remarkably different from those that were used during the SWCRPI. As seen earlier, impressive dividends have accrued from the re-orientation. Experience from the PPP has also underlined the value of matching the volume of work with the available resources. Thus, while all the four projects were handled during the PPP it was and it had to be P4 that received mainstream attention and indeed got completed as scheduled.

Almost all the bottlenecks that plagued the SWCRP I have been eased and despite the whole range of difficulties encountered, the PIT has managed to do most of what it set out to do in the six months. The vision is there and there is a clear path in pursuit of this in the minds of the staff.

In fact they seem to have accomplished an epic on peanuts! There is little doubt now that implementation of the PPP has created a technical and management environment that is conducive for a successful SWCRP II. *Accordingly, but subject to the fulfillment of the specific recommendations to be seen in other sections, it is recommended that the agreement for the SWCRP II be reactivated and implementation of the programme begins immediately.* Even if what follows later implies that the agreement cannot become operational immediately, emphasis here is on the principle. *At any rate SIDA should find mechanisms of continuing financial support during the transition period because OF research raises the peasants' expectations and an abrupt break in activities would be a disaster and the cost of starting all over again would be prohibitively more expensive. The financing modality that is operating now should be extended until an appraisal of the SWCRP II is done.*

It has been noticed that apart from annual reviews, nothing else was done to salvage the SWCRP II. There were considerable investments in the phase and there is no rationale for letting all of it melt away into forgotten history. Whether negative or positive, there must be some lessons to learn from it that are relevant to the SWCRP II. There is for instance no doubt that the project on *"measurement of vegetal land cover for major cropping systems and levels of management"* is as relevant today as it was during the SWCRP I.

In any case, the PRAs during the PPP have unveiled new realities, gaps and challenges that may render some parts of the SWCRP II proposal irrelevant. After all this is indeed one of the advantages of PRA! It also appears that the spirit of the bad experiences of the SWCRP I is still lingering on and this is the kind of "hang-over" that the public relations of the SWCRP II need least. *In order to pick some lessons from phase I, make the PPP findings the more relevant and meaningful and recast the SWCRP II proposal, it is recommended that phase I gets a formal final evaluation and during the same exercise the SWCRP II proposal is appraised.* Evaluation will ensure positive continuity while appraisal will in addition to re-orientation draw a programme strategy and workplan from which the scientists can draw their annual workplans. Too much of the scientists' valuable time is currently drawn into these rather routine activities and this is not desirable.

2.4.2 Research Activities

The recommended appraisal in 2.4.1 above will expedite recasting the research agenda and to be explicit here would be pre-emptive. *Meanwhile, however, all on-going and planned activities should continue to receive support. It is also recommended that the PIT undertakes more intensive characterization of soils in the farms involved in OF research and the "vertical interval" contour/terrace spacing should be adopted at the onset of the impending long-term trials. An adequate amount of chemical reagents, glassware and enamelware should be procured as soon as possible since analytical work on soil fertility and fodder quality will begin in the near future.*

If the distiller and fume hood cannot be made serviceable, new ones should be procured. The PIT should give priority to finding a clone of Napier grass and substitutes to Napier that are not so sensitive to frost.

There is also need to find conservation-sensitive crop combinations in mixed cropping systems and the economics of soil and water conservation.

2.4.3 Linkages and Interactions

Although firm linkages have been forged, there is no guarantee yet that the situation cannot lapse to what it was before. There is need, therefore, for consolidation and enhancement. *To continue nurturing and strengthening the process of the researcher - extensionist -farmer linkages and to encourage cross-fertilisation between its scientists, it is recommended that KARI HQ takes a more active role in ensuring grass-root direct linkages between its centres. SIDA may also wish to make this a mandatory consideration during negotiations and reviews. Collaboration must be intensified and it should be budgeted for.*

It is true that because of the legacy of the SWCRP I, the programme does not enjoy a good image. This must change since there is now a different situation. It is, therefore, recommended that SWCRP II launches a public relations stint through publication of its works and wide circulation of reports. This exercise should be budgeted for.

2.4.4 Programme Management

i) Staff

KARI should strengthen the staffing outlay of the project by allocating fulltime qualified people where critical shortages exist. It should be realised that aptitudes and skills of the nature as are needed take time to acquire. KARI should, therefore, not only be committed to availing competent staff, logistics and equipment to the programme but should also ensure that capable staff remain available to the project through incentives and less frequent transfers. SIDA may consider discussing this issue exhaustively during negotiations and reviews and could even request for commitment from KARI.

The number of technician cadres of staff is definitely enough but these should not be diverted away from programme duties without the knowledge of the PH as this is disruptive and harmful. The case of a socio-economist is also very pertinent. *It is recommended that PIT members be given opportunity to attend relevant short inductive courses in the basics so that they can cope with simple assignments.* It is also possible to hire locally a socio-economist for the project and such need not be a member of staff of KARI. The third alternative is to look for volunteers from overseas. Two of the Research Officers working with the programme as Project Leaders are likely to go for further studies when the SWCRP II finally gets underway. This will imply a serious shortage of experienced staff. It is, therefore, recommended that KARI pays attention to this issue to ensure that the absence of the two officers does not hamper the quality and progress of work.

ii) Finances

It is evident that SIDA has been availing the funds as requested and the bottlenecks have been within the KARI system. It is the weakest link that determines the strength of a chain and it seems that the cash flow problems the PPP has faced all emanate from the bureaucracy in KARI HQ. *To ensure more transparency, accountability and control, it is recommended that funds from SIDA by-pass KARI HQ and are disbursed straight to the NARC - Muguga bank account. It is also strongly recommended that the PH the "mandatory signatory" for the funds.*

SIDA should also play a more supervisory role in the use of the funds through regular audits. Pooling of funds into a common kitty is probably easier for the accountants to handle. However, this should be avoided as much as possible as it does not auger well for good financial management. Problems arising from under-pricing can be avoided by doing comprehensive and rigorous budgeting.

2.4.5 Monitoring

SIDA should mount tracking system that can detect and prevent problems before irreparable damage has occurred. Monitoring mechanisms should be spelt out clearly in the project documents. The consultant currently assisting the programme is an immense source of practical experience and his services should continue to be enlisted. Accordingly, his contract should be renewed to cover the expected life of the projects. However, all the relevant parties should be involved and informed this time. It is also recommended that the programme produces a mandatory progress report every six months. This interval is preferred because it takes into account the seasonality of most of the activities. Because of the difficulties the programme has experienced in the past, it is recommended that for consistency and hence stability of purpose, it is recommended that future reviews/evaluations should include at least one person from the previous reviews/evaluations.

2.4.6 Motivation

People working on projects do a bit more work than the other researchers at the Centre. They need incentives if they are to devote both their thoughts and feelings to the tasks. OF research is particularly very taxing in terms of patience, physical and mental work and planning. To attract and hold and get the commitment of good brains and hands requires more than a salary and allowances. Quite often it is not the economic sense of the incentive that will matter but the principle that someone does appreciate the work being done. Accordingly, if the laws and regulations permit, it is recommended that a "dislocation allowance" similar to what is paid by the NAFRP at Embu be paid to all cadres of staff engaged permanently on the programme. The allowance should be budgeted for.

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- | | |
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ANNEX 1:

TERMS OF REFERENCE AND SCOPE OF WORK

These included:

- * review project achievements with regard to the six months pre-pilot phase agreed upon in February, 1995.
- * based on the findings make recommendations regarding future SIDA support after the pre-pilot.

Views of institutions that are beneficiaries of this research programme such as Soil and Water Conservation Branch of MOALDM should be sought. The evaluation shall comprise the following:

- * project activities;
- * project inputs (including staffing);
- * project management and administration;
- * project monitoring and evaluation (including role of external consultant/advisor); and
- * project interaction with other institutions dealing in soil and water management.

ANNEX 2: PEOPLE WITH WHOM DISCUSSIONS WERE HELD

Name	Designation/Institution
ANYONGE, T.	Assistant Programme Officer/SIDA (Nairobi)
KARLSSON, A.	Counsellor, Dev. Coop. Swedish Embassy)
ERIKSSON, A.	Managing Director/AGRISYSTEM (EA) LTD
KIOME, M. (Dr)	Assistant Director - SWM/KARI HQ
WAMWONGO, J. (Dr)	SRO & Programme Head/SWCRP - KARI (Muguga)
NJOROGE, J.	DIVSCO - Lari Division
NGUGI, M.	DAEO - Lari Division
KIMANI, F.	Farmer - Kinale Sub-Location
NJERI, N. (Ms)	Ag. DAO - Kiambu District
MWANGI, P.	DSWCO - Kiambu District
NGINYANGI, J.	DIVVAEO - Githunguri Division
KARAU, S	DIVSCO - Githunguri Division
THOMAS, D. (Prof)	Consultant - SWCRP
GISHUKI, F.	SAREC Project - Nairobi University
IKUA, D.	Principal - Waruhiu FTC
KIMANI, S. (Dr)	Project Leader - P4
KILEWE, A. (Dr)	Centre Director - KARI (Muguga)
MWANGI, D.	Research Officer - KARI (Muguga)
CHUI, J.	Research Officer - KARI (Muguga)
MANGALE, N.	Research Officer - KARI (Muguga)
MIRITI, J.	Research Officer - KARI (Muguga)
MUTUA, J.	Research Officer - KARI (Muguga)
O'NEILL, M. (Dr)	Coordinator - NAFRP/Embu
KAHUMBURA, J. (Dr)	Dep. Centre Director - NARC (Muguga)
MWANGI, D.	Research Officer - NARC (Muguga)
MUSEMBI, F.	Research Officer - NARC (Muguga)
METHU, J.	Research Officer - NARC (Muguga)
OWANGO, M.	Chief Res. Officer - NARC (Muguga)
STEPHANSSON, E.	SIDA - Swedish Embassy, Nairobi.

TERMS OF REFERENCE FOR AN EXTERNAL EVALUATION OF THE SOIL AND WATER CONSERVATION RESEARCH PROGRAMME AT KARI, MUGUGA.

Since 1988 Sweden has provided support through Sida to the Kenya Agricultural Research Institute (KARI) for the implementation of the Soil and Water Conservation Research Programme at the National Research Centre, Muguga. Assistance as to the tune of 5,500,000 SEK has been provided since the start of the project.

During the first phase (1988-1990) the project faced a number of unforeseen problems and therefore did not take off as planned.

A review was carried out 1990 resulting in reorientation and scaling down of the activities. This second phase was evaluated 1992 and 1993. Both these evaluations were highly critical to project performance.

Following a proposal developed by KARI during March 1994, a third phase was agreed upon resulting in a two year agreement between Sida and KARI in February 1995. In the agreement was included, that after a pre-pilot phase of 6 months, an evaluation be carried out to assess the achievements. This evaluation was needed to provide a base when considering further funding by Sida.

BACKGROUND OF PROJECT

During the second phase (1990-1994), the National Soil and Water Conservation Research Programme comprised of three components, namely:-

- i) Quantitative evaluation of Soil and Water Management practices in Kiambu district.
- ii) Measurement of land cover for major cropping systems and levels of management.
- iii) Evaluation/demonstration of low input soil and water management practise.

Following discussions between KARI and SIDA in March 1994, it was agreed that a new two year proposal 1994/95 - 1995/96 be developed focusing on research on catchment approach. The new proposal is to form part of KARI's NARP II.

Ca *FE*

A project proposal aimed at integrating soil and water conservation practices into small holder systems is comprising of the following four new projects:

- i) Project 4: Diagnosis of catchments and design of on-farm research.
- ii) Project 5: Manure management
Evaluation and utilization of manures and their integration with inorganic fertilizers in smallholder farms in Kiambu District.
- iii) Project 6: Improvement of the quality of fodder grown on terraces in the smallholder farms in Kiambu District.
- iv) Project 7: The impact of soil and water conservation measures on soil productivity on steep sloping lands.

PROJECT OBJECTIVES

- i) To generate technologies for the protection of the highly erodible or susceptible soils from accelerated erosion.
- ii) To adopt and test developed soil and water conservation technologies to rehabilitate eroded soils while everything their further degradation.
- iii) To develop efficient water use strategies and practices to increase total water yield.
- (iv) To determine the role of agroforestry practices and systems in erosion control and maintenance of soil fertility.
- v) To develop soil and water conservation technologies that protect the quality of surface and ground water from sediments and agricultural chemicals.

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EVALUATION OBJECTIVES

- i) Review project achievements with regard to the six months pre-pilot phase agreed upon in February, 1995.
- ii) Based on the findings make recommendations regarding future SIDA support after the pre-pilot phase.

Views of institutions that are beneficiaries of this research programme such as Soil and Water Conservation Branch of MOALDM should be sought.

SCOPE OF WORK

The evaluation shall comprise the following:-

- project activities
- project inputs (including staffing)
- project management and administration
- project monitoring and evaluation (including role of external consultant/advisor)
- project interaction with other institutions dealing in soil and water management

EXPECTED OUTPUT

1. Brief description of the project
2. Project implementation status/achievements
3. Project management
4. project interaction with other organisations NSWCP
5. Conclusion and recommendations

BACKGROUND DOCUMENTS

1. Project proposals (1988, 1990), 1994
2. Progress and review reports
3. Resulting studies
4. Budgets and financial reports for the period
5. Agreements
6. Adoption and Diffusion of Soil Conservation Technologies in Kenya. A case study in Matungulu Machakos District 1995 ACTS.
7. Any other reports available
8. Evaluations 1990, 1992, 1993

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PROPOSED EVALUATION TEAM**Team leader (10 days)****Mr J.R. Kamugisha**

(Mr. Kamugisha is known to KARI and Sida from the evaluation of NAFRP)

Soil and water management specialist (5 days)**Dr. Solomon Abate (CV attached) is proposed for this position****TIME TABLE AND REPORTING**

The evaluation will take place from 20 November to 1 December 1995.

The Project management will provide comprehensive briefing on the project and supply the team with latest reports.

The project will prepare a tentative programme and timetable for the evaluation (all information gathering to be done 20-24 November)

Programme and time table to be finalized after team leader arrives in Nairobi.

The team leader will present preliminary findings in a meeting 27th November for comments by the project staff and Sida. The team leader will be responsible for the preparation of the final report to be submitted to Sida not later than 15 December 1995.

PROPOSED BUDGET

ITEM	COST (USD)
Air Fares	340
Entebbe - Nairobi return (USD 236)	
Addis Ababa - Nairobi return USD (564)	
PTA charges 20x2	
Consultancy fees	4,000
Mr Kamugisha 10 days @ 300 USD	
Dr. Abate 5 Days @ 200 USD	
Airport taxes	80
Taxi to and from Airport	100
Hotel NBO 18nights @ 50 USD	900
Per diem 18x 47 USD	846
Transport within Nairobi (for field trips, transport to be provided by project)	200
Secretarial support and telephone	200
Printing and photocopying	150
Miscellaneous	200
TOTAL	7,516

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Sida Evaluations - 1995/96

- 95/1 Educação Ambiental em Moçambique. Kajsa Pehrsson
Department for Democracy and Social Development
- 95/2 Agitators, Incubators, Advisers - What Roles for the EPU? Joel Samoff
Department for Research Cooperation
- 95/3 Swedish African Museum Programme (SAMP). Leo Kenny, Beata Kasale
Department for Democracy and Social Development
- 95/4 Evaluation of the Establishing of the Bank of Namibia 1990-1995. Jon A. Solheim, Peter Winai
Department for Democracy and Social Development
- 96/1 The Beira-Gothenburg Twinning Programme. Arne Heileman, Lennart Peck
The report is also available in Portuguese
Department for Democracy and Social Development
- 96/2 Debt Management. (Kenya) Kari Nars
Department for Democracy and Social Development
- 96/3 Telecommunications - A Swedish Contribution to Development. Lars Rylander, Ulf Rundin et al
Department for Infrastructure and Economic Cooperation
- 96/4 Biotechnology Project: Applied Biocatalysis. Karl Schügerl
Department for Research Cooperation
- 96/5 Democratic Development and Human Rights in Ethiopia. Christian Åhlund
Department for East and West Africa
- 96/6 Estruturação do Sistema Nacional de Gestão de Recursos Humanos. Júlio Nabais, Eva-Marie Skogsberg, Louise Helling
Department for Democracy and Social Development
- 96/7 Avaliação do Apoio Sueco ao Sector da Educação na Guiné Bissau 1992-1996. Marcella Ballara, Sinesio Bacchetto, Ahmed Dawelbeit, Julieta M Barbosa, Börje Wallberg
Department for Democracy and Social Development
- 96/8 Konvertering av rysk militärindustri. Maria Lindqvist, Göran Reitberger, Börje Svensson
Department for Central and Eastern Europe
- 96/9 Building Research Capacity in Ethiopia. E W Thulstrup, M Fekadu, A Negewo
Department for Research Cooperation
- 96/10 Rural village water supply programme - Botswana. Jan Valdelin, David Browne, Elsie Alexander, Kristina Boman, Marie Grönvall, Imelda Molokomme, Gunnar Settergren
Department for Natural Resources and the Environment
- 96/11 UNICEF's programme for water and sanitation in central America - Facing new challenges and opportunities. Jan Valdelin, Charlotta Adelstål, Ron Sawyer, Rosa Núnes, Xiomara del Torres, Daniel Gubler
Department for Natural Resources and the Environment
- 96/12 Cooperative Environment Programme - Asian Institute of Technology/Sida, 1993-1996. Thomas Malmqvist, Börje Wallberg
Department for Democracy and Social Development
- 96/13 Forest Sector Development Programme - Lithuania-Sweden. Mårten Bendz
Department for Central and Eastern Europe
- 96/14 Twinning Programmes With Local Authorities in Poland, Estonia, Latvia and Lithuania. Håkan Falk, Börje Wallberg
Department for Central and Eastern Europe
- 96/15 Swedish Support to the Forestry Sector in Latvia. Kurt Boström
Department for Central and Eastern Europe

- 96/16 Swedish Support to Botswana Railways. Brian Green, Peter Law
Department for Infrastructure and Economic Cooperation
- 96/17 Cooperation between the Swedish County Administration Boards and the Baltic Countries.
Lennart C G Almqvist
Department for Central and Eastern Europe
- 96/18 Swedish - Malaysian Research Cooperation on Tropical Rain Forest Management. T C Whitmore
Department for Research Cooperation, SAREC
- 96/19 Sida/SAREC Supported Collaborative Programme for Biomedical Research Training in Central
America. Alberto Nieto
Department for Research Cooperation, SAREC
- 96/20 The Swedish Fisheries Programme in Guinea Bissau, 1977-1995. Tom Alberts, Christer
Alexanderson
Department for Natural Resources and the Environment
- 96/21 The Electricity Sector in Mozambique, Support to the Sector By Norway and Sweden. Bo
Andreasson, Steinar Grongstad, Vidkunn Hveding, Ralph Kårhammar
Department for Infrastructure and Economic Cooperation
- 96/22 Svenskt stöd till Vänortssamarbete med Polen, Estland, Lettland och Litaunien. Håkan Falk, Börje
Wallberg
Department for Central and Eastern Europe
- 96/23 Water Supply System in Dodota - Ethiopia. Bror Olsson, Judith Narrowe, Negatu Asfaw, Eneye
Tefera, Amsalu Negussie
Department for Natural Resources and the Environment
- 96/24 Cadastral and Mapping Support to the Land Reform Programme in Estonia. Ian Brook
Department for Central and Eastern Europe
- 96/25 National Soil and Water Conservation Programme - Kenya. Mary Tiffen, Raymond Purcell, Francis
Gichuki, Charles Gachene, John Gatheru
Department for Natural Resources and the Environment



SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

S-105 25 Stockholm, Sweden

Tel: +46 (0)8-698 50 00. Fax: +46 (0)8-20 88 64

Telegram: sida stockholm. Postgiro: 1 56 34-9

E-mail: info@sida.se. Homepage: <http://www.sida.se>