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**EMBU-MERU-ISIOLO
ARID AND SEMI-ARID LANDS
PROGRAMME**

MINISTRY OF AGRICULTURE
AND
LIVESTOCK DEVELOPMENT

SOIL AND WATER CONSERVATION PROJECT

ANNUAL REPORT
JULY 1985 - JUNE 1986

EMI ASAL PROGRAMME

MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT
NAIROBI, KENYA

EMBU, MERU, ISIOLO ARID AND SEMI-ARID LANDS DEVELOPMENT PROGRAMME

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Prepared by
Jill Browning
October 1986

EMI ASAL Programme
Eastern Province
P.O. Box 1199
Embu
KENYA

SUMMARY

A number of problems delayed progress during FY 1985-86 (Phase IA) and led to serious underspending of the Soil and Water Conservation Project budget. The main difficulties included the lack of a replacement for the TCO team leader who departed in October 1985, the absence of an agreement between the Governments of Kenya and Great Britain until March 1986, a shortage of hand tools for soil conservation activities, and our inability to obtain customs clearance for new project vehicles and equipment imported from UK. Two important short term consultancies had to be postponed until the next financial year.

It was not possible to start any major new activities this year. Progress on the programme continued from the previous year was satisfactory.

The project continued to centre activities on the two catchments of Evurore and Marimanti. Over 800 farmers were assisted with soil conservation works, trials of a number of improved drought resistant crop varieties were carried out, seed of drought resistant crop varieties was bulked on a small scale and sold to farmers, and cultivation trials took place.

In Embu District the last of four sand weirs being built by a local contractor was completed in October 1985. The Embu AMS team started work on two new sand weirs near Kiambere and fitted a hand pump to the well at Kirigo sand weir.

In Meru District the AMS team completed the main structures on the Tunyai Furrow in December 1985. The survey, designs and costings have been completed for the rehabilitation of the Kithino Furrow, and survey work has been undertaken for a proposed irrigation scheme on the Thingithu River at Ruungu in Meru District.

Many of the problems experienced in Phase IA of the project have not been solved and progress in Phase II is likely to suffer as a result. A tentative work programme for FY 1986-87 has been drawn up, but most new activities can be started only when an agronomist/agricultural economist has been recruited and the difficulties over importing and clearing project equipment have been solved.

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1.0 INTRODUCTION

The Soil and Water Conservation Project (SWCP) basically carried out a holding operation during Financial Year July 1985-June 1986.

The Project Memorandum between the Governments of Kenya and Great Britain covering Phase IA (July 1985-June 1986) was not signed until March 1986, which meant that equipment scheduled to be purchased during the year could not be ordered and two consultancies were postponed.

A new TCO Team Leader/Agricultural Economist, scheduled to take over from the TCO Team Leader/Land Use Planner who departed in October 1985, was not approved by GK. This meant that amongst other things, the agro-economic surveys scheduled to take place during Phase IA have not yet been started and an extra administrative burden was placed on the TCO Soil and Water Conservation Engineer.

Although there has been little or no progress towards achieving some of the objectives set for the SWCP, other aspects of the programme have been satisfactory.

Soil conservation activities were hampered by a shortage of hand tools for loaning to farmers and the project was unable to start work in any completely new areas. Nevertheless, during the year over 800 farmers in the Evurore and Marimanti areas undertook soil conservation work on their land with assistance from EMI field staff.

On the agronomy side, the trials of improved drought resistant crop varieties have yielded useful results. Farmers are keen to try some of these varieties and the SWCP has carried out seed bulking on a very small scale to provide seed for sale to farmers in the Evurore and Marimanti areas. Cultivation trials in the ASAL areas showed clearly that crops grown on tied ridges gave much higher yields than those grown by traditional methods on the flat.

The last of four sand weirs being constructed in Embu District by a local contractor was completed in October 1985, bringing the total number built under the SWCP to 20 (8 in Meru District, 12 in Embu District). Work has started on two further sand weirs near Kiambere in lower Embu. The well at Kirigo sand weir has been covered and a hand pump installed.

In Meru District, the main structures on the Tunyai Furrow were completed in December 1985 and a number of smaller improvements have since been made. The survey, designs and costings for the rehabilitation of the Kithino Furrow have been finished and the approval of the Meru District Development Committee obtained. Survey work for a proposed irrigation scheme at Ruungu on the Thingithu River has been undertaken.

A tentative work programme for FY 1986-87 has been drawn up. However, most of the problems which hampered the 1985-86 programme have not been resolved and will continue to delay progress.

0 STAFF CHANGES

J E Mansfield, Land Use Planner (Team Leader), left in September 1985 and a replacement has not been approved by GK.

K R S Proud, PTAS Field Engineer, left in October 1985. No other PTAS students have joined the project.

J F Browning, Soil and Water Conservation Engineer, arrived in July 1985 to take over from S C White who left in April 1985.

M Kairaria, typist, was replaced by S Kitonyi in May 1986.

T N Njeru (Field Assistant, Marimanti) resigned and was replaced by M M Nthuka who transferred from Ishiara.

D M Mwaniki, Project Manager, attended a short course on Project Development and Management at K.I.A. from 26th May to 1st August 1986. J K Mburu, the Provincial Soil Conservation Officer, was appointed acting Project Manager during his absence.

The staffing position of the project at the end of June 1986 is shown in Appendix 1.

3.0 TRANSPORT

The following vehicles are attached to the project:

- Landrover GKH 506 used by D M Mwaniki
- Landrover GKH 507 used by T E Nyongesa and L I Mwarasomba
- Landrover GK 349B used by J M Karani (AMS)

Unfortunately GKH 506 was involved in an accident on the Marsabit to Isiolo road on 31st July 1986 and is probably a write-off.

A Ford tractor, a trailer and a water bowser provided under British Aid for the SWC Project arrived in Kenya in November 1985 and a Leyland Landmaster truck arrived in January 1986. It has so far proven impossible to clear them through customs.

0 STEERING COMMITTEE MEETINGS

The programme and policies of the SWC Project were discussed at the following meetings during the year:

19.7.85 - Special EMI Agricultural Steering Committee.
Activities, budget and funding arrangements for FY 1985/86 were discussed, and EMI Phase II proposals were reviewed.

16.9.85 - Embu District Steering Committee
The work programme and problems of the SWC Project in Embu District were discussed.

8.10.85 - Provincial Steering Committee
EMI Phase II proposals were discussed in detail.

11.11.85 - Meru District Steering Committee
The work programme and problems of the SWC Project in Meru District were discussed.

20.1.86 - Agricultural Steering Committee
Progress during the previous 6 months, plans for the next 6 months, and problems were discussed.

23.1.86 - Provincial Steering Committee
The Phase IA and Phase II Project Memorandums were discussed. Progress and problems were reviewed.

29.4.86 - SWC Project Special Steering Committee
The reasons for slow progress over the previous 10 months were discussed.

5.0 BUDGET AND EXPENDITURE

The table below shows the SWCP budget and the expenditure of funds for FY 1985-86. For various reasons which are outlined in Section 6.0 the budget was seriously underspent.

Table Summarising the SWCP Budget and Expenditure for Financial Year 1985-86

Vote No.	Item	Total Budget	ODA Expenditure	GK Expenditure	Total Expenditure	Balance on 1% Spent	
		Shs	Shs	Shs	Shs	30,6,86	1985-86
100	Trans. Op.	360 000-00	150 279-25	4 720-00	154 999-25	205 000-75	43
110	Trav. & Acc.	240 000-00	104 627-10	525-00	105 152-10	134 847-90	44
120	Post & Tgms.	4 000-00	0	0	0	4 000-00	0
140	Electricity	4 000-00	107-20	166-80	274-00	3 726-00	7
153	Farm Inputs	40 000-00	0	0	0	40 000-00	0
174	Stationery	12 000-00	1 310-20	895-00	2 205-20	9 794-80	18
175	Airphotos	90 000-00	2 254-00	0	2 254-00	87 746-00	3
182	Rent/Rates	36 000-00	0	0	0	36 000-00	0
184	Consultancy	-	-	-	-	-	-
190	Miscellaneous	172 000-00	10 819-80	3 205-00	14 024-80	157 975-20	8
210	Transport	-	-	-	-	-	-
212	Bicycles etc.	170 400-00	0	0	0	170 400-00	0
220	Plant/Equip.	352 000-00	0	0	0	352 000-00	0
400	Buildings	700 000-00	32 381-00	0	32 381-00	667 619-00	5
403	Soil Cons.	2 720 000-00	516 009-45	5 450-00	521 459-45	1 98 540-55	56
		4 900 400-00	1 817 788-00	14 961-80	1 832 749-80	3 067 650-20	37

The GK expenditure shown in the table above was incurred at the start of FY 1985-86 while the SWCP was temporarily under the reimbursement system of funding. AIE D400/85/86 was issued to the PDA Eastern Province on 4th July 1985, but when it was largely withdrawn on 7th October 1985 the project was direct funded from the UK. The PDA's office retained funds in 3 votes and these were topped up with the issuing of AIE D400/D/86 on 20th January 1986.

Table Summarising GK Expenditure on the SWCP for Financial Year 1985-86

Vote No.	Item	AIE Issued	AIE Withdrawn	AIE Issued	Total
		4,7,85	7,10,85	20,1,86	Expenditure
		Shs	Shs	Shs	Shs
100	Trans. Op.	7 000-00	2 280-00	0	4 720-00
110	Trav. & Acc.	2 300-00	1 775-00	0	525-00
120	Post & Tgms.	1 000-00	0	500-00	0
140	Electricity	1 000-00	0	500-00	166-80
174	Stationery	1 000-00	0	1 000-00	895-00
175	Airphotos	90 000-00	90 000-00	0	0
190	Miscellaneous	6 000-00	2 795-00	0	3 205-00
403	Soil Cons.	250 000-00	244 550-00	0	5 450-00

The figures for total expenditure shown in the table above are not entirely accurate as some expenditure by the PDA's office on behalf of the SWCP for items such as electricity do not appear to have been recorded under the SWCP vote. The amount involved is relatively small.

The Government of Kenya's expenditure on GK staff salaries is not given in this report, neither is ODA's expenditure on TCOs and their vehicles.

1. A shortage of hand tools for soil conservation activities according to an amendment to the Project Regulations, £30,000 worth of hand tools were to be supplied from the US for soil conservation work. An indent in parcel 103, part of these tools was passed to the Chief Inspector in the Ministry of Agriculture in September 1965, but at the end of this reporting period there was no sign that it would be approved. Permission has been granted to purchase £200,000 worth of hand tools locally and quantities for the supply of these tools have been obtained from Nairobi, via Crown Agents and local hand suppliers. These tools will keep the project going for a while but there is still the need for tools from the USA.
2. A tractor, trailer, lorry, water bowser and some spare parts for them, which were ordered from UK for the SWCP, were still being held by the Kenya Customs at the end of this reporting period - 6 months after their arrival in Kenya. According to the Supplies Office in the Ministry of Agriculture, responsibility for their clearance and issue with the tractor...
3. The Project Regulations covering FY 1965-66 was not signed until 15th March 1965. This meant that some of the equipment which was intended to be purchased during the year was not obtained. This will hinder progress during the following financial year.

6.0 MAJOR CONSTRAINTS

The main problems which delayed progress and led to the budget being underspent during FY 1985-86 were:

- a) The lack of a Team Leader/Agricultural Economist who should have taken over when Mr Mansfield left in October 1985. Agricultural economic surveys and other activities scheduled for 1985-86 have had to be postponed. The Soil and Water Conservation Engineer has had to take on an extra administrative burden, including the project accounts.
- b) A shortage of hand tools for soil conservation activities. According to an amendment to the Project Memorandum, £30 000 worth of hand tools were to be imported from the UK for soil conservation work. An indent to permit the import of these tools was passed to the Chief Supplies Officer in the Ministry of Agriculture in September 1985, but at the end of this reporting period there was no sign that it would be approved. Permission has been granted to purchase shs200 000/= (approx.) of hand tools locally and quotations for the supply of the tools have been obtained from Nairobi via Crown Agents and from Embu suppliers. These tools will keep the project going for a while but there is still the need for tools from the UK.
- c) A tractor, trailer, lorry, water bowser and some spare parts for them, which were ordered from UK for the SWCP, were still being held by the Kenyan Customs at the end of this reporting period - 6 months after their arrival in Kenya. According to the Supplies Office in the Ministry of Agriculture responsibility for their clearance now lies with the Treasury.
- d) The Project Memorandum covering FY 1985/86 was not signed until 14th March 1986. This meant that much of the equipment scheduled to be purchased during the year was not obtained. This will hinder progress during the following financial year.

0 WORK PROGRAMME AND PROGRESS IN FY 1985-86

The objectives of the Soil and Water Conservation Project are outlined in Appendix 2.

It was not possible to start any major new activities during FY 1985-86 due to the constraints outlined in Section 6.0. Satisfactory progress was made with a programme consisting largely of a continuation of activities from the previous year.

Little progress was made towards strengthening the planning capacity of Government agencies working on environmental problems in the project area.

In-field training of SWCP staff continued. Three GK staff working with the SWCP, Mr Mwarasomba, Mr Chiyonzo and Mr Karani, had their names put forward for British Council awards to undertake B.Sc. courses in the UK.

Satisfactory progress was made with on-farm soil conservation work in the Evurore and Marimanti areas but it was not possible to expand activities to new areas.

Work was undertaken to control a number of gullies but this activity was hampered by the shortage of hand tools.

The main structures required for the rehabilitation of the Tunyai Furrow were completed. The survey, designs and estimates have been completed for the rehabilitation of the Kithino Furrow.

Agro-economic surveys due to be undertaken in the project area had to be postponed.

Trials of improved drought resistant food crop varieties continued satisfactorily.

The sites for two new sand weirs in Embu District were chosen and both sites were surveyed. Designs and costings have been prepared for one of the sites.

Trials of different hand cultivation methods and their effects on crop yields continued. No work was done on ox-drawn methods of cultivation.

The bulking of improved drought resistant crop seed continued on a very small scale.

Possible sites for small scale gravity fed irrigation schemes were sought in Embu and Meru Districts. The best of the sites, Ruungu in Meru District, has been surveyed.

The two proposed short term consultancies in Land Resource Zonation and Irrigation had to be postponed.

7.1 SOIL CONSERVATION

The willingness of farmers to undertake soil conservation work on their farms has been found to depend on a number of factors. These include:

- (i) **The depth of the soil.** Farmers with deeper soils are more likely to undertake soil conservation activities than farmers with shallower, stonier soils.
- (ii) **Land ownership.** Tenant farmers are not likely to be interested in soil conservation. Farmers who own sufficient land to crop new areas when yields drop off through loss of soil fertility are less likely to install soil conservation structures, especially if they are planning to abandon the land within the following 3 or 4 years, than those who are forced to continue cultivating the same area.
- (iii) **Outside interests.** Farmers with business interests and jobs which keep them away from their land much of the time tend to be less interested in soil conservation. There are exceptions, such as teachers and other government employees, who appreciate the value of soil conservation and employ paid labour to carry out the necessary work on their land.

Land adjudication, which has been completed in Embu District and is underway in Meru, does not appear to be an influence.

The project's main soil conservation activities have continued to be concentrated in Evurore catchment (78 km²) in Embu District, where work started in 1983, and Marimanti catchment (50 km²) in Meru District, where work started in 1984. However, most interested farmers within the catchments have received assistance and so farmers in areas adjoining the catchments are now included in the programme also.

Guidance to farmers is provided by 3 EMI field staff based in the Evurore area and 4 EMI field staff based in the Marimanti area. Field staff all attend the fortnightly T & V training sessions and are expected to pass relevant extension messages to farmers during the normal course of their work.

As few people in the lower areas of Embu and Meru district have hand tools suitable for constructing terraces and gully control measures, the SWCP loans them tools such as pickaxes, shovels, mattocks, jembes and wheelbarrows for this work. This is Government policy in the ASAL areas.

By the end of June this year 332 farmers in Evurore and 476 in Marimanti were actively engaged in soil conservation work on their land, as compared with 115 farmers in Evurore and 175 in Marimanti at the same time last year. Farmers are encouraged to form soil conservation groups as it is easier to provide advice to a number of people at the same time. Also, group chairmen can be made responsible for the hand tools loaned by the project and ensure that they are rotated fairly within the group. Marimanti had 14 groups (including 2 womens' groups) and Evurore 5 (4 of them womens' groups) at the end of June 1986.

Table Summarising Soil Conservation Activities During FY 1985/86

	Evurore	Marimanti
No. of soil conservation groups	5	14
No. of farmers undertaking soil conservation	332	476
Length of fanya juu terraces constructed	14,3km	22,7km
Length of stone bunds constructed	5,2km	3,8km
Length of trash lines established	6,4km	24,9km
Length of cut-off drains dug	0,2km	1,3km
No. of gully control check dams constructed	164	133

The demand for grass for stabilizing terrace banks has led to the establishment of a third grass bulking plot at Mitunguu (0.5ha) to serve lower Meru District. The two older bulking plots at Karaba (1ha) and Kangaru (0.4ha) now serve only lower Embu District. Grass is distributed during the rains in November and April.

In the November 1985 rains 496 tree seedlings were distributed to 76 farmers in the Evurore and Marimanti areas. In the April 1986 rains 350 trees were distributed in Marimanti and 400 in Evurore. Trees planted in November generally stand a better chance of survival than those planted in April as the following dry season is shorter.

The training of group leaders in the use of line levels to align terraces has been started. By the end of June 1986 30 farmers from the Marimanti area had been given a two day course.

Areas intended to demonstrate river bank protection were established on the River Ena at Karerema in Evurore catchment and on the banks of a dry river bed near Marimanti village. Measures demonstrated included fencing off the areas with thorny branches, and planting grass and trees. This worked reasonably well at Karerema but failed at the other site due to insufficient rain to establish the grass.

Field days for farmers were held at Francis Njeru's farm in Evurore catchment and at Mr Mugao's (Assistant Chief) farm near Marimanti. Various types of soil and water conservation measures and improved drought resistant crops were demonstrated, and extension staff were on hand to explain interesting points. About 130 people attended the field day in Evurore and 150 the one in Marimanti.

Soil conservation film shows in Evurore and Marimanti catchments aroused considerable interest. Five shows in Marimanti attracted a total audience of 2 400 people and three shows in Evurore attracted 1 950 people. As a result 9 new soil conservation groups have been formed and will be assisted by the project when more hand tools are available.

The soil conservation run-off trial plots have been abandoned as they were too small (1.5m x 7.0m) to give reliable results, did not measure soil loss, and were too far from Embu to be properly supervised.

7.2 AGRONOMY / LAND USE PLANNING

The main activities of FY 1985/86 included on-farm trials of improved drought resistant crop varieties, the bulking up and sale of improved drought resistant crop varieties, and cultivation trials. Other activities included the establishment of a demonstration plot of drought resistant crop varieties at Siakago, and the organisation of 3 field days for farmers.

The agronomy field staff have been based in the field (2 in the Marimanti area and 2 in Evurore) since last September rather than in Embu as before. They now attend fortnightly T & V training sessions and are expected to pass relevant messages on to the farmers in their areas during the normal course of their work.

a. Trials of Improved Drought Resistant Crop Varieties

The results of trials of improved drought resistant varieties of bulrush millet, green grams, cowpeas, sorghum, proso millet and tepary beans carried out during the March-June and October-December 1985 rainy seasons were collected and tabulated (see Appendix 3). Trials were also planted in the March-June 1986 rainy season but the results are not yet known.

In the March-June 1985 on-farm trials in Marimanti catchment, improved varieties of bulrush millet, green grams, and cowpeas consistently outyielded the local varieties of these crops growing on the same farms. The improved variety of sorghum IS8595 produced very low yields as a result of poor germination, smut, and its need for higher rainfall because of its long growing season (4 months). Proso millet did not perform particularly well, but tepary beans produced reasonable yields.

In the October-December 1985 on-farm trials, average yields of improved varieties of green grams, cowpeas, proso millet and tepary beans were considerably lower than in the previous season. Bulrush millet gave a slightly higher yield than in the season before and the yield of Sorghum IS 8595 more than doubled. The results do not take into account the number of plots which failed to produce a crop.

In trials at Ishiara bulking plot (0.13 ha) during both 1985 rainy seasons half the crop was planted on broad ridges and half on narrow. The germination of sorghum in the October-December rains was very poor (less than 25%) and plots were replanted. Apart from the October-December crop of proso millet, higher yields were consistently obtained for all varieties on the broad ridges. In the March-June rains half the cowpea crop regularly had its leaves plucked, whilst the leaves were left on the remainder. Plucking the leaves increased the cowpea yield by over 50%.

b. Bulking of Improved Drought Resistant Crop Seed Under Contract

In the October-December 1985 cropping season 4 farmers at Ishiara Irrigation Scheme and 4 at Mitunguu Irrigation Scheme produced seed of improved crop varieties under contract.

Farmers were paid 50% above the current market price for the seed.

Yields obtained by farmers, the quantity of seed purchased from them by the project, and the price paid are summarised in Appendix 4.

In the March-June 1986 cropping season the number of contract farmers dropped to 2 at Ishiara and 1 at Mitunguu. One farmer grew 0.2ha of cowpeas Vita4 and the other two each grew 0.2ha of green grams N26. Yields are not yet known. No attempt was made to recruit more farmers for this season as the project had sufficient seed in stock for the existing scale of operation.

Bulking of drought resistant crop seed under contract has not proven popular with farmers. Although they are paid 50% above the current market price, with irrigation they can grow higher value crops. This had been expected.

c. Sale of Improved Drought Resistant Crop Seed

Details of seed sold in the October-December 1985 and the March-June 1986 cropping seasons are given in Appendix 5.

Seed was sold to farmers at 50% plus the cost of the seed dressing above the local market price. Cowpeas Vita4 proved particularly popular, no doubt because it is high yielding and both the seed and the leaf are edible. Farmers do not particularly like proso millet or tepary beans - they dislike the taste, probably because these crops are new to them. Sorghum IS8595 was not offered for sale in the March-June rains because of its generally poor germination and poor yields.

d. Cultivation Trials

On-farm cultivation trials to test the effectiveness of tied ridging as against traditional planting on the flat were carried out in both cropping seasons during FY 1985/86. Details are given in Appendix 6.

In the October-December season yields were generally low due to poor rainfall, but crops planted on tied ridges produced consistently higher yields than those grown traditionally. Results for the March-June season are not yet known.

e. Demonstration Plot

A demonstration plot of improved drought resistant crop varieties established at AMTU Siakago this year has not been a success as rainfall in the area is too high. Tepary beans, proso millet, and sorghum all performed poorly and were of no use as a demonstration of ASAL crops. Another site in a more suitable location must be sought.

f. Field Days

This year the agronomy/land use team held 3 field days for farmers. One in Evurore and one in Marimanti were held in conjunction with the soil and water conservation team, and the third was held at the project seed bulking plot at Mitunguu.

3 EMBU CONSTRUCTION

Four sand weirs built by Sema Building Contractors were completed in October 1985, bringing the total number of sand weirs constructed under the EMI programme in Embu District to 12. Unfortunately, 2 of the contractors sand weirs at Karamule and Rienu were later found to leak badly. The contractor did not have the resources to repair the leaks and so his 5% retention money (shs14 094-45) was withheld. Mr Chiyonzo is now supervising the repairs which it is estimated will cost about shs10 000-00.

Repairs and maintenance were carried out on the other 8 Embu sand weirs at the end of 1985.

The walk-in well at Kirigo sand weir was covered and a WECO hand pump was installed last February. In June the pump was found to be out of order - the plunger had come unscrewed from the pump rod (which appears to be a common problem with this type of pump) - and was repaired by Mr Chiyonzo's team.

Two more sand weirs are to be built at Gacabari and Gitikari near Kiambere. Both sites have been surveyed. Designs and costings have been prepared for Gacabari and the local community has started work on the access road. Construction can begin as soon as an agreement has been signed between the EMI SWCP and the newly formed sand weir maintenance committee outlining the responsibilities of each party.

Mr Chiyonzo's work was being handicapped by lack of transport at the end of this reporting period. The Landrover (GKC019) which he has been using, and which the project had spent a great deal of money repairing and maintaining, was taken back by the manager of AMS Machanga in mid-June.

Local maintenance committees are urgently needed for all the completed sand weirs in Embu District, apart from Kirigo where one has been formed. Simple by-laws for the operation and maintenance of the sites and their surroundings must be drawn up in cooperation with the committees. Once minor construction faults have been corrected and the sand weirs are operating satisfactorily they should be officially handed over to the maintenance committees as soon as possible.

Potential sites for small-scale, gravity fed irrigation schemes in lower Embu District were investigated by the Soil and Water Conservation Engineer together with the District Irrigation Officer, Mr Gerald Muthomi. For one or more of the following reasons all the sites visited were found to be unsuitable:

- The rivers in lower Embu are deeply incised so either very long canals or pumps would be required to extract the water for irrigation,
- The terrain is generally rough and undulating and therefore unsuitable for surface irrigation,
- The soils tend to be infertile, highly permeable, erodible, and shallow.

4 MERU CONSTRUCTION

During the last year the main work of Mr Karani and his team has been (a) completing construction of the Tunyai Furrow, (b) surveying, designing and costing the proposed Kithino Furrow structures and (c) surveying the site for a proposed small scale gravity fed irrigation scheme on the Thingithu River at Ruungu.

The major structures on the 17km long Tunyai Furrow (see Map 2) were completed in December. Recently a number of improvements have been made including extra drop structures, raising the intake weir slightly, and constructing escape weirs to divert flood water from the canal. At the insistence of the local chief an extension to the Tunyai Furrow has been surveyed by Mr Karani's team. The chief has been advised that the project will not provide funds for its construction and that during the drier times of the year water is unlikely to flow along the extension.

All necessary clearances have been obtained for the rehabilitation of the Kathino Furrow (see Map 2). Construction can begin as soon as an agreement has been signed between the project and the Furrow Committee outlining the responsibilities of each party. A draft has been drawn up for discussion with the Furrow Committee. The project will provide all the necessary materials and skilled labour for construction, whilst the beneficiaries will be expected to provide all the unskilled labour and maintain the canal on its completion.

A detailed survey of the Ruungu area (see Map 2) is underway at present. Mr Karani estimates that about 420ha of land could be gravity irrigated from the Thingithu River. However, since each farmer and his family will probably only be able to manage $\frac{1}{2}$ ha - 1ha under irrigation and we do not intend to change present farm boundaries, the final irrigated area will be considerably less than the potential. The project will probably be divided into 3 phases for implementation. Provided that the necessary clearance is forthcoming from the DDC and funding is available, this project will be implemented on completion of the Kithino Furrow.

Other possible sites for small-scale irrigation schemes in Meru District were investigated together with the District Irrigation Officer, Mr Theuri. Apart from the Kibunga area (see Map 2) on the Kathita River which will be investigated further, none of the sites was found to be suitable for the small-scale, low cost, gravity fed irrigation schemes envisaged.

As in Embu District, there is an urgent need for local maintenance committees to be established to care for the 8 EMI constructed sand weirs in Meru District.

7.5 OTHER ACTIVITIES

A suitable location is being sought for the establishment of an agricultural research field testing site in lower Embu. The sub-station will come under Embu Agricultural Research Station and is intended to be used mainly for testing improved drought resistant crop varieties before they are released to farmers in the ASAL areas of Embu and Meru. The site must be chosen carefully to ensure that it is representative of the lower areas of Embu and Meru Districts

Alternative designs and materials for extension staff housing to be constructed by EMI in lower Embu and Meru are being examined. We need to know GK policy as regards staff housing and the standard of housing required for extension staff. The recommended cost per house is to be about shs50 000/=. A report is expected from Mr Mwaniki.

8.0 PROPOSED WORK PROGRAMME FOR FY 1986-87

Unless the problems which arose during the last financial year are resolved soon the progress of the SWCP will continue to be slow.

Also, since the end of FY 1985-86 another major problem has arisen. The development estimates for the SWCP for FY 1986-87 bear no relationship to the figures in the agreement for EMI Phase II signed by GK and the UK in April 1986. Added to this, the Phase II agreement states direct funding, but we have been informed by GK that the SWCP is now on the reimbursement system (AIEs have been issued).

8.1 SOIL CONSERVATION

A shortage of hand tools for loaning to farmers for the building of soil conservation structures is hindering the expansion of the soil conservation programme at present. Also, housing for extension staff, bicycles, and motorbikes for supervision must be provided.

Soil conservation activities will continue in the Marimanti and Evurore areas. As soon as an adequate number of hand tools are available the programme will be expanded to a focal area based on Kiritiri in lower Embu and to another area in Meru.

Efforts will be concentrated mainly on interested and responsive farmers. This necessitates identifying the areas with deeper soils, and the areas where farmers generally do not have other jobs and business interests (i.e. away from the main centres).

It is planned to assist another 10 soil conservation groups, comprising approximately 200 farmers, in the Evurore and Marimanti areas during the coming year. Progress in Kiritiri will depend upon how soon work can start in the area, but ideally we would like to provide assistance to 5 soil conservation groups (about 100 farmers) by July 1987.

Once a reasonable supply of hand tools is available, the rate at which terracing can be implemented is likely to be limited by the rate at which field staff can peg out alignments. The simplest way to overcome the problem is to train one or two farmers from each soil conservation group to use line levels. By the end of June 1986 about 30 farmers had each been given two days training. This idea has been tried before but foundered because trained farmers demanded money from their neighbours for doing the work. The neighbours refused to pay knowing that our field staff would eventually do the job for nothing. To overcome this problem it is proposed to pay trained farmers a small daily fee for doing the work and a bonus for terracing actually resulting from their work.

Harambees for carrying out gully control will be encouraged in all parts of lower Embu and Meru. The SWCP will provide hand tools on loan and transport.

Soil conservation field days for farmers will be held in Evurore and Marimanti (and perhaps in Kiritiri if it can be organised in time) during the year. The SWCP will provide lunch and transport for visiting farmers.

A 2 day field trip to the Kitui ASAL Project for farmers and field staff from lower Embu and Meru is planned, possibly in early December. The SWCP will provide transport and subsistence.

Integration of our soil conservation programme into the T & V system has been much discussed. However, apart from our field staffs' attendance at the fortnightly T & V training sessions (which are often on topics irrelevant to the drier areas) little progress has been made on this front. A more determined effort must be made this year to bring about better integration.

It is GOK policy to give as many people as possible an understanding of soil conservation. During the coming year the SWCP will be involved in training about 100 teachers, KANU leaders, chiefs, assistant chiefs, and other community leaders in the ASAL areas of lower Embu and Meru. Examples of topics to be covered include:

- a) Government policy on soil conservation,
- b) Grazing management and control,
- c) Terracing and conservation techniques applicable to ASAL areas (including the use of the line level),
- d) Rehabilitation of eroded areas.

We have been provided with training materials for 100 people (100 line levels, 100 note books, 100 pens etc.) by SIDA. Two day long courses will be held in lower Embu and Meru so that participants do not have to travel too far. The SWCP will provide transport and subsistence for the trainees.

The soil conservation run-off plots have been abandoned but we need some method of determining the effectiveness of the various types of soil conservation measures. In the next year it is proposed to install erosion pins in various areas, on land with different types of soil conservation structures and vegetation covers. Erosion pins are basically metal or fibre glass stakes which are hammered into the ground until the top of the stake is level with the ground surface. These allow the depth of soil eroded to be measured directly. Rainfall records should be kept in the areas where the pins are installed. Preferably this work should be done in cooperation with the agricultural research field testing site which is to be established in lower Embu.

In the ASAL areas of Embu and Meru cultivation generally takes second place to the keeping of livestock. The main cause of soil erosion in the project area is overgrazing. It had been intended that a range ecologist would tackle this problem, but as nobody has been appointed the SWCP should make a start. Grazing control, the protection and rehabilitation of overgrazed land, pasture improvement, and the protection of abandoned cultivated land to allow the re-establishment of cover are all matters which need urgent attention.

It is intended that the project will cooperate with the Agricultural Information Centre in Nairobi in the production of extension material suitable for soil conservation in the arid and semi-arid areas. Lower Embu would be used as a pilot area.

Table Summarising the Main Work of the Soil Conservation Section and Farmers in the ASAL Areas of Embu and Meru for the Period July 1986 - June 1987

Activity	1986						1987					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Land clearing & preparation	XXX	XXX					XXX	XXX				
Planting			XXX	XXX					XXX	XXX		
Weeding				XXX	XXX					XXX	XXX	
Pest/disease control				XXX	XXX	XXX				XXX	XXX	XXX
Harvesting	XXX						XXX	XXX				XXX
Pegging terrace alignments	XXX	XXX	XXX				XXX	XXX				
Terracing and gully control		XXX	XXX				XXX	XXX				
Grass & tree planting				XXX	XXX					XXX	XXX	
Training teachers & local leaders			XXX				XXX				XXX	
Field trip to Kitui						XXX						
Field days for farmers						XXX						XXX
Supervision	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Reporting	XXX			XXX			XXX			XXX		

All revenue resulting from the sale of specially raised improved seed has to be submitted to the Treasury. It is therefore not possible to establish a revolving fund to enable this activity to become self-sustaining.

The SWCP seed banking programme will continue on a small scale with limited trials, green grass, sorghum, cowpeas, Vigna and pigeon peas being grown at Ishiara (0.3ha), Mutungu (0.3ha) and Kibura (0.3ha) existing plots. Once the demand for this seed has been met in the Embu and Meru districts, it will also be sold to farmers in other parts of Lower Embu and Meru.

Sillahi pm

2 AGRONOMY / LAND USE PLANNING

a. Trials of Improved Drought Resistant Crop Varieties

Trials of improved drought resistant crop varieties will continue, both on and off-farm. Besides continuing trials with the more successful varieties from last year's programme - bulrush millet, green grams N26, Cowpeas Vita4 and proso millet - a number of varieties new to Embu and Meru will be tested. These will include:

Bulrush millet	KPM 1
Bulrush millet	KPM 2
Finger millet	Katumani FM1
Sorghum	2KX17
Sorghum	Serena
Sorghum	IS76
Sorghum	954066
Beans	KB1
Cowpeas	M66
Cowpeas	K80
Pigeon peas	NPP670
Pigeon peas	Munaa
Pigeon peas	Kioko
Pigeon peas	KPPA
Pigeon peas	KPPB

Ideally, all new crop varieties should be tested off-farm before being given to farmers for on-farm trials. Off-farm trials will probably be carried out at Marimanti in Meru District and at either Kiritiri or Machang'a in Embu District if sites are available.

Liaison with Katumani and Embu Agricultural Research Stations is important. It would be extremely useful to obtain copies of the results of crop trials at Katumani's sub-station at Marimanti.

b. Bulking and Sale of Improved Drought Resistant Crop Varieties

At present there is no special government policy on seed bulking. All revenue resulting from the sale of specially bulked improved seed has to be submitted to the Treasury. It is therefore not possible to establish a revolving fund to enable this activity to become self-sustaining.

The SWCP seed bulking programme will continue on a small scale with bulrush millet, green grams N26, cowpeas Vita4 and proso millet being grown at Ishiara (0.13ha), Mitunguu (0.8ha) and Kiburine (1.6ha) bulking plots. Once the demand for this seed has been met in the Evurore and Marimanti catchments, it will also be sold to farmers in other parts of lower Embu and Meru.

Tepary bean seed will be available to farmers although it is not popular with them. If the prejudice against its taste could be overcome it would be a good crop for the ASAL areas of Embu and Meru as it yields well in arid conditions. The Home Economics section in the Ministry of Agriculture is attempting to overcome this prejudice.

No attempt will be made to recruit farmers on Mitunguu and Ishiara Irrigation Schemes to grow seed under contract as they are not satisfied with the prices the project is prepared to pay.

c. On-Farm Cultivation Trials

Trials started last year to test the effectiveness of tied ridging as against traditional planting on the flat, using a digging stick or panga to bury the seed, will be continued. Forty farmers in Evurore and ten in Marimanti catchment have been recruited. They can either grow local varieties of seed or improved seed which is provided free by the SWCP. Plot size will be 10m x 10m.

d. On-Farm Manuring Trials

Ten farmers in each catchment have been recruited to test the effect of applying FYM at different rates to trial plots. Each farmer will be provided with a wheelbarrow and spade by the SWCP and will be free to choose which crops to grow.

Table Summarising the Plan of Work for the Agronomy/Land Use Planning Section for the Period July 1986 - June 1987

Activity	1986						1987					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Recruit farmers for trials	XXX	XXX					XXX	XXX				
Land preparation	XXX	XXX					XXX	XXX				
Planting/gapping up			XXX	XXX					XXX	XXX		
Weeding/thinning				XXX	XXX					XXX	XXX	
Pest/disease control				XXX	XXX	XXX				XXX	XXX	XXX
Harvesting	XXX						XXX	XXX				XXX
Weigh produce from trials	XXX	XXX					XXX	XXX				
Dressing/packing seed		XXX						XXX				
Seed distribution			XXX	XXX					XXX	XXX		
Supervision	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Reporting	XXX			XXX			XXX			XXX		

3 EMBU CONSTRUCTION

The two sand weirs at Gacabari and Gitikari will be built and the leaks in the Karamule and Rienu sand weirs will be repaired.

All 12 existing sand weirs in Embu District should be inspected and necessary repairs and maintenance carried out.

To date maintenance committees have been formed only at Gacabari and Kirigo. Committees should be established at all the other sites and the sand weirs should be officially handed over to these committees as soon as possible.

4 MERU CONSTRUCTION

Work on the Kithino Furrow will start shortly and construction should take about 2 to 3 months. When this is finished, providing that all necessary clearances have been obtained, the Meru AMS team will move to Ruungu to work on the proposed small-scale irrigation scheme. This project will be implemented in cooperation with the District Irrigation Officer.

The Kibungaa area on the Kathita River will be investigated in cooperation with the District Irrigation Officer as another possible site for a small gravity fed irrigation scheme. Further possibilities for the rehabilitation of old furrows will be examined.

The 8 sand weirs constructed by the project in Meru District should be inspected and essential repairs and maintenance carried out. As in Embu, maintenance committees should be formed at all sites and the sand weirs officially handed over to them as soon as possible.

5 CONSULTANCIES

Two consultancies were proposed for EMI Phase IA but for various reasons they were postponed and are now scheduled to start in October 1986.

a) Consultancy in Irrigation Engineering (6 - 8 weeks). The consultant will be expected to produce a definitive plan of action for EMI involvement in small scale irrigation in lower Embu and Meru.

b) Consultancy in Land Resource Zonation (5 months). The result of this consultancy will be a set of maps, supported by a report, which will assist future planning and monitoring of agricultural development in the ASAL areas of Embu and Meru.

8.6 TRAINING

Mr Ireri Mwarasomba (SWCO), Mr Chiyonzo (TO Embu AMS), and Mr Karani (TO Meru AMS) have all been accepted by the British Council as suitable candidates for B.Sc. courses in Britain. They are now waiting to hear if university places have been found for them. If they go to UK they will leave Kenya in late September/early October 1986.

Other candidates will be put forward for British Council awards during the year. These may be for B.Sc., M.Sc., or short courses.

8.7 AGRICULTURAL RESEARCH SUB-STATION

A suitable site in Embu District, representative of the ASAL areas of Embu and Meru, should be identified and work started on the establishment of the Agricultural Research Sub-Station this year.

8.8 EXTENSION STAFF HOUSING

Housing for extension staff in lower Embu and Meru Districts should be constructed this year. A decision is needed on the number of houses we can build and suitable sites must be identified.

8.9 AGRO-ECONOMIC SURVEYS

Agro-economic surveys were scheduled for FY 1985-86 but work cannot be started until an agricultural economist has been appointed.

9.0 CONCLUSION

Due to various problems progress was slower than anticipated during FY 1985-86. Even so satisfactory progress was made towards achieving some of the projects objectives.

Unfortunately many of the problems, especially staffing, are still with us and with the new financial year further problems over our budget and funding arrangements have been added. Inevitably Phase II of the SWCP will get off to a slow start.

1. J. J. ...	Technical Officer (Agriculture/Soil Use Planning)
2. J. J. ...	Technical Officer (Soil Conservation Extension)
3. J. J. ...	Technical Officer (Soil Conservation Extension)

(b) District Staff

1. J. J. ...	Technical Officer (Soils)
2. J. J. ...	Technical Officer (Extension)
3. J. J. ...	Driver
4. J. J. ...	Office Manager
5. J. J. ...	Driver
6. J. J. ...	Driver

(c) Field Staff

1. J. J. ...	Field Assistant (Agronomy Extension)
2. J. J. ...	Field Assistant (Agronomy Extension)
3. J. J. ...	Field Assistant (Agronomy Extension)
4. J. J. ...	Field Assistant (Agronomy Extension)
5. J. J. ...	Field Assistant (Soil Cons. Extension)
6. J. J. ...	Field Assistant (Soil Cons. Extension)
7. J. J. ...	Field Assistant (Soil Cons. Extension)
8. J. J. ...	Field Assistant (Soil Cons. Extension)
9. J. J. ...	Field Assistant (Soil Cons. Extension)
10. J. J. ...	Field Assistant (Soil Cons. Extension)
11. J. J. ...	Field Assistant (Soil Cons. Extension)
12. J. J. ...	Field Assistant (Soil Cons. Extension)

(d) Staff Seconded from Agricultural Extension Service

1. J. J. ...	Technical Officer (Soil Conservation)
2. J. J. ...	Technical Officer (Soil Conservation)

Jill Browning
October 1986

APPENDIX 1

Staffing Position at the end of June 1986

(a) Technical Staff

D M Mwaniki	Project Manager
J F Browning	Soil and Water Conservation Engineer
<i>Tom</i> T E Nyongesa	Agronomy/Land Use Planning Officer <i>Till land</i>
L I Mwarasomba <i>(by)</i>	Soil Conservation Officer <i>now Philip Sillah</i>
C M Mbijiwe	Tech. Asst. (Agronomy/Land Use Planning)
M Ngati	Tech. Asst. (Soil Conservation Marimanti)
J M Kamicha	Tech. Asst. (Soil Conservation Evurore) ✓

(b) Support Staff

S N Kareru	Clerical Officer (Stores)
P M Njoka	Clerical Officer (Accounts)
J W Njagi	Typist
L W Chiuri	Office Messenger
J Ndwiga	Driver
S M Mara	Driver

(c) Field Staff

B M Karugano	Field Assistant (Agronomy Marimanti)
M M Nthuka	Field Assistant (Agronomy Marimanti)
S N Kiragu	Field Assistant (Agronomy Evurore)
P J Ngai	Field Assistant (Agronomy Evurore)
H J Gichoya	Field Assistant (Soil Cons. Marimanti)
J N Nganga	Field Assistant (Soil Cons. Marimanti)
A M Muchee	Field Assistant (Soil Cons. Marimanti)
B N Mitugo	Field Assistant (Soil Cons. Evurore)
C N Rugano	Field Assistant (Soil Cons. Evurore)
P I Mutwiri	Field Assistant (Mitungu Bulking Plot)

(d) Staff Seconded From Agricultural Mechanisation Service

K B Chiyonzo	Technical Officer AMS Machanga (Embu) ✓
J M Karani	Technical Officer AMS Chiakariga (Meru)

APPENDIX 2

Soil and Water Conservation Project Objectives - Phase IA

The project aims to formulate a comprehensive approach to the problems of soil erosion and water loss in the project area, and to improve the planning and implementation capacity of the Ministry of Agriculture and Livestock Development to deal with such problems.

Specifically, within Embu and Meru Districts, the project aims to continue to:

- strengthen the planning capacity of Government agencies working on environmental problems in the area
- train staff at all levels in conservation in the semi-arid areas
- demonstrate to and advise farmers on carrying out their own conservation works e.g. terracing, cut-off drains, etc.
- plan and implement a programme of gully control and rehabilitation of water furrows
- collect information on existing patterns of land use, evaluate the use of land in semi-arid areas under different crop and livestock production systems and advise on more productive and less destructive uses of land in such fragile environments
- determine the most appropriate varieties of food crops to be grown in the semi-arid areas
- implement a programme of sand weir construction (on a more modest scale than carried out previously and taking into account earlier experience)
- evaluate ox-drawn and hand cultivation methods and their effect on rainwater infiltration
- promote seed-bulking

Under the project, a land zonation survey will be carried out, and social and economic data on specific aspects of development will be collected and analysed. A pilot programme of small-scale irrigation works will also be implemented.

APPENDIX 3

AGRONOMY / LAND USE PLANNING

Trials of Improved Drought Resistant Crop Varieties

a. March-June 1985 Cropping Season

Data on yields of improved crop varieties collected after the March-June 1985 rainy season were analysed.

On-Farm Trials Marimanti Catchment

Out of 116 farmers who were given improved seed to test on 10m x 10m trial plots 97 obtained some yield, while the other 19 suffered total crop failure due to late planting and/or no weeding. Sixty eight farmers planted local varieties which could be used for yield comparisons. Unfortunately, for the local varieties, no records were kept of the number of plots planted and the number harvested.

Table Showing March-June 1985 On-Farm Crop Yields

	Improved Varieties					Local Varieties			
	Plots	Plots	Yield (kg/ha)			Yield (kg/ha)			
	Planted	Harvested	Lowest	Highest	Average	Lowest	Highest	Average	
Bulrush millet	49	30	200	880	450	Bulrush millet	120	410	260
Green grams N26	89	77	350	1350	500	Green grams	210	1000	340
Cowpeas Vita4	76	68	420	1800	650	Cowpeas	420	1800	650
Sorghum IS8595	62	7	90	195	150				
Proso millet	20	9	100	760	250				
Tepary beans	63	42	270	1260	600				

Ishiara Bulking Plot

Manure was applied to the entire 0.13ha plot at the rate of 12.5 tonnes/ha. Planting was done on broad ridges on half the plot and narrow ridges on the remainder. Half the cowpea crop regularly had the leaves plucked, whilst the leaves were left on the other half.

Table Showing March-June 1985 Ishiara Bulking Plot Crop Yields

	Improved Varieties	
	Yield (kg/ha)	
	Broad Ridges	Narrow Ridges
Bulrush millet	1816	1745
Green grams N26	1318	1107
Cowpeas Vita4 (leaves plucked)	1902	1534
Cowpeas Vita4 (leaves left)	1153	993
Sorghum IS8595	947	839
Proso millet	1054	794
Tepary beans	1528	957

Although irrigation is available at this site it was not used as the bulking plot also serves to demonstrate drought resistant crops to local farmers.

b. October-December 1985 Cropping Season

On-Farm Trials

Eighty eight farmers in Evurore Catchment and 61 in the upper half of Marimanti Catchment purchased packets of improved seed from the project. Each packet contained sufficient seed to plant a plot 10m×20m. It was not possible to monitor all these farmers. Of those who were monitored, 56 farmers in Evurore Catchment and 18 in Marimanti produced some yield.

In lower Marimanti Catchment 50 farmers were given seed by the project for planting 10m×10m on-farm trial plots and of these 39 obtained some yield. The yields for all these plots are summarised below. Crop failures and the reasons for failure were not monitored. No comparative figures for local varieties are available.

Table Showing October-December 1985 On-Farm Crop Yields

Improved Varieties	Yield (kg/ha)				
	Plots	Harvested	Lowest	Highest	Average
Bulrush millet	21	95	1340	490	
Green grams N261	23	50	745	300	
Cowpeas Vita4	29	75	1080	365	
Sorghum IS8595	11	40	1120	350	
Proso millet	10	30	620	185	
Tepary beans	26	40	1305	371	

Mitunguu and Ishiara Bulking Plots

At Ishiara 0.13ha were planted with improved seed and at Mitunguu 0.8ha. Planting was done in October, just before the onset of the rains. At Ishiara half the crop was planted on broad ridges and half on narrow. At Mitunguu all planting was done on the flat. No fertilizer or irrigation water was applied at either site.

Germination of the sorghum IS8595 was poor (<25%) and it had to be replanted. Germination of the other crops was acceptable (>90%).

A record was kept of the number of days from the date of planting of each crop to the date of first harvesting.

Table Showing October-December 1985 Bulking Plot Crop Yields

	Improved Varieties			Days to Maturity
	Yield (kg/ha)			
	Ishiara	Mitunguu	Flat	
	Broad ridges	Narrow ridges	Flat	Maturity
Bulrush millet	2693	2151	1847	110
Green grams N26	2295	1857	822	92
Cowpeas Vita4	2245	1883	1337	102
Sorghum IS8595	826	723	1078	135
Proso millet	2795	3026	2142	104
Tepary beans	1806	1616	1646	94

c. March-June 1986 Cropping Season

The project plots at Ishiara and Mitunguu were planted before the onset of the rains. Germination was poor because of irregular rainfall at the beginning of the season. Gapping up of legumes and transplanting of cereals had to be done. Yields are not yet known.

APPENDIX 4

AGRONOMY / LAND USE PLANNING

Bulking of Improved Drought Resistant Crop Seed Under Contract

The table below summarises the yields obtained by contract farmers (considerably less than 1ha of each crop was grown under contract but yields were calculated in kg/ha), the quantity bought by the project, the current local market price and the prices paid to the farmers.

	Yield Obtained kg/ha	Quantity of Seed Bought kg	Current Market Price sh/kg	Price Paid to Farmers sh/kg
Bulrush millet	1855	371	1,40	2,50
Green grams N26	471	228	4,00	6,00
Cowpeas Vita4	891	477	1,80	3,00
Sorghum IS8595	867	321	2,00	3,00
Proso millet	2827	311	2,00	3,00
Tepary beans	794	113	3,30	5,00

APPENDIX 5

AGRONOMY / LAND USE PLANNING

Sale of Improved Drought Resistant Crop Seed

In the October-December 1985 cropping season small packets of seed, sufficient to plant an area of 10m x 20m, were sold to 88 farmers in the Evurore area and 61 in upper Marimanti Catchment.

In the March-June 1986 cropping season improved seed, dressed and divided into 500g packets was sold to 119 farmers in Evurore catchment and 103 in Marimanti.

No. of packets of seed sold	Evurore	Marimanti	Price per pkt
Bulrush millet	60	68	shs1,90
Proso millet	16	13	shs2,15
Green grams N26	55	60	shs3,65
Cowpeas Vita4	108	84	shs2,15
Tepary beans	14	23	shs3,15

APPENDIX 6

AGRONOMY / LAND USE PLANNING

Cultivation Trials

a. October-December 1985 Cropping Season

Of the 8 farmers who took part in cultivation trials in Evurore Catchment, 6 obtained some yield from their plots. Crop failures were due to destruction by sheep and goats.

Plot sizes ranged from 5m×10m to 20m×10m.

Table Showing the Result of Cultivation Trials in Evurore Catchment October-December 1985

Name of Farmer	Crop Grown	Yield (kg/ha)	
		Tied Ridges	Traditional
Pilisca Mbaka	Bulrush millet	542	413
Nthenge Mukandi	Bulrush millet	255	90
Igoki Njeru	Bulrush millet	312	245
Judith Njeru	Bulrush millet	-	-
Duncan Njeru	Bulrush millet	229	129
Silvano Njeru	Bulrush millet	-	-
Nathan Njeru	Local sorghum	690	420
Kambugu 4K Club	Cowpeas	474	396

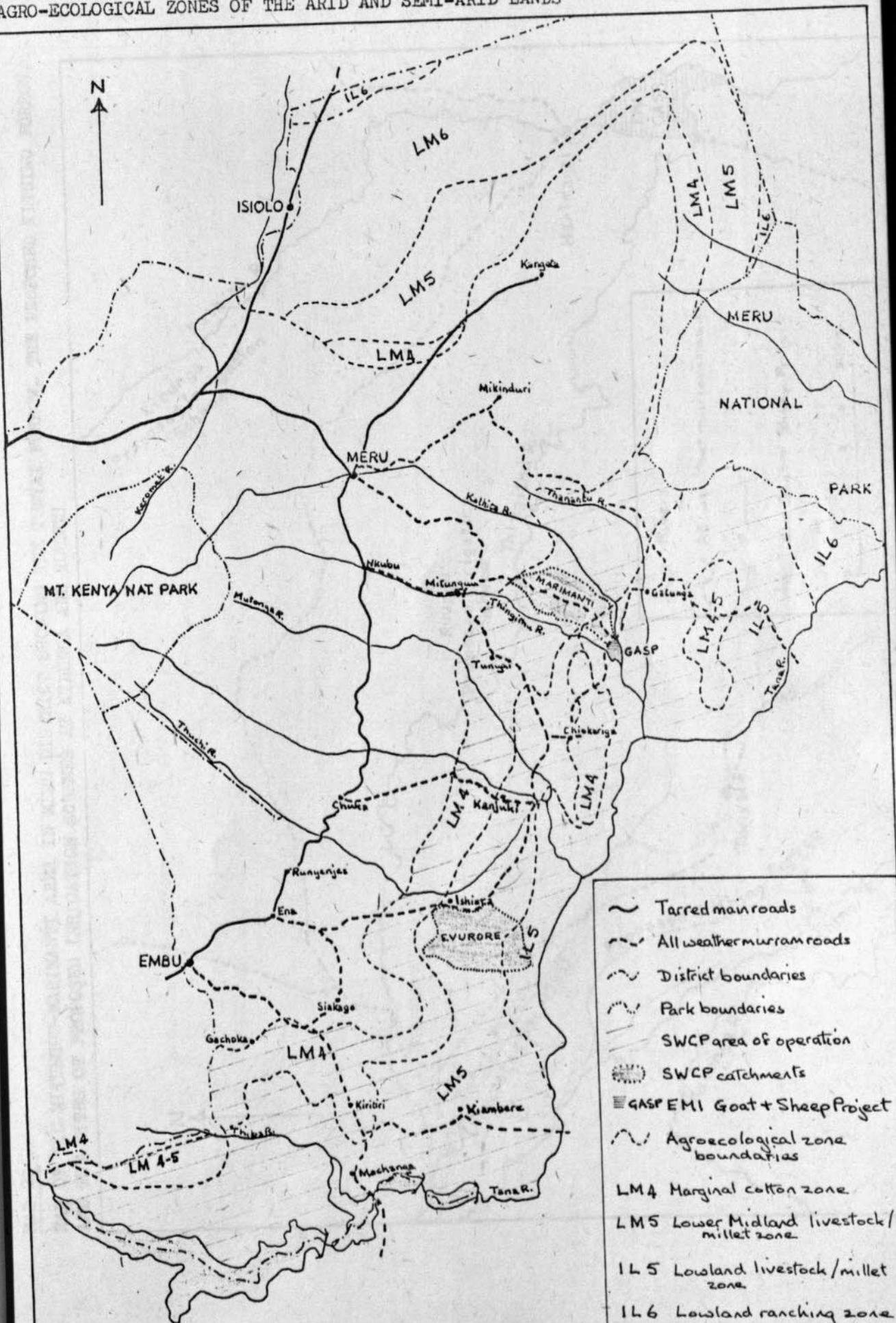
Four farmers planted cultivation trials in Marimanti Catchment but their crops failed due to poor management.

b. March-June 1986 Cropping Season

Tied ridge versus traditional planting trials were carried out by 41 farmers in Evurore catchment and 11 in Marimanti. Yields are not yet known but 27 farmers in Evurore and 9 in Marimanti obtained some crop. The other 16 suffered crop failure for various reasons including their own negligence, attacks by wild animals, birds or other pests (particularly cut worm), and poor germination. On a visual assessment crops grown on tied ridges appeared better than those grown on the flat.

MAP 1.

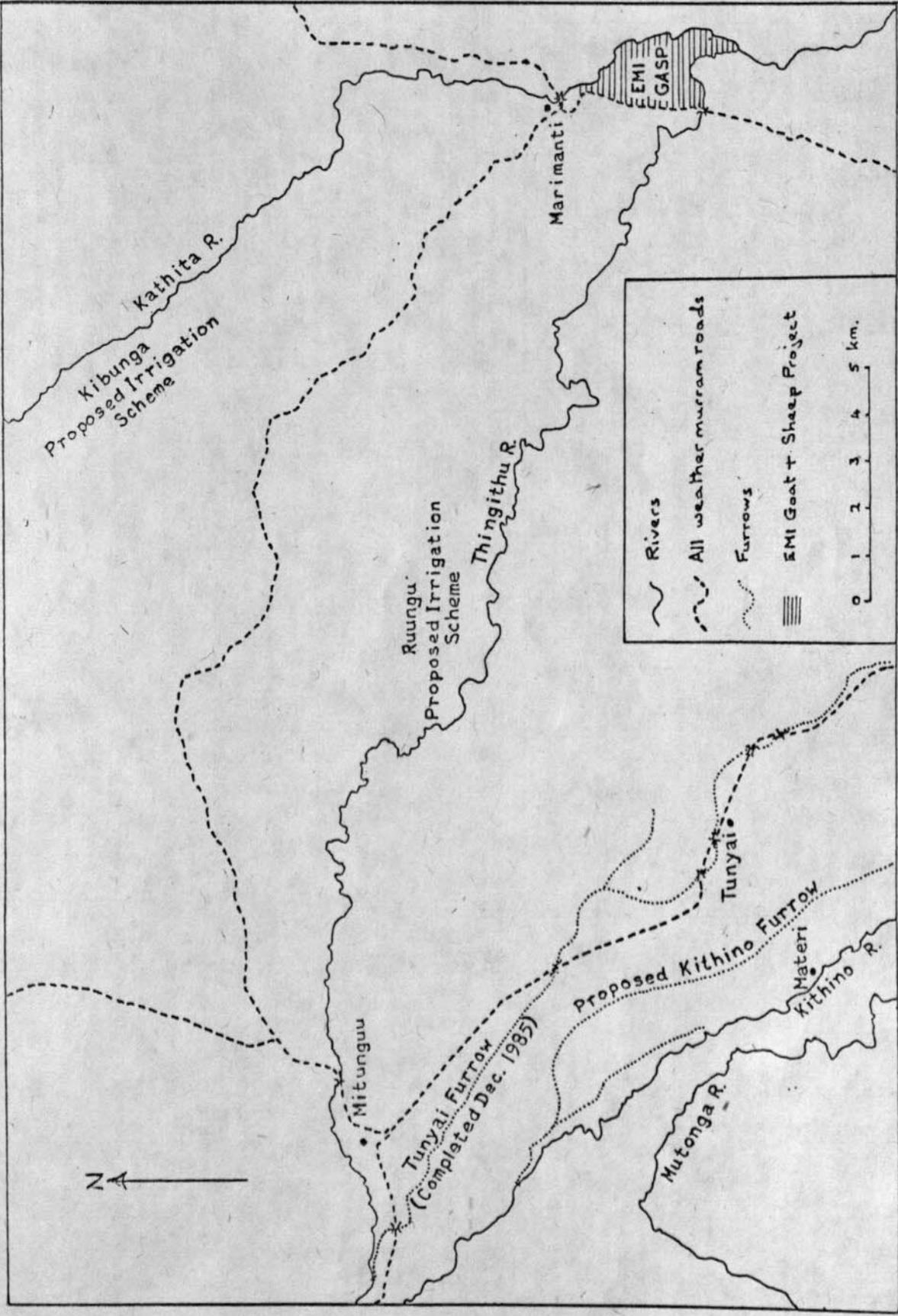
MAP OF EMBU AND MERU DISTRICTS SHOWING THE SWCP AREA OF OPERATION AND THE AGRO-ECOLOGICAL ZONES OF THE ARID AND SEMI-ARID LANDS



Based on maps from the Farm Management Handbook of Kenya. Volume II. Part C. by Jaetzold & Schmidt

MAP 2.

MAP OF THE MITUNGUU-MARIMANTI AREA IN MERU DISTRICT SHOWING THE TUNYAI FURROW, THE PROPOSED KITHINO FURROW, AND THE SITES OF PROPOSED IRRIGATION SCHEMES AT KIBUNGA AND RUUNGU



EMBU, MERU, ISIOLO ARID AND SEMI-ARID LANDS DEVELOPMENT PROGRAMME

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT

Mr. [Name], [Title] [Department] [Office], [Address], [City], [Country].
[Faded text describing a person's background and qualifications, mentioning a college and a year IV school level.]

MINISTRY OF AGRICULTURE
AND
LIVESTOCK DEVELOPMENT

SOIL AND WATER CONSERVATION PROJECT

QUARTERLY REPORT
JULY TO SEPTEMBER 1986

Prepared by
Jill Browning
November 1986

EMI ASAL Programme
Eastern Province
P.O. Box 1199
Embu
KENYA

E.M.I. SOIL AND WATER CONSERVATION PROJECT

QUARTERLY REPORT - JULY TO SEPTEMBER 1986

1.0 STAFF

B N Mitugo, Soil Conservation Field Assistant based at Ishiara, resigned in September to further his studies at Egerton College. Njangu Njogu, a Form IV school leaver who has been working as a casual for the SWCP, has taken on Mitugo's duties temporarily. He will be confirmed in the post if his qualifications are acceptable and he is considered the most suitable candidate.

L I Mwarasomba, the SWCP Soil and Water Conservation Officer, learnt in late September that he had been accepted for a 3 year BSc agricultural economics course at Wye College starting on 6th October 1986. He will be funded by British Council.

K B Chiyonzo (Technical Officer, AMS Embu) and J M Karani (Technical Officer, AMS Meru) were turned down by Newcastle University for the BSc course in agricultural engineering because neither of them has 'A' Level mathematics. A way around this problem is being sought and their names will be put resubmitted for British Council awards, assuming that the DPM agrees.

2.0 MEETINGS

29th July 1986 - Brief EMI Agricultural Projects Meeting

The SWCP's problems, particularly the funding method, were discussed. The idea of decentralising the SWCP was introduced.

14th August 1986 - EMI Agricultural Steering Committee

The progress and problems of the SWCP and the proposed work programme for FY 1986-87 were discussed.

2nd September 1986 - EMI Provincial Steering Committee

The minutes of the previous Provincial Steering Committee of 23rd January 1986 and the Agricultural Technical Steering Committee of 14th August 1986 were reviewed and matters arising were discussed.

Fuller details of these meetings can be found in Appendix 1.

3.0 VEHICLES

Landrover GK H506 was written off in an accident on the Isiolo-Marsabit road on 31st July 1986.

Mr Chiyonzo continues to have transport problems. Landrover GK C019 was returned to him by the manager of AMS Machanga, but it has been damaged and is in need of major repairs.

The Leyland Landmaster lorry from UK which arrived in Kenya last January was finally cleared through customs and arrived in Embu on 22nd September 1986. Its number plate is GK H424.

4.0 PROBLEMS

The overriding problem since the beginning of this financial year has been the the method of project funding. Last July GK replaced direct funding from UK by a reimbursement system. Under reimbursement the project obtains all funds through normal GK channels and GK is expected to reclaim from the UK Government the sum spent by the project. This system is time consuming and inefficient for the project and in the past GK has lost a vast amount of aid money since the necessary paperwork to reclaim project expenditure from the UK Government was never completed. The GK rules applying to purchases through government channels and which now apply to the SWCP are outlined in Appendix 2. Some of the difficulties experienced by the project because of the funding system are given in Appendix 3.

The GK Development Estimates for the SWCP for this financial year bear little relationship to the figures in the EMI Phase II Project Memorandum. The total budget has been cut by about 40% and the amount in most votes has been altered considerably, some items being omitted entirely. A comparison between the SWCP budget as given in the GK Development Estimates for FY 1986-87 and the SWCP budget agreed upon in the Project Memorandum is shown in Appendix 4.

The other main difficulties are familiar ones which have been hindering the SWCP since early in FY 1985-86:

- The project does not have an agricultural economist; agro-economic surveys and other activities have been postponed as a result,
- The project is very short of hand tools for loaning to farmers and so expansion of the soil conservation programme is not possible at present. Mr Paul Njoroge, Head of the Soil Conservation Branch, has promised to loan the project some SIDA provided tools as a stop gap, but a considerable quantity of tools must be purchased to replace the borrowed one and expand the area of work.
- The project tractor, trailer, water bowser and spare part which arrived from UK last year are still being held by Kenyan Customs.

5.0 RAINFALL

No rainfall was recorded in the lower areas of Embu and Meru Districts this quarter.

6.0 PROGRESS JULY-SEPTEMBER 1986

6.1 Soil Conservation

Soil conservation activities continue to be handicapped by the severe shortage of hand tools. Added to this, most of the soil conservation field staff are now having to walk everywhere as it is impossible to obtain funds to repair their bicycles (see Appendix 3). Morale amongst the field staff is low, partly because of the hand tools and bicycle problems, but largely because most of them receive their pay late every month. The technical assistants are full Government employees and are paid promptly, but the field assistants are employed on a casual basis and government procedures mean that their wages are always delayed by at least one or two weeks.

Information on the quantities and distribution of hand tools in the Evurore and Marimanti areas are given in Appendix 5 (Evurore) and Appendix 6 (Marimanti)

Slow progress continued in Evurore and Marimanti areas.

Table Showing the Soil Conservation Work Completed in the Evurore and Marimanti Areas During the Period July-September 1986

Area	SC farmers		Soil conservation work completed							
	new	old	FJ	SB	CD	TL	Gr	GC	T	LR
			(m)	(m)	(m)	(m)	(m)	(m)		(ha)
Evurore	43		3 960	2 470	200	1 200	0	900	0	0
Marimanti			12 935	2 270	1 485	110	0	43	0	0
Total			16 895	4 740	1 685	1 310	0	943	0	0

SC farmers new - farmers who started soil conservation activities on their farms during this quarter

SC farmers old - farmers continuing with soil conservation measures started before this quarter

FJ - length of fanya juu terraces constructed

SB - length of stone bunds constructed

CD - length of cutoff drains constructed

TL - length of trash lines constructed

Gr - length of terraces planted with grass

GC - length of gullies controlled

T - number of tree seedlings planted

LR - land rehabilitation (area fenced and planted with grass and/or trees)

A more detailed breakdown of the soil conservation figures for the Evurore area is given in tables in Appendix 7. A few minor corrections to these tables are needed and a similar exercise should be carried out for the Marimanti area. It is intended to include these in the report for the October-December 1986 period.

6.2 Agronomy

The agronomy staff are suffering the same bicycle repair and wages problems as the soil conservation staff because of the present funding system. Also, it is now impossible to purchase seed bulked up under contract by farmers on Ishiara and Mitunguu Irrigation Schemes. The project was unable purchase improved drought resistant crop seed from Katumani Research Station and Nairobi University in time for the October-December 1986 cropping season.

The main activities of this quarter were:

- Harvesting and weighing produce from Ishiara and Mitunguu bulking plots
- Weighing produce from the demonstration plot at AMTU Siakago
- Weighing produce from cultivation trials
- Dressing and packing improved drought resistant crop seed for sale in Evurore and Marimanti catchments
- Recruiting farmers for cultivation and manure application trials

The SWCP bulking plots at Ishiara and Mitunguu were planted with improved drought resistant crop seed before the onset of the March-June 1986 rains and harvesting was completed in July. At Ishiara yields of most crops were higher than those obtained in the March-June 1985 rains, but lower than those obtained in the October-December 1985 rains. In previous seasons crops grown on broad ridges have generally given higher yields than those grown on narrow ridges, but in the March-June 1986 growing season tepary beans, cowpeas Vita4 and sorghum 954066 produced higher yields on narrow ridges. At Mitunguu yields were considerably lower than at Ishiara (except for bulrush millet which produced a similar yield), and were also lower than yields obtained at Mitunguu in the October-December 1985 season.

Reasons for the decline in yields include loss of soil fertility as no fertilizer was applied to the plots, and the use of third generation seed which had lost many of its original characteristics.

Table Showing March-June 1986 Bulking Plot Crop Yields

Variety	Yield (kg/ha)		
	Ishiara		Mitunguu
	Broad ridges	Narrow Ridges	Flat
Bulrush millet	1847	1473	1725
Proso millet	1612	1143	670
Sorghum 954066	2020	2112	840
Green grams N26	1786	1625	950
Cowpeas Vita4	1704	1920	820
Tepary beans	1908	2076	730

The demonstration plot for drought resistant crop varieties at AMTU Siakagq gave poor yields as the area is too wet. The plot has been abandoned.

Tied ridging versus traditional planting trials were carried out on 10m×10m plots by 41 farmers in Evurore catchment and 11 in Marimanti during the March-June 1986 cropping season. Twenty seven farmers in Evurore and 9 in Marimanti obtained some crop. The other 16 suffered total crop failure for various reasons including lack of weeding, destruction by wild animals, goats, birds or cut worm, poor germination, or planting maize for which rainfall was inadequate.

Table Showing the Results of the Cultivation Trials March-June 1986

Area	Crop	No. of plots planted	Average Yields (kg/ha)	
			Tied ridges	Traditional
Evurore	Bulrush millet	11	833	583
	Proso millet	4	166	0
	Sorghum	8	766	566
	Cowpeas	3	573	317
	Green grams	1	365	240
Marimanti	Bulrush millet	3	500	385
	Sorghum	1	250	200
	Cowpeas	1	675	790
	Green grams	4	677	436

Apart from one crop of cowpeas, yields from plots with tied ridging were higher in every case than yields from plots planted in a traditional manner on the flat. The crop failed completely in the case of proso millet planted in the traditional way.

Drought resistant crop seed was dressed and divided into 500g packets for sale to farmers in the project area for planting in the October-December 1986 rains. Final sales figures are not yet known but green grams N26, cowpeas Vita4 and bulrush millet were proving very popular.

6.3 Embu Construction

Mr Chiyonzo continues to have transport problems. Landrover GK C019 was returned to him but needed major repairs. The lowest of 5 garage quotes was accepted for the work, but the garage is now unable to complete the work for the price quoted. The Landrover is lying in pieces while it is decided who is responsible for bearing the extra cost.

Excavation of the foundations of the new sand weir at Gacabari started in early July. The local community is expected to provide the unskilled labour for the sand weir and improvements to the access road. An agreement has been signed between the SWCP and a newly formed sand weir committee outlining the responsibilities of each party. To date little assistance has been provided by the community and progress is very slow.

Repairs to the contractor built sand weir at Karamule were carried out at a total cost of Kshs 3 569-60.

The notches in Karamule and Mwakiri sand weirs were filled in and the outlet pipe at Mwakiri was plugged.

At present Mr Chiyonzo cannot devote his entire time to the SWCP as he is providing technical advice and supervision for the construction of a sand weir at Kamarandi, between Ishiara and the Tana River. This is being funded by the RDF.

6.4 Meru Construction

The agreement between the SWCP and the Committee for the Kithino Furrow was signed and excavation of the intake area was completed in July. It was not possible to start constructing the diversion weir across the Kithino River, however, until the end of September because of the difficulty of procuring construction materials through the GK system. It will not be possible to finish the construction of the intake until after the next rains.

The survey of the site of a proposed small scale irrigation scheme at Ruungu on the Thingithu River was completed. The Ruungu Irrigation Scheme Committee are applying for a water extraction permit and clearance for the project from the sub-DDC and DDC.

The Tunyai Furrow is working well but some minor improvements are required. Extra drop structures are needed in several places where erosion is occurring. The stilling basins below some drop structures need to be improved. A 600m length of the furrow, about a kilometre before Tunyai Market, should be lined to prevent excessive seepage. Cattle troughs should be provided to help prevent the damage which occurs when cattle drink straight from the furrow. Maintenance of the furrow is the responsibility of the local community, but to date little has been done; the Furrow Committee should ensure that all routine maintenance is carried out promptly.

6.5 Other Activities

A field trip, by staff from the SWCP and the DAO's offices in Embu and Meru, to the Kitui ASAL Development Project and Mutomo Soil and Water Conservation Project took place 7th-11th July 1986. This was a very interesting and useful trip, appreciated by all those who took part.

Embu Show took place 7th-9th August 1986. The SWCP GK staff were much involved in this and the preparation for several weeks beforehand.

D M Mwaniki and J F Browning took part in a Soil Conservation Workshop at the Kabete Campus of Nairobi University on 16th-19th September 1986.

7.0 Conclusion

Since direct funding was replaced by the reimbursement system at the start of the new Financial Year in July 1986 the rate of progress of the SWCP has declined to an even lower level than in 1985-86. If all other problems were removed it would not be possible to make satisfactory progress under this inefficient method of funding.

The main points covered included:

The discrepancy between funds allocated to SAI in the UK Development Estimates for FY 1985-87 and the funds agreed upon in the Project Memorandum.

The need for the SWCP to revert to direct funding as stated in the Project Memorandum, rather than continuing a reimbursement as called for in the Development Estimates for FY 1985-87.

The urgent need for hand tools and the problems of obtaining an indent from the Ministry of Agriculture allowing for their import.

The problem of obtaining Customs clearance for vehicles and equipment which arrived in Kenya 3 or 4 months ago.

The proposed SWCP consultants in Land Resources Education and Irrigation. The FIA was requested to contact the Ministry of Agriculture to ascertain whether or not local organisations had the capacity to undertake these within a reasonable time schedule.

The difficulties of recruiting a FOD Agricultural Economist/Team leader acceptable to UK. It was tentatively suggested that the post should be divided between a FOD Agronomist and a UK agricultural economist.

The decentralisation of the SWCP, to facilitate District planning and implementation & bring in more closely with the concept of District Teams.

Review Missions should include both ODA and UK staff at all stages.

APPENDIX 1

Summary of Important Meetings Held During Period July-September 1986

1. 29th July 1986 - Brief EMI Agricultural Projects Meeting

A short meeting was held in the PDA's office to discuss some of the more important issues concerning the SWCP and GASP.

The main points covered included:

- The discrepancy between funds allocated to EMI in the GK Development Estimates for FY 1986-87 and the funds agreed upon in the Project Memorandum.
- The need for the SWCP to revert to direct funding as stated in the Project Memorandum, rather than continuing on reimbursement as called for in the Development Estimates for FY 1986-87.
- The urgent need for hand tools and the problems of obtaining an indent from the Ministry of Agriculture allowing for their import.
- The problem of obtaining Customs clearance for vehicles and equipment which arrived in Kenya 8 or 9 months ago.
- The proposed SWCP consultancies in Land Resource Zonation and Irrigation. The PDA was requested to contact the Ministry of Agriculture to ascertain whether or not local organisations had the capacity to undertake these within a reasonable time schedule.
- The difficulties of recruiting a TCO Agricultural Economist/Team Leader acceptable to GK. It was tentatively suggested that the post should be divided between a TCO Agronomist and a GK agricultural economist.
- The decentralisation of the SWCP, to facilitate District planning and implementation fitting in more closely with the concept of District Focus.
- Review Missions should include both ODA and GK staff at all stages.

2. 14th August 1986 - EMI Agricultural Technical Steering Committee

Points arising from the minutes of the EMI Agricultural Steering Committee held on the 20th January 1986 and the SWC Project Special Steering Committee held on the 29th April 1986 were discussed. Those of interest to the SWCP included:

- Extension staff housing; a possible site for up to 3 houses has been identified at Kamumu in Embu District but no sites have been suggested in Meru District. The Coffee Factory Technician has not been able to spare the time to provide suitable designs. Mr Mwaniki was requested to obtain house plans from the Ministry of Works.
- Irrigation; 2 possible sites have been identified in Meru District. Before an irrigation programme can be instituted a framework must be provided by the proposed irrigation consultant.
- Honey refinery for Chiakariga; no action has been taken because of the lack of feedback from the DAO Meru on the need for the refinery.
- Agricultural Nurseries; if EMI's funding problem can be resolved recurrent expenditure could be provided for 2 or 3 years for a nursery at Gachuriri in Embu District and another in Meru District.
- Customs clearance of imported equipment; Mr Paul Njoroge promised to undertake the task of clearing the SWCP lorry, tractor, trailer, water bowser and spare parts through customs.
- Kathwana Furrow; A project proposal, including an analysis of the socio economic benefits, is required before EMI can consider funding this furrow.

The progress of the SWCP during FY 1985-86 was discussed and the proposed work programme for FY 1986-87 was outlined.

The Committee made the following recommendations with regard to the SWCP:

- Farmers from outside the irrigation schemes should be selected to bulk improved crop seed.
- P N Njoroge should request the National Environment Secretariat to investigate soil erosion rates in Embu and Meru Districts.
- The DAO Embu should investigate the possibility of using a portion of the 1100 acres of land set aside for AMS Machanga for agricultural trials and seed bulking. Ownership of the land is disputed and it is not being used at present.

- An unoccupied house in Kiritiri, constructed by SRDP (an early seventies development programme), could be renovated by the SWCP rather than building a new house.
- The SWCP should make a request to P N Njoroge for the loan of SIDA hand tools to act as a stop-gap until new tools can be purchased by the project.
- D M Mwaniki and A T Barrett should obtain suitable plans for extension staff housing from the Ministry of Works.
- AMS Machanga should immediately return Landrover GK C019 to the SWCP for use by Mr Chiyonzo.
- Landrover GK 635W should be transferred to the SWCP to replace GK H506 which was written-off in an accident.
- D M Mwaniki and J K Mburu should draw up plans to enable the work of the SWCP to be clearly divided between the districts.
- SWCP field staff should be assist to obtain further training.

3. 2nd September 1986 - EMI Provincial Steering Committee

Matters arising from the previous Provincial Steering Committee, held on 23rd January 1986, were discussed. The following points referred to the SWCP:

- Some purchases planned for FY 1985-86 could not be made as the agreement for Phase IA was not signed until March 1986. The committee recommended that these items should be obtained.
- The District Tender Board has accepted quotations for the local purchase of shs 200 000/= of hand tools. Hand tools from UK are still needed urgently.
- Candidates proposed by ODA for the post of TCO Team Leader of the SWCP have been rejected by GK. Jill Browning will therefore take on this responsibility.
- No site has been identified for the establishment of an agricultural research sub-station in lower Embu. The DDO and DAO should consult Embu County Council about the availability of suitable land in an area representative of the lower zones.
- Katumani and Embu Research Stations should make available their plans for the substation at Marimanti GASP
- A proposed EMI Annual Review Meeting in Nairobi is considered important by the Committee. The Programme Officer should to follow this up.

The minutes of the Agricultural Technical Steering Committee Meeting held on 14th August 1986 were reviewed.

- The PDA was asked to allocate a vehicle to the SWCP to replace GK H506.
- It was agreed that the PDA and staff concerned should discuss proposals drawn up by D M Mwaniki and J K Mburu for decentralising the work of the SWCP so that it fits more closely with the aims of District Focus.
- The DAO Isiolo was told that EMI could not provide funds for a proposed furrow in Isiolo District as the SWCP confines its activities to Embu and Meru Districts.

APPENDIX 2

Rules Relating to Purchases Made Through the GK System

AIEs (Authority to Incur Expenditure) are issued to the office of the Provincial Director of Agriculture. Funds are then released in accordance with the following rules:

- items costing up to shs 500/= can be paid for with cash,
- items costing shs 500/= to shs 1 000/= must be bought with a Local Purchase Order (LPO) which is prepared by the project and approved by the District Treasury,
- five quotations must be obtained for items costing shs 1 000/- to shs 5 000/= and the decision on which quote to accept is made internally in the Ministry of Agriculture,
- five quotations must be obtained for items costing shs 5 000/= to shs 50 000/= and adjudication is done by the District Tender Board,
- items costing shs 50 000/= to shs 250 000/= have to go to tender and tenders are adjudicated by the District Tender Board,
- items costing over shs 250 000/= have to go to tender and tenders are adjudicated by the Central Tender Board.

APPENDIX 3

Difficulties Encountered by the SWCP due to the Reimbursement Funding System

1. The Project Officer has been unable to obtain funds to purchase new seed of improved drought resistant crop varieties. Therefore, the project will not be carrying out variety trials in the October-December 1986 rains.
2. The purchase of seed bulked for the SWCP by contract farmers is not possible under the reimbursement system. The project has not been able to buy the seed bulked by 3 contract farmers in the March-June 1986 cropping season.
3. Virtually every single project bicycle is out of order and the field staff are now having to walk everywhere. It is impossible to obtain funds for repairs and spare parts through the reimbursement system. Normally GK sells bicycles to field staff and then provides them with an allowance of shs60/= per month for upkeep. The bicycles cost shs1760/= and field staff pay for them at a rate of shs70/= per month, the money being deducted from their salaries.
4. Hiring casual labour can be difficult as, under the reimbursement system, it is only possible to pay people who have ID cards. This is a particular problem in Mitunguu where there are a number of different projects recruiting staff and many of the school leavers do not have ID cards.
5. A simple repair to a project vehicle can take days to organise. First a quote has to be obtained from the garage (generally New Embu Uhuru Garage) for the work required. The quote is then taken to the Supplies Officer in the PDA's office who has to sign a Local Service Order (LSO). If the Supplies Officer is not available there is another delay as nobody else can sign the LSO. Finally the vehicle and LSO can be taken to the garage for the necessary work to be done.
6. Expensive repairs to vehicles can lead to endless complications. Five quotations must be obtained for a costly repair and the lowest is generally accepted. However, in the case of the Embu AMS Construction Supervisor's Landrover, the garage was not able to complete the work for the price quoted; the Landrover has been lying idle for weeks while the various parties concerned argue over who is responsible for the extra cost.
7. Project staff are reluctant to take imprests since, even if they hand in the receipts and vouchers promptly, processing them takes some time and in the meantime the amount outstanding is deducted from their pay. Also, it is not possible to obtain a second imprest until the first one has been cleared. Imprests to staff are essential to the smooth running of work in the field.

8. Under the present system, Meru AMS Construction Supervisor has to order and transport all his fuel and materials for construction work in Meru District from Embu. This is time consuming, expensive and inefficient. Often material he has ordered is not delivered and he either has to go to Meru and telephone the SWCP to ask someone to follow it up or else he has to come to Embu. Also, no invoice is sent with deliveries, so the Construction Supervisor is often unsure of the quantity of a particular item (such as sand) delivered and is unable to keep accurate records of the materials used by the project.
9. The AIE system is inefficient and time consuming. The Project Officer, for example, reckons that he spends at least 5 working days a month following up vouchers to obtain funds.

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APPENDIX 4

Comparison between the SWCP Budget as Given in the GK Development Estimates for FY 1986-87 and the SWCP Budget Agreed Upon in the Project Memorandum

Item	Budget for FY 1986-87						
	GK Development Estimates			Project Memorandum			
	Draft	Funds from UK		Total	Funds from UK		
	Estimates	A-in-A	Revenue	Budget	A-in-A	Revenue	
KE	KE	KE	KE	KE	KE	KE	
	0	0	0	32 773	10 200	0	
000 Personal Emoluments	0	0	0	15 600	0	0	
050 House Allowances	0	0	0	1 350	0	0	
051 House Allowance	13 000	0	13 000	22 500	22 500	0	
100 Transport Op.	3 300	0	3 300	15 150	0	0	
110 Travel & Acc.	300	0	0	300	0	0	
120 Post & Telegrams	1 200	0	0	1 200	0	0	
121 Office Telephone	200	0	0	200	0	0	
140 Electricity & Water	4 040	0	4 040	8 750	8 750	0	
150 Purchase of supplies	2 000	0	2 000	0	0	0	
153 Farm Inputs	0	0	0	3 350	3 350	0	
171 Mapping & Printing	1 200	0	0	0	0	0	
174 Purchase of Stationery	1 800	0	1 800	0	0	0	
182 Rents Rates	3 900	0	3 900	10 100	10 100	0	
190 Miscellaneous	0	0	0	43 200	43 200	0	
210 Vehicles	3 920	0	3 920	19 450	19 450	0	
220 Plant & Equipment	0	0	0	5 500	5 500	0	
400 Buildings	0	0	0	36 500	36 500	0	
410 Buildings Residential	136 000	0	136 000	59 500	59 500	0	
403 Conservation Works	0	0	0	49 000	49 000	0	
405 Irrigation							
Gross Expenditure	170 860	0	167 960	324 423	268 050	0	
Direct Payment (UK Grant)	0	0	0	268 050	268 050	0	
Net Expenditure Subhead 401	170 860	0	167 960	56 373	0	0	

A-in-A = Appropriation in aid

APPENDIX 5

SWCP Hand Tools - Evurore

Table Showing the Hand Tools Provided to Evurore Catchment and their Distribution in September 1986

Type	Received	Issued to groups	Issued to individuals	Worn out	Balance in store	*Transferred
Wheelbarrows	115	33	20	-	4	58
Shovels	218	145	51	2	4	16
Pickaxes	207	97	27	-	73	10
Mattocks	113	61	10	3	28	11
Sledgehammers	4	-	4	-	-	-
Crowbars	12	-	1	-	11	-
Rakes	28	20	7	1	-	-
Axes	1	-	-	-	1	-
Pangas	21	16	-	-	5	-
Forked jembes	5	-	3	-	2	-
Long jembes	20	17	-	-	3	-
Plain jembes	8	-	5	-	3	-
Handles	170	151	19	-	-	-

* 47 wheelbarrows were transferred to Marimanti catchment.
 5 wheelbarrows were transferred to the Embu AMS Construction Team.
 Remaining tools were given as prizes to farmers at field days.

Hand Tools Issued to Soil Conservation Groups Evurore Area

Group name	Total no. of members	Hand tools on loan from SWCP												
		W	S	P	M	H	C	R	A	K	FJ	LJ	PJ	B
11 Kamutu Womens	37	5	40	10	10			5		10		10		60
12 Usanbara Womens	30	5	20	20	10			5		4		7		40
13 Kamugua Womens	40	5	20	10	10			5		2				20
14 Kigwambiti Womens	27	5	10	10	7									14
15 Mbaraka Mens	40	3	10	7										7
16 Kyeniri Womens	38						Tools issued from DAO's store							
17 Kianthambu Womens	35	2	10	10	6									10
18 Njura Womens	27	2	10	10	6									
19 Kamukanya Womens	51	2	15	10	6									
110 Karangare Womens	30	4	10	10	6									
Totals	355	33	145	97	61			20		16		17		1151

W - wheelbarrow, S - shovel, P - pickaxe, M - mattock, H - sledge hammer, C - crowbar, R - rake, A - axe, K - panga, FJ - fork jembe, LJ - long jembe, PJ - plain jembe, B - handle

Hand Tools Issued to Individual Farmers in Evurore Area

Area	Total no. of farmers	Hand tools on loan from SWCP													
		W	S	P	M	H	C	R	A	K	FJ	LJ	PJ	B	
11 Kamuthigo	37		4												
12 Kambungu	25	4	4	3	1		1								
13 Njura/Njarange	18	5	8	3											
14 Kigwambiti	12	2	5	4	1										
15 Kathuri	10		3	1											
16 Karuri	8	4	4	2	2	1									
17 Kamiigua	8		5	4											
18 Kamutu	7	2	6	3											
19 Kabuguri/Gaceci	5		3	3	1										
110 Karangare	4	?	?	?	?	?	?	?	?	?	?	?	?	?	
111 Kamwaa	3	3	7	2	5										
112 Kyenri	?		3	2											
Totals			20	51	27	10	4			7		3		5	19

W - wheelbarrow, S - shovel, P - pickaxe, M - mattock, H - sledge hammer, C - crowbar, R - rake, A - axe, K - panga, FJ - fork jembe, LJ - long jembe, PJ - plain jembe, B - handle

APPENDIX 6

SWCP Hand Tools - Marimanti

Table Showing the Hand Tools Provided to Marimanti Catchment and their Distribution in September 1986

Type	Received	Issued to groups	Issued to individuals	Worn out	Balance in store
Wheelbarrows	103	59	38	4	2
Shovels	506	254	248	4	-
Pickaxes	198	84	104	10	-
Mattocks	290	161	99	30	-
Sledgehammers	7	2	4	-	1
Crowbars	-	-	-	3	3
Rakes	35	3	29	-	-
Axes	3	-	-	-	-
Pangas	-	63	20	27	5
Forked jembes	115	64	75	3	150
Long jembes	292	-	25	4	13
Plain jembes	42	-	-	200	930
Handles	3 330		2 200		

Hand Tools Issued to Soil Conservation Groups Marimanti Area

Group name	Total no. of members	Hand tools on loan from SWCP												
		W	S	P	M	H	C	R	A	K	FJ	LJ	PJ	B
11 Kithioroka Mens	48		15	5	10							4	2	
12 Kiagu Self Help	21	3	23	2	5							10	6	
13 Rugika Mens	18	4	18	8	10							3		
14 Kirurumoni Mens	20	3	20	5	10							5	5	
15 Mugui Soil Cons	21		10		5							10	6	
16 Kinondo Mens	40	5	14	6	10							8		
17 Turima Mens	16	3	17	6	10							4	4	
18 Kakurume Mens	8	3	8	3	4							4		
19 Kanganda Mens	?	?	?	?	?	?	?	?	?	?	?	?	?	?
110 Lanca Mens	10	4	10	5	5							4	6	
111 Mucuna	30	10	30	11	20									
112 Kiruiro Mens	16	2	3		4									
113 Kivumbi Mens	11	3	6	5	6						3		2	
114 Kakunguguni Mens	13		13	2	13									11
115 Ruungu Inst Was	11		5											10
116 Ruungu P Hse Wms	10													
117 Nkararu Mens	11	4	11	4	11									
118 Ruugu SA Tonya M	23	7	23	15	8									5
119 Ruungu Cath P M	12	5	12	5	5									5
120 Kamukangau Mens	10	3	10	2	6									4
121 Kaigemia Womens	17		6		6									5
122 Kanithoroko Mens	13				13									
Totals		379	59	254	84	161	2					3	63	64

New Marimanti Soil Conservation Groups Not Yet Provided With Hand Tools

Group name	Total no. of members	Hand tools on loan from SWCP												
		W	S	P	M	H	C	R	A	K	FJ	LJ	PJ	B
123 Kamarika Mens	20													
124 Kariini Mens	10													
125 Lanca Womens	24													
126 Karocho Farmers	12													
127 Mukunga Corner M	16													
128 Kiraka Mens	15													
129 Karume Mens	10													
130 Kanthungu Mens	8													
Totals	115													

W - wheelbarrow, S - shovel, P - pickaxe, M - mattock, H - sledge hammer, C - crowbar,
 R - rake, A - axe, K - panga, FJ - fork jembe, LJ - long jembe, PJ - plain jembe, B - handle

APPENDIX 7

Soil Conservation Work Undertaken in the Evurore Area since the Start of the Project

Table Showing Soil Conservation Measures Completed in the Evurore Area up to September 1986

Period	*No. of new S.C. farmers assisted	Soil conservation work completed								
		FJ (m)	SB (m)	CD (m)	TL (m)	Gr (m)	GC (m)	T	LR (ha)	
Up to Dec 84	60	224	8 635	338	0	0	450	300	2	
Jan - Mar 85	29	10 133	310	948	24 182	300	1 600	0	0	
Apr - Jun 85	26	0	0	0	0	0	0	200	0	
Jul - Sep 85	40	4 079	1 290	200	2 000	0	630	0	0	
Oct - Dec 85	19	3 136	2 110	110	0	900	720	300	0	
Jan - Mar 86	23	1 880	2 560	140	3 350	0	800	0	3	
Apr - Jun 86	35	0	0	0	0	4 510	0	400	2	
Jul - Sep 86	43	3 960	2 470	200	1 200	0	900	0	0	
Totals	275	23 412	17 375	1 936	30 732	5 710	5 100	1 200	7	

* Once farmers start soil conservation work they are given assistance for as long as they require it.

- FJ - length of fanya juu terraces constructed
- SB - length of stone bunds constructed
- CD - length of cutoff drains constructed
- TL - length of trash lines constructed
- Gr - length of terraces planted with grass
- GC - length of gullies controlled
- T - number of tree seedlings planted
- LR - area of land under rehabilitation (fenced and planted with grass and/or trees)

Evurore Soil Conservation Groups

Table Showing Progress of Evurore Soil Conservation Groups up to September 1986

Group name	Date S.C. started	Total no. of members	No. farms with S.C. works	S.C. work to date				Comments
				FJ (m)	SB (m)	CD (m)	GC (m)	
11 Kamutu Womens	Mar 1985	37	37	4 200	-		200	Sufficient tools.
12 Usambara Womens	Mar 1985	30	16	1 300	1 500		120	Active group.
13 Kamugua Womens	Mar 1985	40	12	900	2 000		140	Slow group. Stony soils.
14 Kigwambiti Womens	Aug 1985	27	12	800	1 200		180	More tools needed. Slow group.
15 Mbaraka Mens	Aug 1985	40	20	2 100		800	300	Sufficient tools.
16 Kyeniri Womens	Aug 1985	38	17	1 200		700	500	Sufficient tools.
17 Kianthambu Womens	Aug 1986	35	8		500	900	120	More tools needed. Promising new group
18 Njura Womens	Aug 1986	27	8		600	800	100	More tools needed. Promising new group
19 Kamukanya Womens	Aug 1986	51	8			2 400	200	More tools needed. Promising new group
110 Karangare Womens	Aug 1986	30	8		800			Sufficient tools. Promising new group
Totals			355	146	12 400	110 300	1 860	

FJ - length of fanya juu terraces constructed
 SB - length of stone bunds constructed
 CD - length of cutoff drains constructed
 GC - length of gullies controlled