TECHNICAL REPORT No. 20

TRADITIONS AND INNOVATION IN LAND HUSBANDRY

Building on local knowledge in Kabale, Uganda

Written by Will Critchley, Dan Miiro, Jim Ellis-Jones, Stephen Briggs and Joy Tumuhairwe

RELMA

PUBLISHED BY SIDA'c REGIONAL LAND MANAGEMENT UNIT, 1999

Traditions and Innovation in Land Husbandry

Building on local knowledge in Kabale, Uganda

Regional Land Management Unit
Technical Report No. 20

RELMA Technical Report Series

1. *The Revival of Soil Conservation in Kenya*. Carl Gösta Wenner's Personal Notes 1974 – 81. Edited by Arne Eriksson. 1992. ISBN 9966-896-00-7
2. *The Wild Lake*. By C.A. Gerden, G.M.O. Khawange, J.M. Mallya, J.P. Mbuya, R.C. Sanga. 1992. ISBN 9966-896-01-5
3. *Miljöprofil Kenya (Swedish).* By Lill Lundgren. 1992. ISBN 9966-896-04-X
4. *Lake Babati, Tanzania and its Immediate Surroundings.* Part I – Baseline Information. By James Kahurananga. 1992. ISBN 9966-896-05-8
5. *Lake Babati, Tanzania and its Immediate Surroundings.* Part II – Management & Action Plan. 1992. By James Kahurananga. 1992. ISBN 9966-896-06-8
6. *The Catchment Approach to Soil Conservation in Kenya.* By Yeraswarq Admassie. 1992. ISBN 9966-896-08-2
7. *Parks & People: Pastoralists and Wildlife.* By Jones R. Kamugisha, Michael Ståhl. 1993. ISBN 9966-896-09-0
8. *Improving Livestock Production in Babati District, Tanzania*. By Josef Jonsson, James Kahurananga, Augustine Macha. 1993. ISBN 9966-896-10-4
9. *Twenty years of Soil Conservation in Eastern Africa.* By Lill Lundgren. 1993. ISBN 9966-896-12-0
10. *Environmental Education: Experiences and Suggestions.* By V. Lindhe, Miles Goldstick, Stachys N. Muturi, Paul Rimmerfors. 1993 ISBN 9966-896-13-9
11. *Management of Natural Resources and Environment in Uganda: Policy and Legislation Landmarks, 1890-1990*. By Jones R. Kamugisha. 1993. ISBN 9966-896-17-1
12. *The Hand of Man: Soil Conservation in Kondoa Eroded Area, Tanzania.* By Carl Christiansson, Alfred C. Mbegu, Anders Yrgard. 1993. ISBN 9966-986-18-X.
13. *Changing Environments: Research on Man-Land Interrelations in Semi-Arid Tanzania. Man-Land Interrelations in Semi-Arid Tanzania*. By Carl Christiansson, Idris S. Kikula. 1996. ISBN 9966-896-18-X
14. *Twenty Years of Soil Conservation in Ethiopia: A personal Overview.* By Berhe Wolde-Aregay. 1996 ISBN 9966-896-26-0
15. *Zero Grazing, an Alternative System for Livestock Production in the rehabilitated areas of Kondoa-Tanzania.* By G. Tekie, A.P. Masaoa, C.M. Shayo, H.A. Ulotu and E.J.M. Shirima. 1996. ISBN 9966-896-27-9
16. *Land Husbandry Education in Agricultural Colleges of Eastern Africa: An overview*. By Tesfaye Abebe. 1997. ISBN 9966-896-28-7
17. *Parks and People – Conservation & Livelihoods at the Crossroads: Four Case Histories.* By J. R. Kamugisha, Z. A. Ogutu, M. Ståhl. 1997. ISBN 9966-986-29-5
18. *Participatory Planning and Implementation: Experiences with Farmers from Nyandarua District, Kenya 1992-1995*. By Christine Holding, Kiunga Kareko. 1997. ISBN 9966-896-30-9.
19. *Evolution of Provision of Tree Seed in Extension Programmes: Case Studies from Kenya and Uganda.* Edited by Christine Holding, William Omondi. 1998. ISBN 9966-896-34-1

Traditions and Innovation in Land Husbandry

Building on Local Knowledge in Kabale, Uganda

Will Critchley, Dan Miiro, Jim Ellis-Jones,
Stephen Briggs and Joy Tumuhairwe

This publication received outside financing through the Environment Programme of the Netherlands Development Assistance and Sida's Regional Land Management Unit.

Vrije Universiteit Amsterdam
Centre for Development
Cooperation Services

RELMA
Regional Land
Management Unit

Published by:
The Regional Land Management Unit, RELMA/Sida, ICRAF House, Gigiri
P. O. Box 63403, Nairobi, Kenya

Photographs:
All photographs by Will Critchley and Dan Miiro

Front cover photographs:
Top: Farmers evaluating the effect of banana mulching (photo: Will Critchley)
Middle: Lake Bunyonyi in the Kabale highlands (photo: Will Critchley)
Bottom: Improved compost production (photo: Will Critchley)

Illustrations by:
Alex Oduor

Edited by:
Will Critchley
Natural Resources Management Unit
Centre for Development Cooperation Services
Vrije Universiteit De Boelelaan 1115
The Netherlands

Editor of RELMA series of publications:
Alex Oduor/RELMA

Design and layout except front and back covers by:
Logitech Limited
P. O. Box 79177
Nairobi, Kenya

Cataloguing-in-publication Data:
Traditions and innovation in land husbandry:- building on local knowledge in Kabale Uganda/William Critchley, Dan Miiro, Jim Ellis-Jones, Stephen Briggs and Joy Tumuhairwe. - Nairobi, Kenya: Regional Land Management Unit (RELMA), Swedish International Development Cooperation Agency (Sida), 1999.
[Regional Land Management Unit (RELMA) Technical Report Series; 20]

Bibliography: p

ISBN 9966-896-38-4

Printed by:
Majestic Printing Works Ltd
P. O. Box 42466,
Nairobi, Kenya

The Authors

Will Critchley:	Centre for Development Cooperation, Vrije Universiteit Amsterdam, The Netherlands
H. Dan Miiro:	Ministry of Agriculture, Animal Industry and Fisheries, Soil and Water Conservation Section, Entebbe, Uganda
Jim Ellis-Jones:	Silsoe Research Institute, UK
Stephen Briggs:	*Formerly attached to* Silsoe Research Institute, UK
Joy Tumuhairwe:	Makerere University, Kampala, Uganda

Contents

Figures and Tables

Acronyms

CDCS	-	Centre for Development Cooperation Services
CWSSE	-	Conserve Water to Save Soil and the Environment
DFID	-	Department for International Development (United Kingdom)
FI	-	Farmer Innovator
FRs	-	Farmer Researchers
ICRAF	-	International Centre for Research in Agroforestry
ISWC	-	Indigenous Soil and Water Conservation
MAAIF	-	Ministry of Agriculture, Animal Industry and Fisheries
NGOs	-	Non Governmental Organisations
ODA	-	Overseas Development Agency (United Kingdom)
PFI	-	Promoting Farmer Innovation
PM & E	-	Participatory Monitoring and Evaluation
PRA	-	Participatory Rural Appraisal
PTD	-	Participatory Technology Development
SRI	-	Silsoe Research Institute
SWC	-	Soil and Water Conservation
SWCS	-	Soil and Water Conservation Section
TLs	-	Trash Lines
UK	-	United Kingdom
UNDP	-	United Nations Development Programme
UNSO	-	United Nations Sudano - Sahelian Office
USCAPP	-	Uganda Soil Conservation and Agroforestry Pilot Project

Dedication

This booklet is dedicated to the memory of Rose Twinamasiko, member of one of the original farmer networks in Kamwezi, who sadly passed away in 1998. Her hard work and cheerfulness are missed by all.

Foreword

The land husbandry project in Kabale District described in these pages is unusual in several ways. Let me just mention two. First of all it has involved local people and has built on their knowledge of how to protect the land. It has shown that they too can be 'scientists' working together with researchers and extensionists to improve conservation practices. Secondly, it is a project which has lasted long enough to have impact. Too often projects come and go in a matter of two or three years. The Kamwezi project will have been active for over six years when its current phase comes to an end in the year 2000. There is a real sense of commitment to the cause of conservation. Finally, let me say how refreshing it is to read a clearly written and illustrated booklet aimed at people 'on the ground'. Not only will the farmers and project staff be happy to read about their hard work and achievements, but others will also be able to follow their example.

Charles Rusoke
Head, Soil and Water Conservation Section
Ministry of Agriculture, Animal Industry and Fisheries
Entebbe, Uganda

Network A: a regular meeting

Farmers evaluating the effect of banana mulching

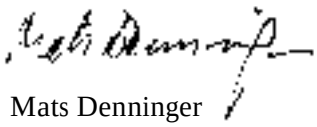
A harvest of sorghum

Publisher's preface

RELMA, through its predecessor, the Regional Soil Conservation Unit, has been supporting soil and water conservation and agroforestry related projects/works for close to two decades. Its new mandate, which is to *contribute towards enhanced food security and improved livelihoods* is much wider than before thus encompassing virtually all the major subject areas in agriculture and related sciences.

The geographical focal area for RELMA remains the same as in RSCU and covers Eritrea, Ethiopia, Kenya, Uganda, Tanzania and Zambia. It is therefore gratifying to note that the activities guided by the Centre for Development Cooperation Services (CDCS) are also covering at least three of the countries mentioned above. The activities in Kabale, Uganda have a lot of similarities in subject matter content with RELMA's endeavours in the Uganda Soil Conservation and Agroforestry Pilot Project, Mbarara. The two sites therefore have complimentary relationships.

The production of this publication has been a joint effort between RELMA and CDCS/SRI, highlighting farmer innovation and research. The collaboration of the institutions should therefore be seen in the light of fostering further relations for the benefit of farmers.



Mats Denninger
Director, RELMA.

Preface

This booklet tells the story of a promising and innovative approach to improving the conservation of land for production. It is a case study from a project in a remote part of southwest Uganda, where farmers have, over the centuries, developed systems of farming and conservation for themselves, with little outside help. In turn, the project has based itself on local traditions and innovations. Researchers and extension agents have joined hands with farmers to form a partnership for development: the project is as much to do with people as technology. Of course there have been problems as well as successes, and there is still a long way to go. But the lessons from this case study, we believe, are valuable. A methodology has been developed here that can be tried with confidence elsewhere. The starting point is to realize that land users can and do have knowledge about land husbandry. This can be stimulated to develop and spread creative ideas. This is 'respecting, recognizing and rewarding local creativity' in the words of Professor Anil Gupta[1], an authority on the subject of indigenous knowledge. Uganda's and Africa's greatest untapped resource is her people and their ingenuity.

[1] see the annotated bibliography at the end of the booklet

Locations of CWSSE projects in East Africa

1 Introduction

In the late 1970s and 1980s, there was a growing tide of opinion that many 'experts' were mistaken about how to conserve soil in Africa. Ideas from outside the continent had been brought to Africa without consulting the local people. Of course many of the new systems recommended (though certainly not all) were technically sound. But the majority - however effective they were at slowing down erosion - simply did not fit in with local production systems. We do not need to write too much here about what those particular problems were. These have been described in detail elsewhere, many times.

But an example will help to paint the picture. Graded terraces or 'bunds' were introduced into many dry regions of Africa in countries as far apart as Zimbabwe and Burkina Faso. The term 'graded' means that the ditch above the earth bund is constructed on a gradient (slope) to get rid of extra rainfall runoff. This makes good sense in areas with heavy and reliable rainfall and large fields. The trouble was that these were *dry* areas where the farmers' first priority was to save water. So in many cases the farmers either ploughed out the bunds, or, more cleverly, adapted them to *harvest and hold* water. In Zimbabwe, this was done by digging deep trenches in the ditch. In Burkina Faso, farmers placed stones in spaces in gaps in the bunds - or used stones to replace the bunds altogether - to allow water to spread slowly through the whole field.

In Uganda, we are familiar with the unpopular colonial by-laws that instructed farmers to *do this* and *not do that*. Again, although these laws were drawn up with the best intentions, they were often shortsighted for various reasons. Can farmers, for example, in very densely populated areas, really be expected to leave wide uncultivated strips between their plots of land? And is it the best approach to *force* people to look after their land: isn't it better to understand what they are already doing to solve the problem, and then look for improvements together?

So not all was well with soil conservation projects and programmes. Failures were more common than success. But what could be done? Some of the 'old school' of specialists believed that farmers were simply not interested in saving their soil, and that land users were 'ignorant' about erosion. Basically, scientists said that farmers were defeated by soil erosion. However, some development workers in different parts of Africa noticed that there were a number of local conservation techniques being used by farmers on their own. Apparently local land users *did* have strategies to deal with erosion, even if these were far from perfect. Equally important, these same farmers understood about the causes and impacts of erosion and the need for conservation. They were not 'ignorant', after all. That is the point of departure for this case study: *the knowledge and creativity of farmers in one part of Uganda.*

2 The beginning of the project

The idea for a project that could 'build on local traditions' was born in 1992. A worldwide review of traditional soil and water conservation was commissioned by Silsoe Research Institute (see Critchley, 1992). This report confirmed that indigenous soil and water conservation (ISWC) was more common than we had thought before and that the prospects for 'building on traditions' were promising. A project proposal was then drawn up by Silsoe Research Institute in collaboration with East African partners, submitted to the Environmental Research Programme of UK's Department for International Development (DFID)[2], and the project became a reality. A first phase from 1994 to early 1998 was funded.

So what was in the project document? To put it simply, the project, called 'Conserve Water to Save Soil and the Environment' (CWSSE) set out to develop existing traditions of SWC with an emphasis on dry zones. The project was also unusual in that it aimed to undertake a full cycle of activities through research, to development to extension. Furthermore, this was to be a joint effort, involving researchers and developers from within and outside Uganda. Most importantly, it would involve the local people as equal partners: at that time an ambitious, and perhaps unique, approach.

[2] named the Overseas Development Administration (ODA) at that time

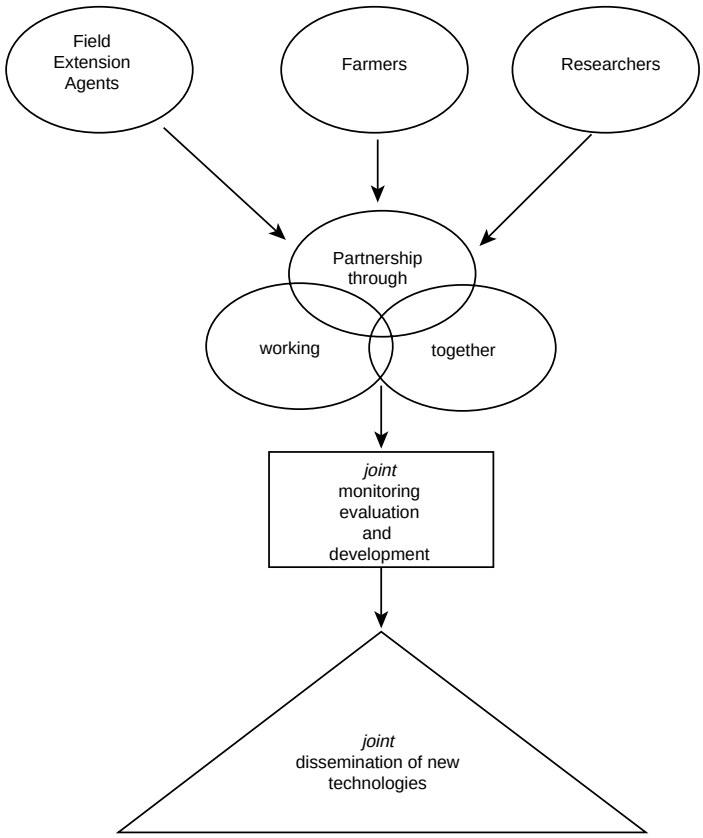


Figure 1: *Partnership through working together*

Careful thought had been given to *how this was going to be achieved*. Three stages were written into the project. These were:

- *evaluation*: of the effectiveness of the indigenous technologies used by those farmers
- *development*: of those technologies to improve their performance where possible
- *dissemination*: of the improved technologies.

Another objective of the project was to develop and describe the methodology itself so that it could provide a guide for future projects setting out on a similar path. We will look at the overall participatory approach in more detail later.

The project had selected Uganda as one of the three participating counties. Kenya

and Tanzania were the others. But the question now was: *what is the most suitable location within Uganda for such a project*? The area needed to have the following characteristics:

- there must be evidence of local traditions of SWC
- the people should be interested in participatory development of these technologies
- it should be a priority area for the government in terms of conservation
- it should be an area where lack of rainfall is often a problem.

The Soil and Water Conservation Section within the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF-SWCS) suggested Kabale District, in the far south-west corner of the country, close to the Rwanda border. And, as it proved, the dry sub-county of Kamwezi, lying below the main hills of Kabale, was ideal for the project. Here was a drought-prone area, with problems of erosion and declining soil fertility, and yet it was clear that local people took a pride in farming and used a wide range of traditional conservation practices. Kamwezi was where the project staff and the local people started work together in 1995.

3 Kamwezi: the area, its people and their farming

After identifying Kamwezi as the focal point for its start-up activities, the project carried out a *Participatory Rural Appraisal (PRA)* to find out more about the area, its people and, particularly, more about their conservation practices. It is true that this was not a full PRA designed to look at all development constraints and opportunities - something that was pointed out later. Nor did we use all of the 'tools' in the PRA toolbag. Perhaps we should call it a '*participatory learning exercise with a particular focus*'. That focus was on the existing conservation measures. But through interaction between the PRA team and the community, a great deal was learned about the area. When written information and records were consulted and added to this, the result was a full and interesting report. One which all the team and the people of Kamwezi were proud of (see Miiro and others in the bibliography).

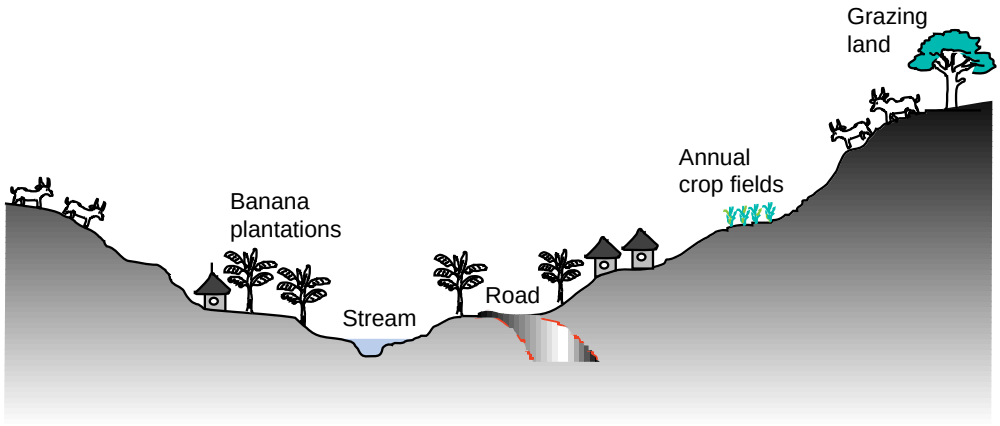


Figure 2: *Transect through Kamwezi: from the 1995 PRA report*

Kamwezi sub-county is situated in the most eastern part of Kabale District, bordering the district of Ntangumo in the north and the Republic of Rwanda in the east and south. Before we talk more of Kamwezi, it is interesting to look at the district as a whole. Kabale is a highland area with relatively good soils and rainfall. Morning mists hang over the hills. We are told that the Bakiga ('the hill people') who inhabit the district immigrated from elsewhere in the great lakes region. These immigrants brought their established farming practices. Agriculture has been practiced here for many generations. Kabale is well known for high population densities and problems of soil erosion. As long ago as 1940, the colonial government brought in a plan to remove and resettle a quarter of the highland population, and to introduce compulsory soil

and water conservation measures. Although the population very soon grew back to its previous levels - and now is far above what it was in those days - some of the conservation measures were adopted by the local people and added to their own traditional systems. More about that later. Nevertheless, although the hills of Kabale are covered with grass strips and terraces, there are serious problems with landslips, decreasing soil fertility and declining productivity.

Let us concentrate now on the sub-county of Kamwezi. Kamwezi was settled later than the highland areas of the district. Apparently there has been a large growth in the population over the last generation or so: there are now about 25 000 people living within the 130 km^2 total area. The sub-county has absorbed part of the overspill population from the highlands which has a population density about twice as high. Kamwezi consists of a fertile valley bordered by steep hills, but it receives the least amount of rain in the whole district. The annual average is just over 800 mm, split between two growing seasons, namely 'Katumba' starting in February, and 'Kicuransi' beginning in September. It is also hotter than the rest of the district, and thus the farming and household livelihood systems are different. However, farming is the main source of income, and both men and women are involved although each has particular responsibilities on the farm.

Kamwezi is characterised by banana plantations in the valley where a small but perennial stream flows, annual crops on the footslopes where the homesteads are found, and communal grazing of cattle and goats on the hills above. Land is held under a secure, traditionally-based tenure system, although there is no official private ownership and no titles to plots. Land fragmentation is very common too: normal farm sizes are from 0.5 to 3 hectares, but these holdings may be split into up to a dozen scattered plots. Bananas are the people's priority for both food (the staple here is 'matooke' cooking bananas) and cash. Amongst the annual crops, sorghum, beans, Irish and sweet potatoes, and onions are widely grown. The practices of crop rotation and intercropping are traditional in this area. Where there is a large enough land holding, fallowing of land (that is, resting it from production for several seasons) to restore fertility is also carried out. Local animals are unimproved breeds , and there is little attention paid to intensive livestock production. Livestock production is of secondary importance, but the value of manure is being increasingly recognised[3].

[3] information from the 1995 PRA - with some added information gained later

Makerere University: One of the research partners

Kamwezi: the shopping centre

Erosion and fertility loss are a problem

Banana plantation in Kamwezi: the main source of food and income

Inside a banana plantation

Bananas and bicycles: a common sight

Water harvested from the road into a soak-away pit

Banana fermenting to make the local brew

Burying weeds and trash during primary tillage

Dan Miiro with a traditional trash line in a crop of beans

Legumes are important in crop rotation

Ridges for sweet and Irish potatoes: a tradition

Stone lines are not common in Kamwezi

Josylen of Network A: enjoys keeping farm records

Azaria of Network A: a retired headmaster

Annah of Network A: the youngest of the team

Patana of Network A: a part-time bicycle repair man

Banana mulching was one of the two key on -farm trails

Shem Turyamureeba - the local extension agent - with a mesh 'litter bag' used to measure the decomposition rate of mulch

Researchers and farmers measuring a trash line

A study tour to a nearby ICRAF station stimulated the Network A farmers

James brought back some tree seedlings to test after the study tour

4 Local soil and water conservation practices

It will be remembered that the area was chosen because of its rich tradition of soil and water conservation practices. It was those practices that the PRA focused on. Quite soon after the PRA started, we realised that these practices - and there were very many of them - were better called 'local practices' rather than being lumped together as 'indigenous' ones. That was because some, indeed, were old traditions, but others were practices that had been introduced from outside and adopted (and often modified) by the people. So two categories of local techniques emerged when talking to the people and walking through their fields during the PRA, namely:

- Traditional techniques
- Introduced techniques

First, an overview of each of the techniques in Tables 1 and 2 with some information on their use, benefits and constraints. Then, a description of each follows, with some technical details.

Table 1: Traditional Techniques

Practice	Where used	How widespread	Main purposes	Problems/Constraints
Trash lines	across the slope on annual crop land	most people/use is increasing	soil, fertility and water conservation	reduces crop area/rats hide some weeds thrive/fire risk
Ridges	slopes and flat areas for Irish and sweet potatoes	everyone that grows potatoes	increases soil volume for tubers	lack of tools/moles sometimes follow ridges
Stone lines	across the slope on annual crop land	rare	soil conservation	stones have commercial value for building
Mulching	mainly for bananas: also for vegetables	majority of banana growers	water and fertility conservation	high labour requirement/ weed infestation
Crop rotation	all annual crops	everyone	fertility improvement and control of pests and diseases	land shortage
Burying weeds and trash	on annual crop land	majority of people	fertility improvement and weed control	some soils too shallow to bury effectively
Fallowing	annual crop land	people with enough land/use decreasing	fertility improvement and weed/pest/disease control	land increasingly limiting

Source: based on Miiro and others 1995, and Briggs and others 1998b.

Table 2: Introduced Techniques
(all introduced in the 1930s/40s except 'Fanya-juu' terraces in the 1990s)

Practice	Where Used	How Widespread	Main Purposes	Problems/Constraints
Contour Bunds	on slopes: esp. field boundaries	not widely used: may be decreasing	soil and water conservation	collapse/labour to construct/loss of land
Infiltration Ditches	in banana plantations	few	for holding rainwater runoff	limitation of land/ labour to construct
Protection Channels	on slopes for all crops	few	protection from runoff/ soil conservation	labour to construct
Harvesting Water from Roads	from roads/paths into banana plantations	many people use these	increasing water in soil	labour to construct
Erosion Control Wash-Stops	mid and lower slopes in gullies	not very common: by-laws have been relaxed	soil conservation	none mentioned
Fanya-juu Terraces	sloping fields	few people so far	soil and water conservation	lack of layout skills/ labour/tools
Composting/ Manuring	in homestead gardens and on cash crops	commonly used	maintenance and improvement of soil fertility	labour
Strip Cropping	on slopes	not commonly practiced	fertility, soil and water conservation	land shortage/relaxed by-laws/rats
Control of Grass Burning	upper slopes	little practiced now:relaxed by-laws	fertility, soil and water conservation	ignorance/no enforcement
Woodlots	mid slopes and valleys	not many people planting these	fuelwood production , sales	none mentioned

Source: based on Miiro and others 1995, and Briggs and others 1998b.

Soil and water conservation techniques in Kamwezi

a. Traditional techniques

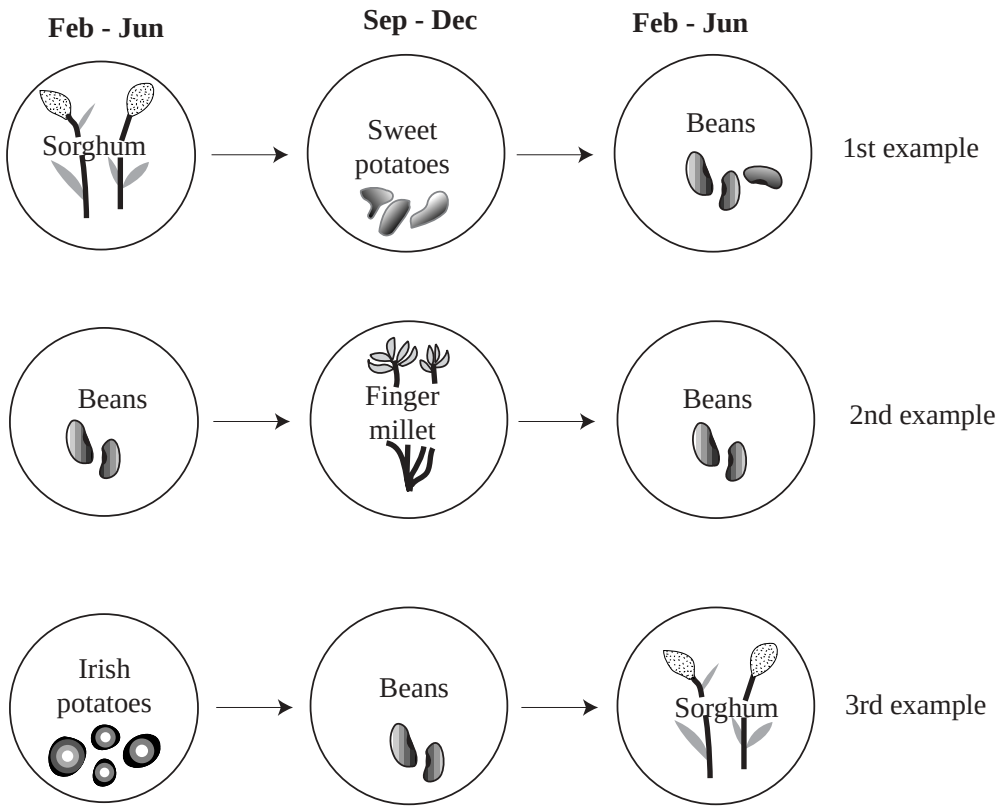
- *Trash Lines (TLs)*: these are cross-slope lines of trash, i.e. dried weeds and crop residues of about 45 cm in height and 60 cm wide, which are laid out in fields of annual crops. The spacing is usually 15 m between lines. They are found both within the cropped part of a field as well as on field boundaries. TLs are among the most common and popular methods of conserving land, and are particularly valued for their positive effect on soil fertility. The labour needed to make a trash line is relatively low. After two seasons, usually, the decaying TLs are dug into the ground and this improves soil fertility. New TLs are then laid out between the sites

of the old ones. TLs effectively act as *'mobile compost strips'*. Trash lines may introduce weed species if the material contains seeds. The PRA participants identified trash lines as one of their 5 priority techniques.

- *Ridges*: ridges are lines of heaped soil, about 30 cm high and 45 cm wide, which are constructed across the slope (or on a slight gradient to allow drainage of surplus water). Irish and sweet potatoes are planted within the ridges, where the conditions for production of tubers are better.

- *Stone Lines*: not a common technique in this area at all and only practiced by a few farmers. There seem to be two reasons for this. The first is that there isn't much stone around, and the second (which results from the first) is that stone can be sold for building. Stone lines are built across the slope, in annual crop fields, and they are usually just 1 or 2 courses (layers) of stones high.

- *Mulching*: by-products from harvested annual crops (especially bean stover and sorghum stems), as well as certain weeds, grasses cut for the purpose and, in the case of bananas, stems and leaves are laid out on the soil between plants to preserve moisture in the ground. Mulching is common in banana plantations and this is the most widespread, and important, SWC system in Kamwezi. Conditions are too dry for bananas to grow well without mulch. Constraints include the labour involved, as mulching demands a lot of time and hard work, availability of materials for mulching, and the danger of introducing weeds from seeds carried within the material. The PRA participants identified mulching as one of the five priority techniques.



N. B: only main crops shown: many crops interplanted

Figure 3: *Crop rotation: Three examples*

- *Crop Rotation*: this is central to the annual cropping system in Kamwezi. It is something which is a genuine, age-old tradition. There is no fixed, regular pattern of crops on a piece of land. But there is a continuous change in crops from season to season, which is governed by certain 'rules': for example, cereal never follows cereal, and a legume is almost always planted every second season. The PRA participants identified crop rotation as another of their 5 priority techniques.

- *Burying Weeds and Trash*: this is a practice carried out usually during primary cultivation (digging) when a heavy growth of weeds and other trash is dug into the ground. Again this is a true tradition.

- *Fallowing*: this is an age-old practice. When cropland has become exhausted - perhaps after 3 or 4 years of cultivation - it is rested and allowed to recover. This 'fallow' period of recovery may last for up to 5 years. Fallowing is becoming

less common now that pressure on the land is increasing. And it is only practiced by those who have enough land to spare.

b. Introduced techniques (all introduced in 1930s/40s except fanya-juu terraces in the 1990s)

- *Contour Bunds*: when contour bunding was introduced in the 1930s, the bunds were formed by soil being thrown downslope. They were planted with grass to stabilise them. The bund design was (about) 60 cm high by up to 90 cm wide. Considerable labour was required. Nowadays, the only bunds which are common are those formed between field boundaries of different owners. This results from the farmer below constantly hoeing the soil downslope away from his/her upper boundary, and the farmer above heaping trash at the bottom of his/her field. Interestingly, the more the land is fragmented, the more these 'bunds' are formed.

- *Infiltration Ditches*: these are ditches of about 60 cm wide and 45 cm deep, of various lengths, sometimes staggered within the fields, which trap water and soil running down the slope. They are dug across the slope and only used in banana plantations. Such ditches are, however, demanding in terms of labour and also require careful laying out. The PRA participants identified 'trenches' and especially infiltration ditches as another of the 5 priority techniques with considerable potential.

- *Protection Channels*: protection ditches are not very common. They are usually only found at the top of plots to protect these from damaging runoff from above. These are excavated channels, with the soil thrown downslope to form a bund.

- *Harvesting Water from Roads*: small channels of 60 cm deep by 60 cm wide are dug by the roadside, leading runoff from the road into banana fields. These channels are then led into 'soak-away pits', within the bananas, 1 m deep and 1 m also in diameter, or (increasingly nowadays) into infiltration ditches.

- *Erosion Control Wash-Stops*: grass or brushwood plugs (or 'checkdams') are placed or planted across rills and gullies to reduce speed of runoff water running downslope. Sediments are trapped, and runoff waters soak into the ground.

- *Fanya-juu Terraces*: fanya-juu terraces are the only modern introduction in the list of existing SWC measures in Kamwezi. This technology originates from Kenya . Ditches are dug on the contour, to a depth of 60-90 cm, and the soil thrown *upslope*. Bunds are then planted with grass for stabilisation. This is not yet a common technique; it is very labour-intensive.

- *Composting / Manuring*: crop residues and livestock droppings are collected close to the homestead and thrown into a pit to decompose. Sometimes the compost is transferred to a second pit, being turned over in the process, to speed up the decomposition process. The decayed mixture is then applied to high value crops (particularly vegetables) near the home.

- *Strip-Cropping*: strip cropping was introduced in colonial times and supported through by-laws, which have now largely been relaxed. The usual instruction was for fallow strips to be left between belts of crops to reduce runoff and soil wash.

- *Control of Grass Burning*: again, control of grass burning on the high hill slopes was originally enforced through by-laws. Now, the practice of burning has become common again. While such burning speeds up the production of young sweet grass for livestock, it exposes the land to erosive rain at the beginning of the season. As a result, sediment and runoff sweep down from the hillsides and destroy cultivated land. The PRA participants identified control of grass burning as the fifth of the priority techniques and strategies.

- *Wood Lots*: most wood lots in Kamwezi comprise small pockets of trees - commonly eucalyptus species - planted in farmland where the soil is too shallow and rocky to allow annual cropping.

The tables and technical description tell us a great deal about what the people know and recognise about their practices. There are several interesting points to note from the observations that we made during the PRA and the information we collected afterwards. These are as follows:

- local practices of soil and water - and fertility - conservation are very common, very varied, and very important in local farming systems

- most of the techniques are viewed as being multipurpose: combining soil and water conservation with fertility management: indeed management of soil fertility is a greater local priority than we had expected

- the richer ('better resourced') farmers use more permanent structures (bunds, ditches, and so forth) and can afford to fallow land, whereas the poorer ('lower resourced') farmers rely more on cheaper measures - for example, trash lines. The richer farmers mulch their bananas with crop residues as well as banana stems and leaves. The poorer group only use banana waste for mulching

- as we have seen, there is no clear distinction between what is 'traditional' and what is in fact an introduced technique or the result of a local innovation which has spread

- some techniques are growing in popularity and importance (for example, trash lines) and others seem to be dying out or decreasing in importance (for example, certain types of earth bunds)

- the relaxation of by-laws controlling certain practices (for example, grass burning and wash stops) has meant that these are much less common than before, when they were enforced

- of the techniques that were identified, most are *biological* (such as mulching or composting) although *structural* measures (infiltration ditches, water harvesting ditches and soak-away pits) are important in particular situations, especially where water needs to be controlled

- the various techniques tend to compete for resources: for example, TLs and mulching both need scarce organic matter, and digging of any ditch or bund requires considerable labour, which is in short supply

- although these local traditions can be quite effective, there is obviously a range in how well they are made and maintained (structures) or managed (biological measures)

- *just because ISWC is widespread in the area does not mean that conservation cannot be improved: local practices are not the answer on their own.*

5 Methodology: the approach and activities of the project

Earlier we talked about the beginning of the project, and the design of the approach. We mentioned that there were three processes written into the project document. These were *evaluation* of ISWC, the *development* of these systems and then the *dissemination* of the improved techniques. We can add another item to that list - one which is perhaps obvious - and that is *identification* of the area, the people and the ISWC systems themselves. Figure 4 shows how these processes were designed to link up and 'flow into' each other.

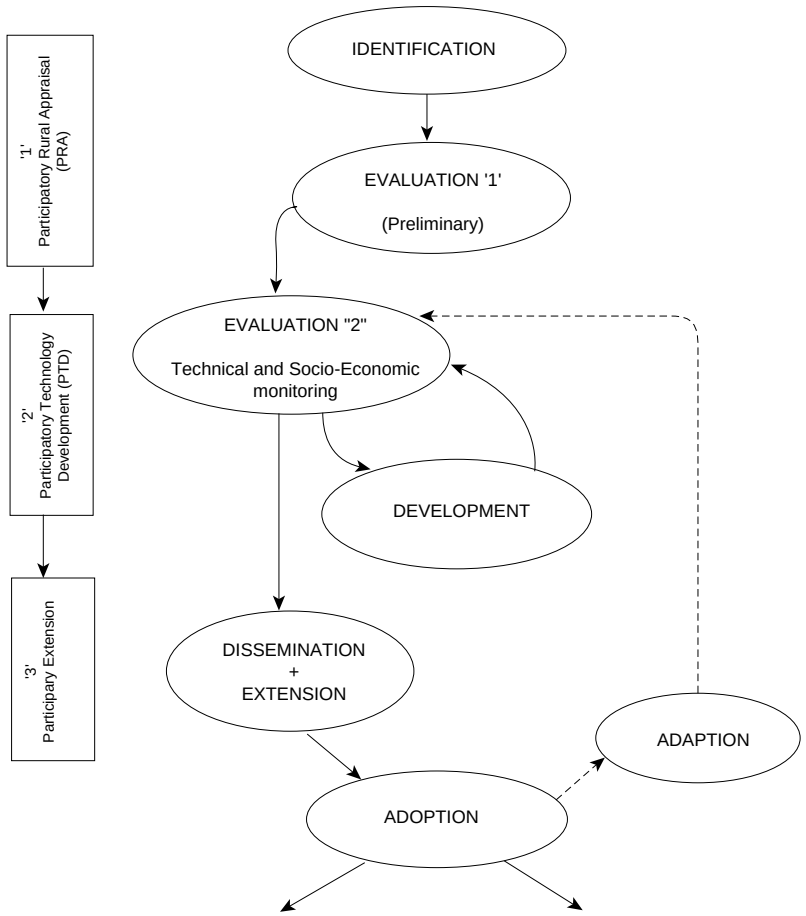


Figure 4: *Participatory research and development process*

Now let us talk more about each of these processes, because the actual methodology used is - we believe - one of its most interesting aspects. *This basic methodology can be used by other projects that want to involve people in the processes of research, development and dissemination.* We will also outline the main activities that took place under each of these processes.

Identification

Identification is, as we have seen, the starting point for such a project. The process of identification must of course start before a proposal is drawn up, and therefore it is usually an 'outsider' exercise to begin with. Obviously, it was important in our project to find an area where there was evidence of a good range of traditional SWC practices and at the same time, local people who were willing to cooperate. There would have been no point, in a pilot project like this, choosing a difficult area to work in. We must not forget either that local collaborating partners needed to be identified. In such a project, the main coordinating agent will usually be the Ministry of Agriculture (this should make it easier to 'institutionalise' the project) Then we have to ask: which is the most suitable research agency to collaborate with?...and are there willing colleges or universities or NGOs? Under CWSSE the local partners were:

- the Soil and Water Conservation Section of the Ministry of Agriculture, Animal Industries and Fisheries
- the District Office of the MAAIF
- Makerere University
- Kawanda Agricultural Research Institute.

The overseas partners were:

- Silsoe Research Institute, UK
- Centre for Development Cooperation Services, Vrije Universiteit, Amsterdam, Netherlands.

The next step is the identification of the individuals with whom to work directly. That was achieved in the Kamwezi project, through the PRA, as we will see under the next heading.

Evaluation (1)

For the sake of convenience we will divide the 'evaluation' into the two rather different processes that took place under this one umbrella term. Let's call the first part *Evaluation (1).* This comprised the PRA - or 'participatory learning exercise' - as we agreed it should be named. We have already talked about how this was conducted, and have

looked at the main results of the exercise. Its purpose was to rapidly pick up a broad span of information about the area - based on what the people themselves knew and felt. Such an approach helps build up a relationship with the local people.

After collecting general information - including data from written reports and records - the PRA team looked more closely at local ISWC practices. The team then identified which of these systems the people felt were priorities for study and improvement. From the overall list, trash lines and banana mulching were selected. Finally, this PRA helped us to identify the 8 farmers (5 men and 3 women) who were ready and willing to work with the project and who became our first group of farmer-researchers.

Evaluation (2)

This was the 'heart' of the evaluation as planned in the project document. An alternative term to describe this process is 'validation', in other words, measuring the value or merit of a technique. This consisted of the scientific *monitoring* of the two chosen ISWC systems: trash lines and banana mulching. It also included the continuous process of recording socio-economic data collected by the participating farmers themselves. Various trials were set up on farmers' fields to monitor what happened (to crops and the soil especially) under certain variations of these two local practices. More detail is given about these trials in the next section. The farmer-researchers were involved in all aspects of the implementation of the trials, and kept records themselves, on weekly labour, expenditure, income and rainfall. They also were involved in *evaluation* of the results. However, it is true that, in the first phase, the researchers played the main role in the design, monitoring and analysis. That is changing under the current phase of the project, which began in 1998. Now there is more emphasis placed on farmer-designed trials, and the use of 'farmer measurable indicators' for them to monitor what happens.

Development

The development process was intended to 'add extra value' to the local technologies. This process is often called 'participatory technology development' (PTD) - where local resource users are fully involved as partners in the process. The main routes that can lead to development of practices are:

- *identifying the best existing local practices and learning from these*
- *stimulating farmers to come up with innovations and modifications*
- *seeking improved alternative practices in other areas through study tours*
- *testing ideas based on outsiders' knowledge of other areas.*

In practice the project has achieved most development through the third path: exposing farmers to ideas from elsewhere, especially through study tours. The current phase of the project is putting more emphasis currently on development.

Dissemination

Now we move into the territory of extension workers: *dissemination* is the spreading of the knowledge gathered in the stages leading up to this. What were the innovative ways of doing this? Well, the basic principle adopted was that farmers themselves can 'spread the knowledge' to their comrades - and not just rely on the MAAIF extension agents. The simplest way that this can be done (and the one we have the most experience with) is holding field days on the farms of the farmer-researchers. There, they can describe to their fellow farmers, in terms they can understand, what they are testing in their fields, and what has proved successful for them. This spreads knowledge very effectively and persuasively, and it gives a 'buzz' of satisfaction to the network farmer too. Secondly, the farmer-researchers can visit other farmers, together with the extension agent, and spread knowledge. That is something that we have not done yet - but it will come soon. There is still a lot to do in terms of dissemination, and this will be a major activity in the next few years.

At the end of this booklet we set out the '10 steps' that can guide a programme through these methodological stages - in Figure 5.

6 The on-farm trials

We have already talked about the on-farm trials that were carried out in phase one of the project: there were two ISWC systems studied - trash lines and banana mulching - and 4 farmers helped study each system on their farms. These 8 farmers were selected partly through the PRA, and partly afterwards as not all the initial selection wanted to continue. One woman dropped out, for example, because her husband said it would be too much of a burden on their family. The main selection criteria were interest and dedication. The farmers chosen were also selected so that they represented various 'wealth categories'. Of course it was necessary that the farmers were also practicing the system that was to be tested. These eight - the 5 men and the 3 women - became known as the farmer network: not only were they farmer-researchers, but they also created the first farmer group under the project.

The trial designs were a result of interaction between the researchers, the farmers and, to a lesser extent, the field agents in the area. Although the trials were participatory - involving these different partners - the project did not take the attitude that everything had to be decided and done by the farmers. They did not want that themselves. The aim of the trials was to *jointly* evaluate the impact of variations of the existing traditions. So, performance indicators for each of the two systems were decided together on the basis of the question: '*what can we easily measure that gives us valuable information*'? Some monitoring was to be done by the farmers themselves, and some by the researchers. Furthermore, general household and farm socio-economic data was to be collected, covering labour, expenditure, farm inputs, yields and income. Each farmer also recorded rainfall at home. As we will see later, this socio-economic data collection (more simply: 'farm record keeping') was one of the aspects of the project that the participating farmers liked the best.

Let us look at the two on-farm trials - trash lines and banana mulching - and also briefly review a participatory study conducted by an outside researcher on organic matter.

Trash lines

Trash lines were selected by the people for on-farm trials, because of their great importance on the hillside fields where crops are grown. Trash lines are, effectively, '*mobile compost strips*' - and this came as a surprise to the outside research team. It is common practice in parts of Africa to use trash lines as the basis for more permanent

terrace bunds, building them up every year. However, in this part of Uganda, trash lines are built along the contour (more or less), about 60 cm wide and 35-45 cm high, then kept in place for 2 or 3 seasons before being dug into the soil as compost. They are looked upon as a measure to build up soil fertility, and not simply to slow runoff and stop erosion. The local farmers like trash lines, but also recognise certain disadvantages. The trash has alternative uses (for mulching bananas in particular), and trash lines tend to hide rats, and can act as 'pools' of weed seeds.

Each of the 4 farmers involved in the trash line trials selected, with the research team, a representative TL to be monitored. Three transects, from above to below the TLs were marked out for the biophysical evaluation. There were 7 sampling points on each transect.

The following were measured:

- *soil fertility* (by researchers, taking samples to the laboratory)
- *soil moisture sampling* (by researchers, using 'Delta T Theta probe')
- *soil water infiltration* (by researchers, using infiltrometers)
- *soil erosion and deposition* (by reseachers with farmers, using a simple horizontal beam with vertical 'droppers' - and also using surveying levels)
- *decomposition rates of various trash line materials* (by researchers, using plastic mesh litter bags)
- *crop performance* (by farmers with field agent, using a quadrant and counting plant numbers as well as yield)
- *labour and material input* (by farmers).

Now, a summary of the most important results from the 3 seasons (November 1995-May 1996):

- during season 2 and 3, organic matter levels were higher under the TLs than the surrounding soil
- in dry conditions, soil water built up above the TLs, and soil water retention was highest upslope, downslope and underneath the TL
- plant performance is best immediately above the TLs
- establishment costs (to construct TLs) range from 20-50 person days per hectare depending on the size of the TLs (spacing is usually constant at 15 metres)
- grass and weed materials decompose rapidly. Bean stover is the next most rapid, and sorghum stover is the slowest to breakdown.

Conclusions from these trials were developed from technical analysis of the data as well as through reviewing results with the farmers. They were not unexpected. The main finding confirmed, as was expected, that trash lines are good for the land in a

variety of ways. But these benefits were shown to occur only slowly, over a number of seasons. The main recommendations therefore were:

- TLs should be left in one place for between 3 and 4 seasons to gain the most benefit from them, rather than be destroyed after 2 seasons as is common local practice
- it is better to build closer and smaller TLs, rather than few, larger ones because of the beneficial 'localised effect' of TLs
- an alternative is to leave trash lines in one place to form permanent barriers.

Banana mulching

Because the local farmers place such a high priority on production of bananas - mainly for production of their staple food matooke - they try everything possible to keep the plants productive in what is a relatively dry area for bananas. Harvesting water from roadsides is common practice, but so is mulching. At its simplest, mulching is done by chopping up banana trash - that is leaves and stems - when a bunch of bananas is harvested, and then laying these on the ground beneath the bananas. However, most people also use crop residues to mulch. These include the stover (stems and leaves) from harvested sorghum and beans. Others cut grass, or bring weeds from the annual fields to use for mulch. Even the dried roots of creeping grasses are used, effectively turning an enemy into a friend. The amount of mulch applied a year can be as high as 40 tonnes (fresh weight) per hectare.

Four farmers participated in the banana mulching trials. Four types of mulching materials were compared. These were:

- mixed mulch (the normal local practice: a mixture of bean and sorghum stover with banana trash)
- bean stover alone
- sorghum stover alone
- banana trash (leaves and pseudostems) alone.

Low (10-20 t per ha), medium (20-30 t per ha) and high (30-40 t per ha) mulching rates were used.

The following were measured under the trial:

- *soil fertility* (by researchers, taking samples to the laboratory)
- *soil moisture sampling* (by researchers using a 'Delta T Theta probe')
- *crop performance* (yields weighed by the farmers with spring balances)
- *mulch material decomposition rate* (by researchers weighing mulch enclosed in 'litter bags')

- *pest and diseases* (by researchers from the Uganda national banana programme at Kawanda).

Now, a summary of the most important results from the trials:

- mulch application rate had a significant effect on yields for all mulch materials used
- mulching with banana trash alone gave the best returns to labour
- there was no significant change in soil fertility between the start and the end of the study period
- the slowest mulch materials to decompose were sorghum and bean stover.

The main conclusion from the trial was to confirm the importance of mulching as a conservation practice. The mulch ensures that whatever nutrient losses take place by removing harvested bananas, these are replaced by the nutrient-rich mulch. It was an important finding that the *amount* of mulch was more important than the *type* of mulch in improving performance of the bananas. This was as a result of its impact on keeping moisture in the soil. The main recommendations therefore were that the traditional mulching system could be improved by:

- using high levels of mulch (30-40 tonnes per ha per year)
- planting alternative sources of organic material (for example, grass strips and woody hedgerows) to provide this mulch thereby reducing the amount of mulch material that needs to be brought from the hillsides.

Organic materials

It soon became clear that the whole farming system in Kamwezi was directly affected and influenced by the availability and use of organic materials. Both trash lines and banana mulching (the subjects of the on-farm trials) depend on organic materials - weeds, stover from harvested crops, stems and leaves of bananas, compost and so forth. Because of the huge importance of organic materials in the system, it was decided to carry out a study to look at how much organic material is produced, where it is used and where it is lost. This study used a mixture of sources to collect data. Much came from gathering estimates from farmers through 'semi-structured interviews', as well as making certain measurements and taking information from relevant literature. The results are important not just to Kamwezi, but many other areas in tropical Africa,

where a declining soil fertility is a problem. The conclusions and recommendations (which support those from the banana mulching trial) can be simplified as follows:

- there is a considerable net loss of organic materials from hillside crop fields every year: this is mainly a result of the harvest being removed and the stover (the crop wastes) being taken to the banana plantations for mulching
- although there is an even balance in the banana plantations, the loss (of bananas removed) is only made up for by the inputs from the hillside fields
- there is clearly a continuous decline in hillside field fertility resulting from materials removed and not being replaced. This will not only lead to lower annual crop yields, but to reduced materials for banana mulching also, which will in turn threaten the fertility status of the banana plantations in the valleys
- unless alternatives are found, the sustainability of the whole farming system is under threat
- the organic matter 'pool' could be improved by several means: these include
    - planting improved hedgerow species to use for mulch (for example, *Tithonia diversifolia*)
    - enrichment planting of legumes in fallowed land (for example, with *Sesbania*)
    - better compost and household waste management
    - planting of grass and leguminous fodder trees for stall-fed livestock
    - stopping the burning of dry season pasture on the hilltops.

Note: all these trials are reported in full in various project reports: please see bibliography.

7 Achievements: 1995 to mid 1998

As we write this booklet, the project continues to expand and increase its impact. A second phase started in 1998 under a new name - 'ISWC-Uganda' - and a new sponsor, the Dutch Government. But let us look first at what the project has achieved up to mid 1998. In addition to the original PRA exercise, the trials carried out and recommendations that resulted, the project can look back on a variety of other activities and achievements. Let us summarize these below:

- There are now 4 networks of 8 farmers each (now called 'farmer-researchers / farmer innovators') that the project works with: this includes an extra network in Kamwezi, and one network each in Bukinda and Bubale. Of the 32 farmers, 11 are women.

- A second PRA exercise was carried out - in Bubale sub-county - during 1998.

- Several training sessions covering SWC practices have been held by the field extension workers together with the farmers: neighbouring farmers were invited also. The topics covered were:

    - the use of 'A' frames
    - infiltration ditches
    - agroforestry tree planting
    - cultural control of banana weevils
    - improved trash line management
    - better compost making

- Five study tours have been undertaken by the network farmer: to the USCAPP project at Mbarara, to the nearby ICRAF station, to Masaka District and to the 'Promoting Farmer Innovation' project in Soroti, Kumi and Katakwi Districts, and most recently to Bushenyi District.

- Participatory evaluations of banana mulching and trash line trials have taken place.

- In June 1997, there was a meeting of the FRs which considered the interim results of the research to date, and generated a variety of ideas for future trials.

- In July 1997, there was a participatory evaluation of the on-farm research methodology.

- The training sessions, tours and general assistance from the project team has led to measurable impacts on the practices of the FRs - and indeed on other farmers as well:

  - Thirty four rainwater harvesting infiltration ditches have been constructed (without outside assistance) by 15 local farmers

  - Two farmers are trying zero grazing with goats

  - Multipurpose trees have been planted by 12 farmers

  - Several farmers have planted 'new grass' species for bund stabilization / plantation hedges / fodder

  - Five farmers have adopted improved composting techniques

  - Several farmers have improved their general banana husbandry by using more mulch…. but few have yet planted more plants and trees to provide an extra supply of mulch.

- From the establishment of one demonstration stone line, three farmers have tried the practice voluntarily.

- The project area has been adopted as a demonstration location by the District Agricultural Office.

- The project has hosted visitors from various districts in Uganda as well as from Kenya.

- There have been two regional project workshops (May 1996 in Nyeri, Kenya, and January 1998 in Kabale, Uganda) where the Uganda programme has been discussed alongside its Kenyan and Tanzanian counterparts.

- Proceedings of these two workshops have been produced and a final comprehensive report covering the ODA-funded / SRI-managed first phase of the programme completed for each of the 3 countries *(see bibliography for details).*

There are plans to carry out a fuller impact assessment of what effect the project has had on local farmers during 1999. We will focus especially on adoption of improved land husbandry measures, and what benefits they have given to the farmers who have taken up these practices.

8 What has been learned from the project's experience?

As we have noted in the previous sections, the project has made a good deal of progress in its efforts to build on local practices of land husbandry - by trying to understand what goes on, and working with local farmers to develop these practices. A number of technical issues have been described, as well as the results of trials. Now it is time to stand back and answer the question *'what have we learned from the approach of the project'?* Here is a summary of the main, broadest lessons, not just from Uganda, but also from CWSSE's work in Kenya and Tanzania:

Traditions of soil and water conservation

- There are indeed very rich traditions of soil and water conservation in this area (as we have also found in the locations studied in Kenya and Tanzania): this wealth of local knowledge and practices has surprised the project staff.

- As we had thought, there have previously been few in-depth investigations into such local traditions in Uganda or the other two countries; until now researchers have tended to describe traditions in a superficial way.

- Farmers have a real interest in soil and water conservation, but this is almost always linked to production (not just conservation for its own sake). And these farmers are often *innovative* - constantly trying and testing new ideas.

- Farmers often notice multiple benefits from their conservation systems. They talk of conservation of water, soil and fertility. We need to remember this when improvements are under development.

- The term 'local' (*local* knowledge, *local* conservation systems and so on) may be a better word than 'indigenous'. 'Local' includes both ancient tradition, modifications to introduced measures and recent innovation, all of which are equally important and relevant to projects such as this one.

- While ISWC is generally effective in many different ways, *it is not enough on its own to sustain soil fertility*. Current levels of production cannot therefore be maintained in the long run unless further improvements are made to the system and some outside inputs (in other words fertilizers) are introduced.

On-farm trials

- Under the project, on-farm trials have formed a framework and a focal point for the farmer network: their benefit has been as important *indirectly* through stimulating the farmer network as in providing specific technical results.

- Through the trials it has been possible to 'validate' two local systems (trash lines and banana mulching) and it has been further possible to develop improvements and recommendations for each.

- One of the most valuable aspects of the trials, according to the farmers involved, has been learning how to keep farm records, and understanding what the data collected means to them.

- Future on-farms trials should be monitored more on the basis of 'farmer measurable indicators', thereby relying less on factors that can only be measured by scientists, with complex instruments or procedures.

Participation of farmers and other stakeholders

- During the first phase of the project, up to the end of 1997, participation of farmers in project activities in Uganda has been a positive factor. Their enthusiasm and commitment has driven the project forwards. But there has been more of a *partnership* between the various stakeholders than a full delegation of decision making to farmers. Generally a good balance has been struck, but there is still room for further involvement of farmers in all stages of the project.

- Local extension staff can be 'empowered' through such a project by being given a stimulating and interesting role. They can and should be fully brought into the overall partnership.

- Farmer networks (8 farmers is a good number) can be a useful tool to help achieve various goals. But we must be careful that these groups do not become too exclusive, otherwise other farmers will feel neglected and marginalised.

- Although being a member of one of these networks is a reward in itself (with study tours, and so on) farmers may need help with trial inputs and some sort of 'compensation' for time lost if they are asked to attend regular meetings. This can be particularly important if we want to ensure that women attend. But, as always, we have to watch out for the ever-present danger of an 'incentive' becoming an attraction in itself.

- A gender (and age) balance can be achieved, more or less, in farmer networks - but we should be careful not to put unfair pressure on women to join when there is opposition from home.

- One aspect that could be improved is reporting back to farmers and field workers: plenty of scientific reports have been produced, and these need translating into documents that can be understood also by extension workers and farmers *and that is the main reason for this booklet*.

Methodology

- The methodological processes (as shown in Figure 4) have proved to be not as 'neat and tidy' as they appear on paper. That is not necessarily a bad thing: we should not always attempt to develop blueprint methodology, but instead let methodology evolve as a dynamic process through interaction between farmers, extension agents and researchers.

- It is clear that an overall broad network of contacts and stakeholders (international, regional, local; at all levels and in various disciplines) is a valuable help to such a project. Regional links permit sharing of ideas, both technical and methodological.

- 'Building on tradition' is only one of several possible starting points for improvements to systems: stimulating farmer innovation and study tours to other areas can be equally important parts of an overall program.

- This approach is dependent on *time* (it can not be hurried) and *people* (commitment, sensitivity and dedication are required).

9 The future: where do we go now?

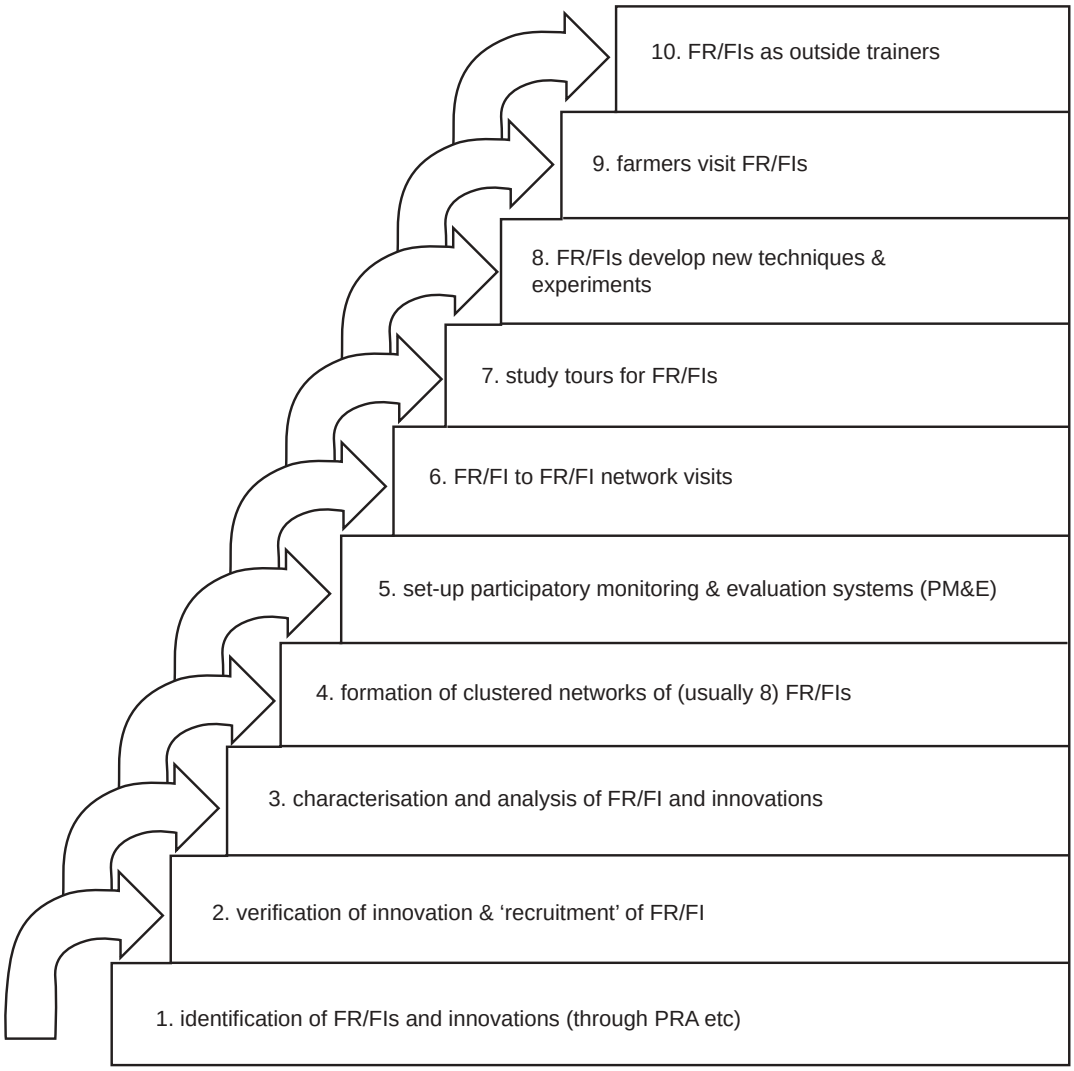
As we have noted, the Uganda part of the overall regional project has been most fortunate to receive phase two funding through the Dutch Government under a 7-country programme in Africa called 'Indigenous Soil and Water Conservation, Phase 2' (ISWC 2)[4]. This then gives the project the chance to continue further into its development and dissemination stages, as well as to expand in area and farmer coverage. The new umbrella ISWC programme does not mean that we have to change our original approach - other than encouraging more emphasis on farmer innovation (rather than just 'tradition') and emphasizing farmer monitoring and evaluation as much as possible. This is the direction that the project is taking. We will therefore concentrate more on farmer innovators (we now talk about 'farmer-researchers / farmer innovators' FR / FIs) to form the networks - in other words farmers who are actively trying and testing new ideas themselves. Working through innovators helps us to 'fast-track' the development of technology. This will help us in the development of new technologies. Many of these farmers are already developing them so why not make use of their skills and ideas?

Looking at it another way, the experience we have gained with methodology is a great help to the new programme, ISWC-Uganda: there is much for the other 6 countries to learn from 4 years of experience in Uganda - and in Kenya and Tanzania as well.

It has already been pointed out that we have expanded from one network of 8 farmers to 4 networks with approximately one third of members being women. And it has grown from one sub-county to three. It is certainly time for the approach to be tested more widely in Kabale District. But as expansion takes place, we need to state more clearly the steps that should be taken in each case to activate the project. Starting with a foundation stone of a PRA - which will be necessary when we move into a new area that we need to know basic information about - there are 10 steps that take us through the whole methodological process. We have developed these 10 steps together with our partner 'Promoting Farmer Innovation'[5]. The steps are shown here in Figure 5.

[4] A partial continuation of the Tanzanian component is also receiving support under the same programme (ISWC 2) ISWC is coordinated by CDCS which leads a consortium of other partners.

[5] Promoting Farmer Innovation (PFI) is working in Uganda (Soroti, Katakui and Kumi Districts) as well as in Kenya and Tanzania. It is funded by the Dutch Government, supported through UNSO / UNDP with backstopping from CDCS, Vrije Universiteit Amsterdam. In Uganda it is executed by the Ministry of Economic Planning, and implemented by the MAAIF- Soil and Water Conservation Section.



FR/FIs = Farmer-Researchers/Farmer Innovators
PRA = Participatory Rural Appraisal
PM&E = Participatory Monitoring and Evaluation

Figure 5: *Ten steps in harnessing farmer innovation*

Now for some explanation of each step:

Step 1 is the identification of farmer-researchers/farmer innovators (FR/FIs). Here we are looking for innovations or for special traditional practices. We must be careful that we trace an innovation back to its roots, in other words we should always try to find the original innovator. Identification can be achieved through a process of PRA, or more simply by starting with what extension staff and local contacts know already, and then following up this process. A sister project (under the ISWC 2 programme) in Ethiopia has even used a competition to attract new innovators.

Step 2 is the process of verification - that is confirming that the innovation (or tradition) is genuine and important. Sometimes field agents find an 'innovation' which is not really one at all. This step also includes recruitment: it is essential to make sure that the innovator (the FR/FI) really *wishes* to join a network, and take part in all the activities that it entails. He or she may not want to be 'recruited'.

Step 3 follows the recruitment in step 2. This is characterization of the FR/FIs and innovations. It means recording certain, basic information about the person and the technology at the start. It could be called a 'snapshot' of information. The forms that we use for this are shown in annex two. This characterization is followed by an analysis of this data, which should help to answer questions such as: '*what type of person is an innovator and why do they test and try new systems?* and *what sorts of innovations are there and where have the ideas come from?'*

Step 4 consists of the creation of farmer networks, from farmers who live close together (in 'clusters'). From experience its best to have about 8 (maximum) in a group, which means the whole group can easily meet in a small room, and can also fit into a vehicle for study tours. Each network should be as balanced as possible in terms of men and women, and the young and older members.

Step 5 involves setting up a participatory monitoring and evaluation (PM&E) system, with discussions between partners (farmers, researchers, extension workers) about who measures what. Remember we are looking for more emphasis on 'farmer measurable indicators'. Labour and other inputs, yields, rainfall and runoff events can, for example be monitored by the farmer; change in soil fertility is an example of something that needs to be measured by the researcher with special equipment. Evaluations are carried out *jointly* by farmers, extensionists and researchers. Please see annex three for some more detail about PM&E.

Dan Miiro: the project car has a new logo for the second phase

Richard of Network A demonstrates banana mulching to a visiting group of farmer innovators from the PFI project in eastern Uganda

Tarcisio (with hat) is a new 'recruit' of Network B: he is improving his composting method with advice from Shem

A roadside hedge of vetiver grass in Kamwezi was copied from one seen on a study tour to Mbarara

Felix (centre) is experimenting with mulching cabbages in Bubale

Jovia is a member of one of the new networks - Network C: she improves pasture and upgrades cows for milk production

Jovia also grows a fodder block of leguminous trees and grasses for her cattle

One of the innovations found under the second phase: Guatemala grass used to stabilise a gully

Evas and James travelled to Soroti in eastern Uganda for an exchange visit to the PFI project: they learned much - as well as making suggestions on better banana management

James standing in his newly constructed infiltration ditch: one of the most widely adopted techniques under the project

Lilian of Network B: not only innovative, but is always ready to try out new ideas

Step 6 is when FR/FI to FR/FI cross-visits begin - first between FR/FIs within the same network, and then visits between FR/FIs in different networks. This is the process of getting to know what others are doing, and sharing ideas.

Step 7 takes the visits one stage further. Study tours for each network are now carried out. This means taking the whole network (or sometime representatives from several networks) outside the area to visit other farmers, or research stations and so on. There will also be other farmers from outside visiting the area - a process that has already begun.

Step 8 hopefully the study tours (and of course the network visits as well) will stimulate the adoption and further development of new techniques. Ideally FR/FIs will then expand their range of experiments, and these will again be monitored through the PM&E processes described in step 5.

Step 9 sees the beginning of the dissemination process. When we have a technique that can be recommended to other farmers, these farmers can be brought to the farm of that innovator to learn from what they see. The extensionist should help facilitate this training or 'field day'.

Step 10 then involves using the farmers to go out to spread messages with the extensionists. Farmer innovators act as outside trainers. Farmers often learn best from their own colleagues. In both dissemination steps (9 and 10) the extensionist has a key role to play as facilitator and organizer.

Do not let us make the sequence of the steps too strict - there will be movement up and down, and not always following the same order. Some project facilitators might wish to make a start with the PM&E that we have put down for Step 5, before they set up farmer networks (Step 4). 'Technological variations' might turn up well before study tours take place, and so on. There is no strict order, and there are repetitions of various stages .

It may be interesting to look back at the methodology section and compare these steps with the broad processes that we have already described. Where do they fit it? Here is a quick summary that shows the basic sequence has been maintained:

Evaluation (1)…….....steps 1 and 2
Evaluation (2) *(validation)*……..... steps 3, 4 and 5
Development *(value addition)*……..... steps 6, 7 and 8
Dissemination……... steps 9 and 10

Note that the original 'identification' process referred to selection of a suitable location for activities: the 10 steps take place once that location has been confirmed.

Phase two is now well underway, and the 4 farmer networks are thriving. There are many interesting systems that have been brought under the project for testing and improving. Of special interest will be those systems which cover soil fertility improvement, namely composting and manuring. There are also some intensive livestock-based systems: and this type of production method is probably a very promising direction for the future. Here is a list (overleaf) of the network members and the systems (innovations, traditions and modified introductions) being tested and developed by each.

Table 3: Current Networks of Farmer-Researchers/Farmer Innovators

NETWORK	NAME	INNOVATION/TRADITION (Main type)
A (Kamwezi)	Mr. Azaria Mutazindwa	Trash lines
	Mrs. Josylen Turyamureeba	Trash lines, stone lines
	Mrs. Annah Katureebe	Trash lines
	Mrs. Evas Gakyalo	Trash lines, manure management
	Mr. James Bitarabeho	Banana mulching, zero grazing, water harvesting
	Mr. Charles Patana	Banana mulching, water harvesting
	Mr. Richard Tibikwese	Banana mulching, water harvesting
	Mr. Labson Nkurunungi	Banana mulching
B (Kamwezi)	Mr. Clinerio Muzanira	Bund stabilization, compost management
	Mrs. Jenifer Katama	Water harvesting from road
	Mr. Tarcisio Keinamura	Tree nursery with banana fibre pots, f-juu terraces
	Mrs. Jovia Kagonyera	Water harvesting/f-juu terraces, manure management
	Mrs. Lilian Besimbire	Mulching, water harvesting, manure management
	Mr. Edison Tuhame	Gully control with *Guatemala* grass
	Mr. George Rutembesa	Agroforestry
	Mr. Stephen Tibari	F-juu trenches in bananas, stabilized with grass
C (Bukinda)	Mrs. Jovia Katariha	Manure management, agroforestry for fodder
	Mr. Peter Munyakazi	Stone lines, manure management
	Mr. Fabiano Tigakanya	Water harvesting, manure management
	Mr. Ferestian Bujara	F-chini terraces, manure management
	Mr. Pokuma Balekye	Fish pond, f-chini terraces
	Mrs. Kajuna	Agroforestry, water harvesting
	Mrs. Carolin Kabwega	Agroforestry
	Mr. Franco Karwemera	Manure management, agroforestry, water harvesting
D (Bubale)	Mr. John Nyongozi	Manure management
	Mrs. Eseri Komunda	Rooftop/compound water harvesting, agroforestry
	Mr. John Nkurunziza	Zero grazing
	Mrs. Leya Rwabubweme	Manure management, seed collection of fodder trees
	Mr. Felix Byaruhanga	Compost management, mulching of vegetables
	Mr. Calist Habimaana	Terrace bunds stabilized with napier grass
	Mr. Benon Twebaze	Compost management
	Mr. George Kabwiso	Manure management

Notes: 1. F-juu = Fanya-juu: contour terrace with ditch below the bund
2. F-chini = Fanya-chini: contour terrace with ditch above the bund
3. Terms like manure management and agroforestry include a number of different techniques

10 A final word

We believe that the approach described in this booklet deserves to be adopted more widely in Uganda, and that it can also be taken up by projects and programmes in other countries. Fortunately, because the project is working through the Ministry of Agriculture, it will be easier to try to institutionalise the process. There are sister projects under the MAAIF ('Promoting Farmer Innovation' in Soroti, Kumi and Katakwi, and the Uganda Soil Conservation and Agroforestry Pilot Project 'USCAPP' in Mbarara) and we share a common philosophy. If such an approach is left to projects alone, then it will live and die with those projects. That is the reason why it needs to be adopted as a *process*.

But we must at the same time build on our early success in phase one, and then show that the approach deserves to be taken up more widely. This will be through impact assessment. Impact assessment means more than just reporting results of trials and monitoring what happened when. It means putting figures on real achievements, in terms of local farmers. The question we need to answer is basically: who has benefited and in what ways? As noted before, an impact assessment exercise is planned for 1999 when a series of questions will be asked and data collected to gauge the impact of CWSSE/ISWC-Uganda so far. To what extent has the project helped the people produce food and cash crops in a more sustainable way? The indications, and our hopes, are that the project will have helped people *directly* by adopting improved systems, but also *indirectly* through helping them to become more innovative.

Looking for local knowledge and creativity - and building development on that - is something that can be useful in many development fields. We should look more seriously at what the rural people can tell us, and then be prepared to work in partnership with them through research to development and finally on to spreading knowledge.

Annex 1: The Kenya and Tanzanian sub-projects of CWSSE

'Conserve water to save soil and the environment' (1994-1998) was an East African regional project, with sub-projects in Kenya and Tanzania as well as Uganda. Here is a summary of activities in the other two countries.

Kenya

The two divisions of Gachoka and Siakago were selected for activities within Mbeere District (the former lower Embu). PRAs were carried out in each, in 1995. Both on-farm and on-station research (at Machanga Research Station) were set up, covering both technical and socio-economic aspects. On-farm trials evaluated some technical aspects of ISWC, focussing on the relationship between slope and spacing of structures. This was an opportunity to investigate socio-economic opportunities and constraints related to ISWC.

In this area there are several common SWC techniques. The most important are:

- Stone bunds (traditional): these are labour intensive, permanent structures which are semi-permeable at first, then they tend to silt up. They are much more common than in the Uganda sub-project.

- Trash lines (traditional): these are formed from sorghum and millet stover. They may just last for one season, or for longer. When trash is plentiful, larger, more permanent trash lines are found.

- Log lines (traditional): these are only found on newly cleared land where bush and trees have been cleared. They are made with species that are not useful for charcoal production.

- Fanya-juu terraces (introduced): Fanya-juu terraces are an introduction to the area, and in places have been promoted recently by projects.

The technical evaluation of the SWC systems (based on the research station trials) led to several conclusions. For example, where chemical fertilizers are not applied, trash lines are the most effective system for most situations. But a combination of trash lines with stone bunds or fanya-juu may be the best approach, as material to make trash lines is not always available (after a dry year with poor yields, for example).

Farmers recognise various causes of land degradation. However, their main reasons for carrying out soil and water conservation are to maintain or increase productivity of the land. The relatively better off farmers construct bigger and more labour-demanding structures. But the choice of structure depends more on what materials are locally available. For example, where there is abundant stone, farmers will tend to construct stone bunds.

See: Okoba B, Altshul H, Tengberg A, Twomlow S, Ellis-Jones J, eds. 1998. An evaluation of indigenous soil and water management systems in Mbeere District. January 1995-March 1998. Report no IDG/98/16. Silsoe Research Institute.

Tanzania

The work in Tanzania was focussed on Mbinga District in the south west of the country. This is where the well known, but little researched, 'ngoro' or `Matengo' pits are to be found. The starting point was a PRA, carried out in 1994. This was followed by a series of on-farm trials. Farmers were involved in monitoring and evaluation of these trials. The overall objective was to understand the biophysical and socio-economic strengths and weaknesses of ngoro and the other common local ISWC technique, ridges or 'matuta'. Some of the findings regarding these techniques are as follows:

- Ngoro: this is a true, ancient tradition, having been used for hundreds of years. The pits are formed in March / April when grass is slashed and lain in a matrix of squares or rectangles with side dimensions ranging from 2.0-2.5 metres. Soil is later dug from the centre of these squares - forming a pit - and thrown over the grass forming ridges on all sides. Crops are planted on the ridges of soil surrounding the pits. Throughout the year, weeds and crop debris are thrown into the pit to form compost. The project showed that erosion was low under the ngoro system, with most soil being captured in the pits. Crop yields under ngoro were found to be higher than under matuta. But as we have noted in the Uganda case, ISWC on its own is not enough to sustain the system: ngoro will need to be adapted to keep up with changing times as labour becomes less available and organic materials become more limiting.

- Matuta: these are ridges - but there are two types. The first is simple ridges of soil, the second is ridges formed on top of organic matter laid in strips on the ground. Although these can be effective when constructed carefully, gullying tends to occur when runoff waters concentrate.

The use of green manure and leguminous cover crops offer potential for the future, and already innovative farmers have started trials. A phase two of the Tanzanian

programme will look at improvements to the system - building on the work of farmer innovators - concentrating on the problem of long term productivity decline.

See: Dihenga H, Ellis-Jones J, Twomlow S, eds. 1998. An evaluation of indigenous soil and water management systems in Mbinga District, Tanzania. November 1994-March 1998. Report no IDG/98/12. Silsoe Research Institute .

Annex 2: Characterisation forms

A. Characterisation of farmer innovators

(Originally developed under the 'Promoting Farmer Innovation' programme).

1.0 PERSONAL DATA

- 1.1 Name
- 1.2 Address
- 1.3 Age
- 1.4 Sex
- 1.5 Marital status
- 1.6 Education level
- 1.7 Family size
- 1.8 Main occupation
  - in terms of time
  - in terms of income
- 1.9 Average annual income
  - cash (salary/sales and so on)
  - in kind (farm produce and so on)

2.0 BACKGROUND TO FARMER INNOVATOR

- 2.1 Size of farm
- 2.2 Size of land cultivated for crops
- 2.3 Form of land tenure
- 2.4 Crops grown: cash crops/food crops
- 2.5 Livestock kept
- 2.6 Farming system
- 2.7 General problems encountered
- 2.8 Specific problems encountered and what is the farmer doing about them?
  - soil moisture
  - soil fertility
  - soil erosion
  - water for livestock
  - water for domestic use
- 2.9 Farmer's ideas for solving outstanding problems
  - soil problems
  - water problems

B. Characterisation of innovation

(Originally developed under the 'Promoting Farmer Innovation' programme).

1.0 INNOVATION (Main)

- 1.1 Type of innovation (brief technical description)
- 1.2 When was the innovation started?
- 1.3 Where did the idea come from?
- 1.4 Status of innovation
  - 1.4.1 is it still experimental?
  - 1.4.2 is it a concluded experiment?
- 1.5 Was it:.
  - 1.5.1 a new idea?
  - 1.5.2 a modified tradition?
  - 1.5.3 an adapted recommendation?
- 1.6 Investments made so far
  - labour (family labour / hired labour)
  - money (implements / fertilizer, and so on)
- 1.7 Benefits gained so far
- 1.8 Problems experienced with the innovation and ideas for solutions
- 1.9 Spread of innovation
  - 1.9.1 how many other farmers have copied (men / women)?
  - 1.9.2 how did they find out about the innovation and when?
  - 1.9.3 how best can others copy from you?
  - 1.9.4 does anything make adoption more difficult? (labour / knowledge / experience / culture, and so on)

2.0 INNOVATION (Others)

- 2.1 Type
- 2.2 When started
- 2.3 Source of Innovation
- 2.4 Status
- 2.5 Benefits gained so far
- 2.6 Problems experienced with innovation

Eseri is one of the newly identified farmer innovators under Network D: here she shows how she harvests water from her compound

Eseri diverts the harvested runoff water into her bananas

The project advisory committee visits one of the innovators under phase two

Lilian passes on her knowledge

Annex 3: Participatory monitoring and evaluation

The following guidelines were originally prepared for the ISWC / PFI newsletter 'Farmer Innovators in Land Husbandry' issue nos. 4&5 of September 1998. They are intended to help guide participants in the programmes to develop systems suitable to their needs.

1. Introduction

Why?

We need to monitor *(measure and record details about)* and evaluate *(assess the value of)* various aspects within farmer innovator programmes for various reasons. We need to know exactly how effective the innovations are. Do they work? How much do they cost? Are they better than common practice? In this sense, PM&E is basically the process of '*validation*' of innovations. We also have to have information on other aspects of the programme regarding the farmer innovators themselves, numbers involved (in cross-visits for example) and, of course on impact in terms of adoption: this is the acid test of how effective we have been in achieving our ultimate objective. It is simply not enough to say '*we have discovered an innovation and it works*. We need numbers to prove it. One more point is worth noting. Experience shows that farmers *enjoy* being involved in PM&E, and that they gain considerable insight from it.

Who designs the PM&E systems?

Simply put, PM&E should be (as its name suggests) a participatory process with inputs from all stakeholders.

What do we monitor and evaluate?

We are interested in some technical and socio-economically related aspects of innovations, and participatory evaluation of the innovations by other farmers. Some data regarding the farmer innovators is also obviously required. Furthermore, we are interested in data about the cross-visits (all the different types) that take place. Of course other aspects of the programme have to be recorded as well - such as finances, personnel input and vehicle movements - but these are rather different matters and are usually recorded by project staff.

How?

Let us just say: *by 'recording simple information as simply as we can, and through participatory methods wherever possible'*.

When?

Throughout! PM&E is an on-going process and should be part of the regular programme activities.

By whom?

By a variety of actors: the farmers themselves must be heavily involved through monitoring of 'farmer measurable indicators'; farmers again will evaluate innovations and cross visits; the field agents will look at numbers participating in cross visits and, crucially, it will be their job to follow up on adoption rates. Researchers will look at certain specific parameters - both technical and socio-economic.

What do we need in terms of equipment and training?

- Training is very important - especially if we are asking farmers (and field agents) to measure things with equipment that they are not used to. It's easy to make simple errors if we do not practice first. And we have to ensure consistency. So some training will always be required in measuring and keeping records. Training will often be necessary too in the methodology of participatory evaluation - how to carry out SWOT analyses ('strengths, weaknesses, opportunities and threats'), matrix ranking and so forth.

- Equipment? The simpler the better. We are talking about measuring tapes, rain guages, spring balances, notebooks - perhaps even cameras…. Farmers will need to be trained in the use of this equipment.

2. Details of participatory monitoring and evaluation

Let us now take the three categories from '*what do we monitor and evaluate*' and see what can and should be monitored and evaluated under each category.

Farmer innovators

- *a preliminary characterisation* must be carried out. This comprises simply completing a data form. PFI uses a simple data sheet, developed at the initial planning workshop, which is basically the same for each country. This form is attached as annex two. It is completed by the *field agent* (extensionist) and is what we call 'snapshot' (or static) monitoring.

- *an analysis of the farmer innovators* then follows. This is merely the process of taking the results of the preliminary characterisation and then analyzing and discussing according to certain criteria. What are the ages of the innovators? How many are women? Where did the innovators get their ideas from? This could be the task of the national coordinator, and is a form of evaluation.

Innovations (or experiments)

- *a preliminary characterisation* must be carried out (just as for the farmer innovator). This comprises completing a simple data form. Note that technical specifications of the innovation are recorded here. A sample recording form is attached as annex two. Photographs (slides where possible) are a very valuable supplement to our 'hard data'. This characterisation is done by the *field agent.*

- *an initial analysis of the innovations* with discussion then follows. This is merely the process of taking the results of the preliminary characterisation and then analyzing according to certain criteria. What is the type/category of innovation? Where did the concepts come from? What are the most common benefits observed? This could be the task of the national coordinator, and is a form of initial snapshot evaluation - which could be followed up later.

- *collection of socio-economic data*: For the project and the farmer to know more about the innovation itself and the farm as a whole, certain simple socio-economic data need to be collected. This comprises the filling-in of forms by the farm family regarding *labour* and other *inputs* (type and weight of seeds, fertilizers and so on) and *outputs* (for example, sales - quantities and prices - and a record of consumption) for:

  (a) each farm production system if the farmer wishes, but most importantly….

(b) the system (such as fruit trees, pasture, and so on) where the innovation (for example, water harvesting or grazing management) is used, compared with….

(c) a control plot.

This is 'on-going' (or dynamic) monitoring.

- monitoring of technical parameters regarding the innovation(s): this should mainly comprise simple aspects monitored by farmers with other parameters measured by researchers - all done on-farm.

  - by the farmer (farmer measurable indicators) for example, whichever might be relevant of the following:
    - rainfall
    - number of water harvesting events
    - rate of siltation / amount of soil harvested
    - yield under innovation versus control plot
    - wilting of crop under innovation versus control plot
    - comparative milk production / weight gain of animals

  - by researchers, for example:
    - soil fertility
    - soil moisture content
    - animal health parameters

- participatory evaluation of innovations: this is where people are specifically called together - often fellow farmer innovators with some outsiders - to critically evaluate a particular innovation from their point of view. The simplest form of participatory evaluation is through a 'SWOT' analysis. But other participatory tools are also useful. These include ranking and scoring techniques. This type of evaluation is helped considerably when the farmer and researchers have data available to present to the evaluation team. Note that this differs from the 'initial analysis of innovations' mentioned earlier.

Cross-visits

Cross-visits (or 'exchange visits') here refer to any form of visits by or between farmers and farmer innovators. Each of these can be monitored and evaluated in the same basic ways. Cross-visits include:

- farmer innovator to farmer innovator visits (networking, evaluation, and others)
- farmers to farmer innovator visits (training, evaluation, and so on)

- farmer innovators to farmers (extension, and so on)
- study tours: farmers or farmer innovators making visits 'outside'.

Monitoring of cross-visits should comprise recording of the visits in terms of:

- when / where
- numbers
- names
- what did we see / discuss / demonstrate

This will normally be carried out by the field agent. The same field agent then needs to conduct *follow-up monitoring* at a certain period (for example, 3 months) after the field visit to record adoption of techniques or other impact of the visits.

Evaluation of the cross-visits should be carried out as a regular exercise after each such occasion. These do not need to be lengthy or detailed, but in principle we need to get feed-back from the participants. What did they learn? What is relevant or not relevant to them? What important messages did *they* themselves pass on in return? What extra training do they need to implement and test the technologies they have seen? These will be participatory evaluation exercises, involving the participants, and facilitated by the field agent (or whoever facilitated the cross-visits).

3. Conclusion

We hope that the following guidelines will give some help to those who are setting up PM&E systems in farmer innovator-based programmes. The emphasis is on simple indicators and the recording and evaluation carried out as much as possible by people close to the ground. Details of PM&E will depend on each situation, and we do not want to provide a strict 'blueprint' to be followed. And there are some aspects that have not yet been covered, for example, evaluation of the impact of training materials. However, there are certain basic pieces of information that we simply must have in order to 'validate' our findings. After all, we need to be able to demonstrate (for example) whether an innovation actually is an improvement on an existing system and again, we simply must have figures about farmer adoption. Without adequate monitoring and evaluation, we cannot identify strengths and weaknesses of our programme. And impact can not be assessed. Effective PM&E helps to prove what works and what does not under the farmer innovator approach.

Bibliography and References

The following are a mixture of reports on the project, as well as background reading on important and related topics.

Briggs SR, Ellis-Jones J, Twomlow SJ. 1998a: *Modern methods from traditional soil and water conservation technologies*. Proceedings of a land management workshop. White Horse Inn, Kabale, Uganda. January 1998. Unpublished report no IDG/98/10. Silsoe Research Institute, Silsoe UK.

In January, 1998, a workshop was held in Kabale to discuss the final results of the CWSSE programme in Uganda, Kenya and Tanzania. This volume is an edited collection of papers delivered at that workshop. Limited numbers are available from Silsoe Research Institute: for those in Uganda, there are copies with the DAO Kabale, and with the MAAIF-SCS at Entebbe.

Briggs SR, Critchley W, Ellis-Jones J, Miiro DH, Tumuhairwe J, Twomlow S. 1998b: *Livelihoods in Kamwezi, Kabale District, Uganda*. A final technical report from Environmental Research Project no R4913. Conserve water to save soil and the environment (1995-1998). Unpublished report no IDG/98/11. Silsoe Research Institute, Silsoe, UK.

This is the final technical report from the Uganda component of CWSSE: all of the trial results are documented here, as well as more general information about the project, the area and the methodology used. Again, limited numbers are available from Silsoe Research Institute: for those in Uganda, there are copies with the DAO Kabale, and with the MAAIF-SCS at Entebbe.

Centre for Development Cooperation Services, Vrije Universiteit Amsterdam. 1997 onwards: *Farmer Innovators in Land Husbandry* Issues 1,2,3,4,5.

This is the joint newsletter of ISWC 2 and PFI and therefore it includes regular updates on current progress of the project reported in this booklet. If you are interested in joining the mailing list, contact: Alie van der Wal (at CDCS) on fax number +31-20-4449095.

Chambers R, Pacey A, Thrupp LA, *eds*. 1989: *Farmer first: farmer innovation and agricultural research*. Intermediate Technology Publications, London.

Robert Chambers is perhaps the main guru behind the participatory approaches in rural development that became the new wisdom of the 1980s and 1990s. This paperback book looks at many of the issues that are important to CWSSE - including our new focus on farmer innovators.

Critchley W. 1991: *Looking after our land: new approaches to soil and water conservation in dryland Africa*. Oxfam, Oxford, UK.

A video and booklet of the same name which focus on success stories from Burkina Faso, Kenya and Mali, summarizes the main ingredients of success in each case. Available through the Regional Land Management Unit (RELMA) in Nairobi.

Critchley W. In press: Harnessing traditions of innovation for better land husbandry: towards a workable methodology from experience in Kabale District, Uganda.

The subject matter of this paper - which is being drafted for a conference in Bedford UK in early 1999 - is exactly that of this booklet itself. The difference is that the paper goes into more of the theoretical background to participatory research and development to give CWSSE more of a contextual basis.

Critchley W, Reij C, Willcocks T.J. 1994: Indigenous soil and water conservation: a review of the state of knowledge and prospects for building on traditions. *Land Degradation and Rehabilitation*, 5: 293-314.

This journal paper was prepared from the original review of ISWC carried out by Will Critchley in 1992. It covers the topic of ISWC in broad terms, and also gives an inventory of some of the best known examples of ISWC in Africa. There are illustrations and photographs.

Guijt I. 1998: *Participatory monitoring and impact assessment of sustainable agriculture initiatives*. SARL Discussion Paper No. 1, July 1998. IIED, London.

The topics of participatory monitoring and evaluation (PM&E) and of impact assessment (IA) are critically important to the success of projects like CWSSE. This booklet is an easy to read overview of the need for PM&E and IA, and gives guidance to how these can be carried out.

Gupta A. 1998: *Respecting, recognising and rewarding local creativity: knowledge networks for biodiversity conservation and natural resource management*. Mimeo. Indian Institute of Management, Ahmedabad, India.

Professor Anil Gupta is one of India's leading authorities on indigenous knowledge amongst the rural poor. This collection of his writings gives considerable insight not just on technical matters, but also important issues such as intellectual property rights of innovations. IIM also produce an interesting newsletter on indigenous knowledge called HONEYBEE.

Hagmann J, Chuma E, Connolly M, Murwira K. 1997: *Propelling change from the bottom-up: institutional reform in Zimbabwe*. Gatekeeper Series no 71. IIED, London, UK.

The kutaraya approach in Zimbabwe has been written about many times. Here we have a booklet studying one very important aspect that it faces now, and that is institutionalization. In other words: how can working with farmers in research for development be taken up into the government system? The lessons given in this booklet are of great relevance to CWSSE/ ISW-Uganda now.

International Fund for Agricultural Development, 1992. *Soil and water conservation in sub-Saharan Africa: towards sustainable production by the rural poor.* IFAD, Rome, Italy.

This report was prepared by the Centre for Development Cooperation Services, Vrije Universiteit Amsterdam for IFAD. It gives a broad overview of the historical and current failures and successes of SWC in sub-Saharan Africa. It is a useful reference document. Available from IFAD, Rome or CDCS/VUA (fax number: +31-20-4449095).

Miiro HD, Tumuhairwe J, Kabananukye KI, Lwakuba A, Critchley W, Ellis-Jones J, Willcocks T.J. 1995: A participatory rural appraisal (PRA) in Kamwezi sub-County, Kabale District, Uganda. Unpublished report no OD/95/13. Silsoe Research Institute, UK.

This is the PRA report produced under the project back in 1995. Many of the findings are reported here in this booklet but the report itself gives greater detail. Copies may be seen at the DAO's office Kabale, or at MAAIF-SWCS in Entebbe.

Miiro HD, Rusoke CG, Lwakuba A, Katungi EM, Turyagenda J, Critchley W. 1998: A participatory rural appraisal (PRA) in Bubale sub-County, Kabale District, Uganda. MAAIF-SWCS and CDCS-VUA. Unpublished report.

This is the recent PRA report produced under the new phase of the project as it moved into the highland and densely populated sub-Country of Bubale where conditions are different in many ways from Kamwezi and the other two sub-Counties covered under this phase. Copies may be seen at the DAO's office Kabale, or at MAAIF-SWCS in Entebbe.

Pretty JN, Guijt I, Scoones I, Thompson, J. 1995*: A trainer's guide for participatory learning and action*. IIED, London, UK.

If you need a guide on PRA (or PLA in the more general sense) then this is the book for you. It gives many practical examples and exercises as well as good theoretical sections.

Reij C, Scoones I, Toulmin C, *eds.* 1996: *Sustaining the soil. Indigenous soil and water conservation in Africa*. Earthscan, IIED, London, UK.

CWSSE has now become part of the 7-country strong Indigenous Soil and Water Conservation Phase 2 programme. The book by Chris Reij and colleagues is the result of phase one of ISWC which was a study of local SWC in more than a dozen countries in Africa. Very interesting reading, and a thoughtful introduction.

Reintjes C, Haverkort B, Waters-Bayer A, *eds*. 1992: *Farming for the future: an introduction to low-external-input and sustainable agriculture*. Macmillan, London, UK.

This is a practical guide to participatory approaches to agricultural development. It is aimed mainly at hands on project staff and fieldworkers. There are a good number of examples and experiences from the field. Easy to read and attractively laid out.

Scarborough V, Killough S, Johnson DA, Farrington J, *eds*. 1997: *Farmer-led extension. Concepts and practices*. IT Publications, London, UK.

All the latest thinking about, and experience with, extension involving farmers themselves. Examples from several continents, and conclusions about how to strengthen these processes.

van Veldhuizen L, Waters-Bayer A, Ramirez R, Johnson DA, Thompson J, *eds*. 1997a: *Farmers' research in practice: lessons from the field*. IT publications, London, UK.

Lots of good practical examples of participatory research projects in Africa and elsewhere (including the kutaraya project from Zimbabwe, which has much in common with CWSSE / ISWC-Uganda). Also a very good introduction and conclusion about the strengths and weaknesses of these projects and programmes.

van Veldhuizen L, Waters-Bayer A, de Zeeuw H. 1997b: *Developing technology with farmers: a trainer's guide for participatory learning*. Zed books, London, UK.

This is a practical manual covering participatory technology development. It is aimed especially at those who are trying to put PTD into practice in the field. This has been used as the foundation for the training given under the ISWC2 programme.

Willcocks TJ, Gichuki FN, eds. 1996: *Conserve water to save soil and the environment*. Proceedings of an East African workshop held at Nyeri, Kenya, 26-30 May 1996. Silsoe Research Institute report no IDG/96/15. Silsoe, UK.

This edited volume records the findings of CWSSE up to the halfway stage. It is based on the presentations made at the workshop held in Nyeri, Kenya. Limited numbers are available from Silsoe Research Institute: for those in Uganda, there are copies for reference with the DAO Kabale, and with the MAAIF-SCS at Entebbe.

The Swedish International Development Cooperation Agency (Sida) has supported rural development programmes in countries in Eastern Africa since the 1960s. It recognizes that conservation of soil, water and vegetation must form the basis for sustainable utilization of land and increased production of food, fuel and wood.

In January 1998, Sida inaugurated the Regional Land Management Unit (RELMA) based in Nairobi. RELMA is the successor of the Regional Soil Conservation Unit (RSCU), which had been facilitating soil conservation and agroforestry programmes in the region since 1982. RELMA's mandate is " To contribute towards improved livelihoods and enhanced food security among small-scale land users in the region", and the geographical area covered remains the same as previously, namely, Eritrea, Ethiopia, Kenya, Tanzania, Uganda and Zambia. RELMA's objective is to increase technical know-how and institutional competence in the land-management field both in Sida-supported programmes and in those carried out under the auspices of other organizations.

RELMA organizes training courses, workshops and study tours, gives technical advice, facilitates exchange of expertise, and initiates pilot activities for the development of new knowledge, techniques and approaches to practical land management.

In order to publicize the experiences gained from its activities in the region, RELMA publishes and distributes various reports, training material and a series of technical handbooks.

About this book:
'Traditions and innovation in land husbandry' relates the experience of a project in South-West Uganda which set out in 1994 to build on local practices of soil and water conservation. Though not directly supported by RELMA, it has maintained close links since its conception. The authors give an overview of the project's experiences and chart out a new course for improved land husbandry - which has its roots in what local land users know and practice, in contrast to the conventional method of bringing in predetermined 'answers' from outside. This booklet critically analyses the problems faced as well as reporting the successes. It is a fully illustrated, easy-to-read, practical guide which should be of wide interest.

ISBN 9966-896-38-4

RELMA
Regional Land Management Unit, RELMA/Sida, ICRAF Building, Gigiri, P. O. Box 63403, Nairobi, Kenya
TEL: (+254 2) 52 14 50 Ext. 3480, 52 25 75, FAX: (+254 2) 52 07 62, E-mail: relma@cgiar.org

SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY Sida