Desk study on land-use management in sub-Saharan Africa

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EXPERIENCES WITH COMMUNITY-BASED LAND-USE MANAGEMENT IN SUB-SAHARAN AFRICA

Activities and Projects Regarding Soil and Water Conservation in Sub-Saharan African Countries

Study for CTA by Dr Martina van de Sand
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WESTERN AFRICA:

In West Africa two types of erosion occur. Water erosion is reported from Burkina Faso, (Northern) Ghana, Guinea, Mali, Niger, Nigeria, Senegal and Sierra Leone, whereas wind erosion and/or mobilisation of sand dunes take place in Burkina Faso, Mali, Mauritania, Niger and Nigeria.

Burkina Faso

1. Zai-planting in Yatenga region (Ouedraogo & Kaboré 1996)

This indigenous SWC technique was re-discovered by Yacouba Sawadogo, a farmer from the village of Gourga, where a strong farmer association is engaged in erosion control. Projects like the *OXFAM*-funded Projef *Agro-Forestier* and the German-funded *Projet Agro-Ecologie* have systematically promoted the use of *zai*, and in many cases farmers have spontaneously adopted it so that'thousands of hectares have been brought back to productivity. Even in certain regions of Niger and Mali it is becoming increasingly popular.

2. Yatenga OXFAM-funded agroforestry project (Reij & Critchley 1996)

It started as an agroforestry-project in 1979 with the objective to develop water harvesting techniques. As it soon became clear that villagers were more interested in cultivating food crops, the project tested simple SWC techniques on farmers' fields and evaluated the results with the farmers. It soon became evident that with some training farmers could easily master the developed techniques, however a number of farmers, realising the usefulness of the measure (e.g. contour stone bunds), copied them even without having been trained. The project's technical package gradually became more comprehensive, e.g. by promoting *zai*, composting, enclosure of livestock, fodder banks. Other projects have adopted contour stone bunding, which has also spread to Mali and Niger as well *as* to India.

3. Central Plateau Soil Management Project (PATECORE) (SPAARIS 1997)

This project is implemented by the German Agency for Technical Co-operation *(GTZ)* in collaboration with *CIRAD*, and is funded by the German Council for Tropical and Subtropical Agricultural Research (ATSAF). It has been integrated into the Land Resource Management Project of the Ministry of Agriculture. As part of the promotion of standard SWC measures, it aims especially at the introduction of new techniques. Research emphasises the appropriateness, efficiency and benefits of the local environmental and social conditions of smallholder farming systems.

4. Community-based Natural Resource and Wildlife Management (SPAARIS 1997)

This World Bank-funded programme, implemented in Burkina Faso and CÙte d'Ivoire, is based on the 'gesfion de *terroir*' approach and is being carried out at three sites. It consists inter alia of the following components: land use planning, community land management, capacity building.

Ghana

1. Ghana Environmental Resource Management Project (Schreiber & Hill 1993)

This project was approved by the World *Bank* in 1992. Within 5 years, up to **48** rural communities were given assistance in planning and implementing measures to manage environmental resources. The primary responsibility lies with the *Ministry of Agriculture*, an interagency committee has co-ordinating functions, and NGOs are invited. Implementation involves the staff of several government agencies and the participation of local governments and NGOs, but will be primarily incumbant on the participating communities and individuals themselves.

2. Mampong Valley in Manya Krobo District (Amanor 1994)

In recent years many agroforestry projects have been implemented in Ghana by the State and NGOs. A characteristic feature of all institutions *is* the adherence to a central source or transfer-of-technology model. The *Institute of* Renewable Resources and *Forest* Research *Institute* at the University *of* Science ***and*** Technology carry out adaptive research by screening technologies advised by *IITA* and

ICRAF. Adaptive trials are carried out by *FAO-UNDP-Ministry of Agriculture (Agroforestry Unit)* on demonstration sites in all regions. These developments are disseminated to the farmers by the agricultural extension services. The most advanced agroforestry extension programmes, which include farmer-to-farmer extension, are run by NGOs such as the *Ghana Rural Reconstruction Movement* in the Mampong Valley.

3. Study on an indigenous technique in Upper East Region (Millar *et al.* 1996)
   Investment in SWC depends on available labour and security of tenure. Women in this region are widely considered to care more about SWC and repair work than men. However, the large gap between labour input, and the unlikeliness of reaping the benefit of their work, jeopardises long-term sustainability. Building up women's incentives for conservation work, by improving their rights of control over land, needs to be central to all policy intervention in this area. Moreover, a credit system for the introduction of SWC technologies, with equal access for men and women, as well as a participatory approach are lacking.

4. Upper-East Reaion Land Conservation and Smallholder Rehabilitation Proiect (IFAD-Homepage 1998)
   The objective of the project financed by the International Fund for Agricultural Development *(IFAD)* is to increase food security, halt land degradation and alleviate poverty. Results so far consist mainly in developing irrigation, creating favourable conditions for the production of crops with high market value, and the development of water users' associations. These associations, such as the *water users' association of Kamega,* have contributed to the formulation of a standard procedure for community mobilisation around rehabilitated sites.

5. BEWDA - Intearated Rural Development in North-East Region (Womankind-Homepage 1998)
   One of the objectives of this project, which is carried out by the NGO *Womankind,* is to provide women farmers and food processors with greater access to credit, which would result in more stable and reliable forms of income and help women learn how to restore their degraded land.

6. Proaramme to Support the Promotion of Grassroots-level Participatory Rural Development in Kadjebi-District (SPAARIS 1997)

This research programme is carried out by the Netherlands Development Organisation *(SNV)* and the African Centre for Human Development *(ACHD)* and is funded by the *Dutch Ministry of Foreign Affairs.* The objectives are to identify bottlenecks to local development, to develop participatory programmes, and to improve management capacity related to district development and infrastructure. A programme implementation and technical support team has been established. It is composed of representatives of SNV and ACDH, and of Ghanaian experts in data-collection, planning, credit, and financial management.

Gambia

1. Soil and water resources management unit (SPAARIS 1997)
   This project, which is funded by the US Agency for International Development *(USAID),* is carried out by the *Ministry of Agriculture and Natural Resources.* It provides for natural resources planning and institution-building, the elaboration of policies and programmes for improved soil and water management practices, and the development of technical guides and training, especially at the village level. It assists in preparing national policies for improved soil and water management practices and providing soil and water management support to the Ministry of Agriculture.

Mali

1. Proiect with indigenous SWC in Central Mali (Wedurn *et al.* 1996)

The soil and water conservation work being carried out focuses on traditional planting pits known as *zai* (see also Burkina) which have been adapted and improved to bring higher and more secure crop yields

and also to enable formerly abandoned land to be brought back into cultivation. The NGO *CARE* has been supporting this project as part of the *Agricultural Systems Project,* in partnership with the Malian Association for Action Research and Development *(AMRAD).*

2. Project with indigenous SWC on Dogon Plateau (Kassogué *et al.* 1996)
A major German-funded Agricultural Extension Project *(Projet de Vulgarisation Agricole sur le Plateau Dogon),* started in 1985, favoured some modifications of indigenous SWC techniques, mainly with respect to stone bunds and the improvement of the traditional planting pits *(zai).* The project supplied equipment to 97 villages while the *Village Reforestation Projects,* run by the *Forestry Service,* equipped *5* villages and the *National Agricultural Extension Programme* equipped 34. The *Yawakanda Experimental Erosion Control Techniques Project,* launched by the Malian NGO called *Harmonious Development in the Sahel (HDS)* brings together four partners in Bandiagara: *HDS,* the *Forestry Service, French volunteers* and the German-funded *Agricultural Extension Project.* This project is designed to harmonise interventions in the field of SWC. Training is given to a team of farmers (men and women) in each village who then train other farmers and check that SWC work is done properly. Contour stone bunds have been constructed using community labour and have received material support. There are two major constraints: labour shortage (some recommended techniques take more time than traditional practices) and land tenure. Women, even if they have no tenure rights, are active in SWC.

Niger

1. Keita Valley-Project (FAO 1990, Reij & Critchley 1996)
This integrated rural development project carried out by the *government* was started in 1984 with help from *FAO* and an *Italian trust fund.* The aim was to marry traditional production systems with new technology. The project is reputed to be a success story. It combined the use of machinery and labour and, from a technical point of view, has been very innovative, especially as concerns water harvesting techniques. However, all work was remunerated with food-for-work rations, which facilitated the mobilisation of labour for construction, but hampered the voluntary adoption of the package as well as its continuation in the post-project phase.

2. Illela/Tahoua Project (Reij & Critchley 1996, Hassan 1996)
This FAD-funded project started in 1987 with earth bund construction, deep ploughing and construction of half moons. The initial food-for-work method was soon replaced by tools-for-work and community-infrastructure-for-work so that food-for-work was provided only in cases of serious food deficit. In 1988 the project organised a field trip for a group of farmers to Burkina Faso (see Yatenga). The farmers were impressed with the successful application of the traditional planting pits method. These pits are larger versions of the *tassa* which is sometimes used in Niger, where the land users actually treated their fields without food-for-work. Upon return some farmers tried the improved *tassa* on their degraded land: the area involved rose from 3 ha in 1988 to 1,000 in 1992 and ca. 6,000 ha in 1995. For this project, besides the promotion of simple, low-cost and duplicable techniques, the *tassa* have now become the main focus. The project is unique in the sense that it has measured the impact of *tassa,* half moons and stone bunds on farmers' fields, which may be demonstration plots, but are nonetheless managed entirely by the farmers themselves. The major technical weakness of the project is lack of soil fertility and soil improvement.

3. *Programme de Conservation et Gestion des Eaux et Sols* in Niger (PGES) (Bender *et al.* 1996)
This SWISSAID-supported *ETH Zurich* research project aims at transferring new results to NGO peasant organisations and the technicians of the rural services. The programme ended in 1997, but is to be divided into two wings: research and extension. Research will continue its peasant-oriented activities through the *University of Niamey.* The extension branch will take over teaching and the supervision of NGOs, private people, and both governmental and rural leaders.

Nigeria

1. Studies on Indigenous Techniques (Reij et al. 1996)

- Small Basin Irrigation on the Jos Plateau (Pillips-Howard 1996)

This type of dry-season farming is a widespread practice in the North, and is traditionally carried out on the flood-plains. Irrigation enables farmers to produce a wide range of vegetables and thus to create income in the slack-period for rain-fed cultivation and actively contribute to market development. However, it is very labour-intensive, and there is keen competition among farmers who only share their knowledge with relatives and labourers; ethnicity remains a barrier. So it will only be possible to increase the area under irrigation if problems related to the recruitment and training of labour and the mobilisation of start-up capital can be solved.

- SWC in Maku (Igbokwe 1996)

In Maku, an agricultural community on the southern tip of a hill complex in Eastern Nigeria, hill farmers have developed an indigenous SWC system consisting of physical (stone-walled terraces) and agronomic (ridging) measures that stand out as an example of a sustainable agricultural practice. However, there are now signs of decay, abandonment and neglect in this system. This is mainly due to socio-economic and ecological factors such as pressure on the land resulting in growing land use intensity and rapid loss of vegetation. Education increases off-farm employment thereby removing the very people who have the energy to maintain and expand the system.

2. Soil Erosion under Various Crop Management Systems (SPAARIS 1997)

This research project, which is carried out by Technische *Universitaet Muenchen* in collaboration with the *International* Institute for Tropical Agriculture *(IITA)* and is funded by the German Council for Tropical *and* Subtropical Agricultural Research (ATSAF), studies the effects of various traditional and modern soil management and cropping systems on rain-impelled soil and water loss. The objective is to improve soil conservation practices and recommend improved soil and cropping systems for soil conservation.

3. The Effect of Live Mulches on the Growth and Yield of Oil Palm and Soil Conditions (SPAARIS 1997)

This research project is being carried out by the Nigerian Institute for Oil Palm in collaboration with the International Foundation for Science (IFS). Problems identified in continuous intercropping of oil palm with maize and cassava include fast depletion of soil nutrients and physical degradation of soils. The objective of the study is to develop a low-input system based on oil palms that is not only sustainable but also meets the farmers' circumstances. Emphasis is placed on intercropping the oil palm with arable crops so as to optimise land utilisation by farmers. In this context live mulches can be useful to enhance crop production compatible with oil palm.

EASTERN AFRICA

Erosion occurs extensively in Kenya and Ethiopia, where productivity impacts seem to be greatest on a countrywide basis. Uganda and Tanzania (Dodoma and Uluguru Region) are also affected. Burundi and Rwanda are uncertain about the relevance of erosion, whereas Sudan, Somalia and Djibouti see it as a minor problem.

Ethiopia

1. Integrated approach to soil conservation and agricultural productivity . This *Alemaya University/Lund University* project is sponsored by the *Swedish Agency for Research Co-operation with Developing Countries (SAREC)* in Harerge Highlands **(SPAARIS,** 1997)

Soil conservation, agricultural productivity, land degradation and agricultural productivity are considered to be interlinked, and require a multidisciplinary (natural and social sciences) research orientation as part of a common project design and conceptional framework. Beneficiaries are small-scale farmers who play an important and active role in the planning and implementation process of the research work.

2. Studies on indigenous soil and water conservation in different regions

- Harerae Highlands (Asrat *et a/.* 1996)

Harerge has been targeted by large-scale SWC programmes promoted by organisations such as ***WFP,*** *FAO* and the *Ministry of Agriculture.* These introduced structures fail to reach their goal because they have imposed simple engineering formulations, and in the long run they may disrupt the flexibility upon which farming performance in traditional systems is based.

- Goiam Highlands, a project under the *Institute of Development Studies (IUED)* and the *University of Berne* funded by *Swiss Development Co-operation (SDC)*

Study on strategies employed by farmers' households, villages, the *Soil Conservation Research Programme (SCRP)* and the *government* to achieve the goals of soil conservation: instead of the usual food-for-work programmes, as an incentive for SWC, a contribution to the social infrastructure was made: villages that helped to build conservation structures were rewarded with a clinic.

- Inventory of Indigenous SWC measures (Kr,ger *et al.* 1996)

There is a large pool of ISWC measures of which certain aspects could be incorporated into conventional approaches to improve their acceptability and appropriateness. It therefore has considerable potential for use in the development of new approaches for working with farmers. Modern measures should form a part of a broader strategy based on an in-depth understanding of prevailing farming systems and their dynamics.

- Project of Lutheran World Services (Vashee 1997)

The project, which has benefited about 225,000 rural people, evolved out of relief efforts during the 1984-1985 famine and aimed at reversing land degradation in Eastern Ethiopia. It focused on the improvement of traditional SWC techniques, and on the development of plant nurseries, afforestation, improved seeds, ploughs, fertilisers. Through the food-for-work programmes, the community became involved in "labour for construction and protection". Since water needs were of central concern to the farmers, their involvement was enthusiastic from the beginning. Use was made of local water committees which existed in traditional society to administer water development. Later on, representatives of peasant organisations were included in the consultation process. Community support also extended to the implementation of the project as well as follow up and management after completion. **A** major shortcoming was the limited number of women involved.

Kenya

1. Activities within the Machakos Project

- Machakos Intearated Development Proaramme (MIDP)

This project has sought to boost agricultural production and to raise living standards through an integrated approach that covers cropping practices, soil and water conservation, forestry and grazing management and the provision of infrastructure.

- Evaluation of economic benefits of soil conservation, carried out by *Nairobi University* and funded by the *Overseas Development Institute (ODI)*

Land degradation and soil erosion have been recognised as a serious problem in the district since 1900, and the first measures were taken around 1930. Work was carried out by the local communities under the colonial administration; the process wanned in the 1950s and 1960s but picked up again after 1975, with financial and technical support from the government and donor agencies. Despite the fact that the population multiplied five-fold over 60 years, agricultural productivity has been sustained or even increased, and the agro-ecological environment has improved. Means: improved high-yielding varieties, fertilisers, improved land husbandry including conservation measures and a radical shift in animal husbandry. The growing market system and easier access to larger urban areas has proved an important incentive for increasing production (profit mechanism, less risk to subsistence).

- *ICRAF*-Programme On-Station Research (SPAARIS 1997)

The soil conservation potential of agroforestry technologies is studied, and input data from models relating to land degradation and sustainable agriculture are generated.

- Machakos Research Project at *Kenyatta University College,* Nairobi (Kaluli & Tiffen 1992, Tiffen *et al.* 1994)

Part of a research project looking at long-term environmental change, population growth and technological change in Machakos during the years from 1930 to 1990. The interaction in SWC between the people of the district and NGOs is examined: *Semi-Arid Land Use Programme (SALU)* of the *Catholic Diocesan Development Services (CCDS),* projects undertaken by the *Church of the Province of Kenya (CPK)* and the *Utooni Self-help project.* NGOs contributed to SWC, particularly after the drought of 1984: *Institute of Cultural Affairs, Greenbelt Movement, ActionAid, World Neighbours, National Council of Christians in Kenya, Kenya Institute of organic farming.* The main activities include the promotion of conservation and organic farming, tree nurseries, gully control, water supply. They have supported community mobilisation for self help and provided financial assistance for minor rehabilitation work and the promotion of better farming.

2. Kenva National Soil Conservation Project (KNSCP) (Lundgren & Taylor 1993, Tiffen *et al.* 1994, Thompson & Pretty 1996)

This project started in 1974 with *some* funds from ***SIDA*** *to* prepare a feasible country-wide soil and water conservation programme, including the financial implication. The strategy emphasised training and extension, labour-intensive methods and densely populated smallholder areas. It began field work in Kagundo Division of Machakos in 1978 and became a success story; the Kenyan model of soil conservation became well-known. By about 1985, the project covered the whole country.

Four phases can be identified:

1. Subsidies were given, in the form of cash, **as** motivation to participate in labour intensive measures.
2. Extension was introduced through a Training and Visit system (T&V), including SWC measures.
3. The Catchment Approach in extension was introduced for systematic treatment in 1987.
4. Participatory Rural Appraisal (PRA) was introduced within the catchment approach in 1990.

The training component has been the spearheading factor of *KNSCP.* Target groups are agricultural staff, government officers, school teachers and children (as concerns school curricula), leaders and farmers. Since the mid 1980s an M.Sc. Programme on SWC has been offered by *Nairobi University* with financial support from *Swedish Agency for Rural Co-operation with Developing Countries (SAREC)*

3. Research on simple techniques to minimise soil erosion from steep lands (Lundgren & Taylor 1993) carried out by the Ministry of Agriculture's, *Soil and Wafer Conservation Branch (SWCS)* and *ICRAF*, sponsored by ***SIDA***

Techniques like *fanya-juu* terracing, hedge-row-intercropping, increasing soil fertility through composting, improved implements have been further developed, tested and disseminated.

4. Programme Production through Conservation *(PTC)* (Lundgren & Taylor, 1993)

This *SIDA*-sponsored programme is supporting *Village Development Councils (VDC)* in their efforts to establish village-level outlets for farm supplies. In 1988 *SWCB* agreed to the introduction of Participatory Rural Appraisal (PRA) as a tool to increase understanding between extension staff and farmers (first workshop in 1989 with the assistance of the *International Institute for Environment and Development (IIED)*.

5. SIDA's Regional Soil Conservation Unit (RSCU) (Lundgren & Taylor 1993, Erikson *et al.* 1993)

The intention of *SIDA's RSCU* (now *RELMA*) is to extend the experience of the Kenyan National Soil and Water Conservation Project *(KNSCP)* to neighbouring countries through training (institutions, ministries, NGOs) and networking, regional capacity building and methodology development. It arranges exchange training visits between conservation staffs of Eastern Africa. An exchange programme is operated jointly by the *Commonwealth Secretariat* and the *Environment and Land Management Sector (ELMS)* of the *Southern African Development Community (SADC)* starting with training workshops.

6. Development of sustainable tillage and weed control systems for SWC management (National Research Institute *NRI / Silsoe Research Institute)* (SPAARIS 1997)

The objectives of the project, which operates in both Kenya and Zimbabwe, are: a) to improve the reliability of rainfed cropping and food-security in semi-arid regions, particularly for resource-poor farmers, b) to conserve limited resources of energy (labour), soil and water and, c) to develop improved tillage/soil management systems. Work also includes the identification and specification of conservation tillage practices, weed control and water harvesting that can be adopted by ASAI farmers in the Zimbabwe and Kenya projects, and R&D involving multidisciplinary collaboration between institutions in Kenya, U.K. and Zimbabwe.

Tanzania

1. Studies on indigenous activities in different regions
   - Dagashida (Lundgren & Taylor 1993)

   The Dagashida is a community assembly which formulates sanctions and customary law; it regulates the use of natural resources by means of revitalised participatory democracy which is reinforced through the Ministry of Land' national policy which acknowledges that customary institutions and participatory democracy can parallel and complement existing administrative systems.
   - Indigenous knowledge of the Burungee of Kondoa (Lundgren & Taylor 1993)

   The study is an example of how misunderstandings arise between Burungee farmers and extension staff if the latter are not aware of how the farmers understand the process of soil formation and erosion.
   - Rice Cultivation as an Indigenous SWC Technology in Mwanza (Shaka *ef al.* 1996)
   - The shift from cotton to rice brought about significant changes in land use. Farmers began to experiment with later harvesting techniques and adapt them to local conditions. They largely adopted cotton as the main cash crop. The remaining high-market value for rice encourages farmers to continue to invest in extensive SWC measures within whole catchment areas and to ensure that water is used efficiently by all the farmers living in the area.
   - Indigenous composting in Rukwa Region (Mbegu 1996)

   The compost mound technique (including composting and green manuring) stemmed from a practical understanding of the poor fertility of soils on the Ufipa Plateau, but with the introduction of the plough

the method became too labour intensive and is therefore declining. It is important to bring this method, which is still appropriate for the average smallholder, in line with current farming methods; the plough, combined with an information programme on the additional benefits of this method, is needed.

Vinvunqu farming in Njombe district (Lema, 1996)

the face of growing population pressures and land degradation, this indigenous SWC method of valley-bottom cultivation has come to play an increasingly crucial role in food security. However, *vinyungu* still does not receive the attention its merits, owing to the dominant perception among district agricultural staff as well as higher policy makers that it is a side-line, an informal agricultural activity, largely confined to women.

Pit cultivation in Matengo Highlands (Temu & Bisanda 1996)

Using the pitting system, for several decades already, farmers on steep erosion-prone hillsides have been able to sustain modest yields from their plots, with minimal or no fertilisers. The government fully supports the system and has often funded visits by farmers from elsewhere in the country. New interventions to improve the system will ensure the continued use and perhaps its expansion into less hilly areas.

2. Research on Soil Conservation in Morogoro carried out by the *Agricultural University of Norway* and *Sokoine University,* supported by the *Norwegian Ministry of Foreign Affairs,* (SPAARIS 1997)

The objective is to collect relevant data on erosion, to estimate potential soil erosion, and to process the data for use in a mathematical calculation of quantitative soil losses and the development of a conservation plan for the farm in Majiembu.

3. The Erosion Control Agroforestry Project *(SECAP)* in Usambara

The project started in 1981 as part German's aid to the Tanga Integrated Development Programme. It is a community-based, integrated, ecologically sustainable, economically viable effort to increase people's capacities to make a livelihood and meet their development needs as well as an effort to control and reverse processes of soil erosion and environmental degradation. Despite all this, the project may fail because it does not tackle problems of population pressure and land distribution.

4. Soil and Water Management Research (SPAARIS 1997)

This project is implemented by the *Department of Research and Training (DRT)* of the *Ministry of Agriculture.* It aims at improving the management of soil and water resources as the basis for sustainable agricultural production. This requires profound knowledge of soil properties and management techniques. Soil and water studies are carried out on Mlingano Research Station which is largely financed by The Netherlands. Priority research includes soil fertility, land resources, soil and water management, and agro-climatology.

5. DUSER/HADO/MALISATA

– DUSER-project Christiansson & Kikula 1996)

The Dar-es-Salaam/Uppsala Universities Soil Erosion Research Project was launched in 1971. The participating institutions were the *Bureau of Resource Assessment and Land Use Planning (BRALUP* - the predecessor of *IRA,* the Institute for Resource Assessment), the *Department of Geography* at *Dar-es-Salaam University,* and the *Departments of Physical Geography* at the *University of Uppsala* and the *University of Stockholm*. The *DUSER* project studied land degradation and erosion control within a multidisciplinary research project. The results formed important input for agricultural planning and the government's initiatives for soil conservation projects, *e.g. HADO.*

– HADO-project (Mndeme *et al.* 1992, SPAARIS 1997)

Hifadhi Ardhi Dodoma *(HADO)* started in 1973 as a state-run soil conservation project in what is probably the most eroded area of Tanzania. The project implemented SWC measures and a national village land use planning programme which included reforestation, conservation of grazing

land, stabilisation structures, destocking, education and legislation, and farmland soil conservation. At the end of the 1970s *HADO* decided to remove all cattle, thus freeing large areas for cultivation. A research project was started in 1990 to develop suitable zero-grazing systems for semi-arid areas. The project was conducted by the *Zonal Livestock Research and Training Center* in collaboration with and financed by *SAREC.* Efforts were made to overcome land tenure issues by adopting a system in which the state leased the land to the villages (for a period of 999 years) and in turn the villages leased the land to the farmers (33 to 99 years).

- Documentation and Assessing sustainability of the HADO project (SPAARIS 1997)

A project carried out by *Sokoine University* focuses on the assessment of local people's perception of soil degradation and on the identification of institutional constraints and organisational structures that have obstructed farmer adoption of *HADO's* soil conservation techniques. For documentation on *HADO* there is a major research project being undertaken by the Institute of Resource Assessment, *University of Dar-es-Salaam* and the Environment and Development Studies Unit *(EDSU)* Stockholm University, financed by *SAREC.*

- Research on Man-Land Interrelations in Semi-Arid Tanzania *MALISATA* (Christiansson & Kikula 1996)

This project was started in 1987 with support from *RCSU* and *SIDA.* Its programme was a joint undertaking of the *Institute for Resource Assessment (IRA)* of the *University of Dar-es-Salaam* and the *Environment and Development Studies Unit (EDSU)* of the *School of Geography, Stockholm University.* It operated using the integrated approach from *RSCU,* with the *HADO* area forming the nucleus for programme activities. The main objectives were *to* collect field data, to develop an understanding of the process of land degradation and resource conservation and to build up the Tanzanian research potential.

Uganda

Development of Farmer Participatory Research Methodologies (SPAARIS 1997)

This project is financed by the *Natural Resources Research Department (NRDD)* and implemented by the *Natural Resources Institute (NRI)* in collaboration with *ActionAid.* The objectives are to develop methodologies for farmer participatory research (with special emphasis on women farmers) and for sustainable and equitable improvements in agricultural production. Mutually advantageous ways for *ActionAid, NRI* and national researchers to collaborate in participatory research are established.

CENTRAL AFRICA:

Severe erosion exists only close to the Zaire-Uganda border; erosion is not considered significant in Zaire, Congo, Gabon, Cameroon, Rio Muni or Central African Republic.

Cameroon

Study on indigenous SWC techniaues

- Mandara Mountains (Hiol-Hiol *et a/.* 1996)

Despite unfavourable climate and difficult soil conditions, the local people have developed an intensive production system that includes soil and water management. Various organisations are working on SWC, including the *Ministry of Agriculture and Livestock.* Because of its influence on cotton production, *SODECOTON* is the most important parastatal organisation. The *Soil and Wafer Conservation Project* of the Mandara Mountains has initiated a number of developments; several **NGOs** are also working on a variety of issues.

- Bamileke Region (Tchawa 1996)

These highlands provide a well-watered and fertile environment for a diverse range of crops. Farmers here have successfully adapted their farming systems, including benefits from SWC. **As** time passes the region faces new challenges: demographic growth, in some places, abandonment of the countryside elsewhere and changes in farming at a time when land-ownership issues are becoming increasingly complex.

SOUTHERN AFRICA:

Erosion is considered heavy for Lesotho and moderate to severe in Swaziland, Zimbabwe and parts of South Africa. In Angola, Namibia and Zambia it is reported to have caused little damage, whereas the situation remains unclear for Botswana, Madagascar, Malawi and Mozambique.

Botswana

Study of on-farm, client-oriented research *(OFCOR) in National Agricultural Research Systems (NARS)* (Heinrich, 1993)

It was initiated in 1986 by the *Infernational Service for National Agricultural Research (ISNAR).* The study was carried out with the support from the *Government of Italy* and the *Rockefeller Foundation.* Besides the budget for *OCFOR* (which was provided by the government) additional grants came from *USAID, GTZ, SIDA* and *FAO.* By 1991 most funding had been withdrawn so all *OFCOR* projects were drawn into the *Department of Agricultural Research (DAR)* of the Ministry of Agriculture and placed under the newly established research-based *Production Systems Programme (PSP). PSP* developed national aims and objectives for *OCFOR* which were approved by *DAR.* This provided a channel for links between on-farm research, station-based research and extension.

Lesotho

1. Institute of Land Use Planning *(ILUP/LUDP)* (Lundgren & Taylor 1993)

In 1981, the government, with ***SIDA*** support, established the *ILUP*. Land use planning was soon recognised as a promising way to support planning at the farm and community levels. The institute became a division *(LUPD)* of the Ministry of Agriculture, and district land use planners were stationed in a number of districts. In 1992 *LUPD* began to change its approach from top-down to bottom-up by introducing methods of participatory planning, such as PRA, so that planning would devolve from the LUDP headquarters to the districts and villages.

2. Proiect of social forestry of *GTZ* (Clarke & Casey 1995)

This project started in 1993 with a 3-year pilot phase. The objectives were to produce fuelwood, poles, fodder, etc. and to contribute to erosion control, the stabilisation of gullies, and catchment rehabilitation.

3. Farm Improvement through Soil Conservation *(FISC)* (Wenner 1989, Bojo *et al.* 1990)

This *SIDA*-assisted project started in Mohales District in 1985 to encourage rehabilitation and construction of terraces, waterways and drainage systems. Farmers working on physical conservation structures on their own land were provided with improved seed and fertiliser, and people working on communal land received cash payments. After 1-1/2 all conservation structures could be made by hand, landholders could carry out reasonable conservation in their own fields, if stimulated by agricultural inputs, local extension/soil conservation agents could guide conservation and agricultural production improvement work. Through a multi-disciplinary evaluation of FISC carried out by the *Stockholm School of Economics* and *Uppsala University,* and financed by *SAREC,* knowledge was generated (soil-nutrient losses, crop yields, financial analyses, cost-benefit analyses, sociological surveys regarding farmers' attitude towards FISC and the role of village institutions and government agents) that could be more broadly applied. The economic analysis showed a negative net present value, because of the need for large capital investments and skilled personnel. Making the farmers aware of potential profitability is the first important step, but high rates of return cannot be expected until the farmers' problems of risk and lack of credit are overcome.

4. Production Throuah Conservation (PTC) (Shone *et al.* 1994)

This *SIDA*-assisted project began in 1985 and covered soil conservation as well as production. The land users were involved in decision-making. The concept was to create a forum at the grassroots level to facilitate interaction with and among the farmers. The aim of this participatory approach was to build up

the capacity of the rural people to plan, implement and review their development activities, and to improve their relationship with the ministry through increased partnership.

5. Soil and Water Conservation in Southern Lesotho Phase II (Letsoia & Stapleton 1996)

The SOWACO II project is supported by FAO and the International Agricultural Centre (IAC) and is carried out by Ministry of Agriculture. It aims at favouring village-based extension agents and stresses the need to work in collaboration with the village and grassroots organisations. Recent approaches employed in SOWACO II extension activities have moved towards integrating simple mechanical techniques into traditional or improved crop production. One aspect is the emphasis on self-help and minimum one-off incentives (tools, seeds) provided as encouragement to motivated members of interest groups.

6. Land Management and Conservation Project (SPAARIS 1997)

This project was funded by the World Bank and formed part of a long-term programme for land management and erosion control aimed at enhancing agricultural productivity. It was to be carried out through newly elected village, ward and district councils. The project put emphasis on strengthening the Ministry of Interior, Chieftainship Affairs and Rural Development (MICARD) and the Ministry of Agriculture's Institute of Land Use Planning (ILUP). The project made it possible to put together district working groups to support local communities in preparing and implementing land management plans. Further, it financed land management sub-projects approved by the district councils and provided assistance in developing a land policy for the kingdom. The land resource management component provided funding for relevant activities, e.g. conservation through off-farm soil conservation inputs and tree-planting.

Madagascar

Lova Sua Project (Randriamampianina et al. 1992)

This rural development project of the University of Berne's Group for Development and Environment (GDE) focused on soil conservation. It was implemented through the agricultural extension services and undertaken individually by small-scale farmers. The project started by promoting mechanical structures. This was followed by biological measures and improved cropping methods for increasing production. It was decided that a collective approach was needed to ensure effective conservation.

Malawi

Study on indigenous SWC techniques (Mangisoni & Phiri 1996)

Due to high labour costs, modern techniques introduced from elsewhere have not been successful in erosion control for smallholder farmers. However, there are no data available that can explain the benefits of various indigenous practices.

South Africa

Study on indigenous techniques in Transkei (Phillips-Howard & Oche, 1996)

The approach to SWC and policy recommendations in the 1991 Transkei Agricultural Development Studies have been top-down. Despite the failure of such schemes and the lack of any institutional support, farmers have established a number of widely established conservation practices. They will probably continue to adapt and develop such indigenous methods. The introduction of the new Reconstruction and Development Programme (RDP) emphasises suitable agriculture for small-scale farmers.

Suggestion for contacts:

Research: University of Transkei, Department of Geography, K. Phillips-Howard, Chris Oche

Swaziland

Study on indigenous techniques (Osunade & Rije 1996)

No effort has ever been made to analyse and measure erosion processes despite the large amount of money spent on SWC. In 1966 the government selected a number of Rural Development Areas (RDA) in which co-ordinated development programmes, that included soil conservation, were carried out. In the years between 1971 and 1977, a terracing programme was established with the help of USAID, but the programme turned out to be expensive, land-consuming and sometimes even erosion-inducing. The RDA programme ended in 1982 and could not be maintained by governmental funding alone. As a result of land users' increasing awareness of erosion during the last few years, the NGOs have been initiating SWC activities.

Suggestion for contacts:

Donor agency: USAID, Director Forestry, Environmental and Natural Resources, Washington, USA, 20532-1812, Tel. +703-875-4106, Telex 892703
Government: Ministry of Agriculture, Manzini, Stephen MF Zukem
Research: University Ife Ife, M. Osunade
University of Amsterdam, Centre for Development Cooperation Services, Chris Reij

Zambia

Developing a Participatory Extension Approach for Siavonga District (SPAARIS 1997)

This project was co-funded by Senator *for* Science and Research, Berlin, the German Ministry of Economic Co-operation (BMZ) and the German Agency for Technical Co-operation (GTZ), and implemented by *Humboldt* University, Berlin. It aimed at introducing participatory elements into the conventional extension service, elaborating and testing a participatory extension approach which would facilitate the development and diffusion of adopted agro-silvi-pastoral land use systems, and action-research through Participatory Rural Appraisal (PRA).

Suggestion for contacts:

Donor agency: BMZ, Bonn, Germany
GTZ, D-65760 Eschborn, Germany, Dag-Hammarskoeld-Weg 1-5, Tel. +49-6196-790
Research: Humboldt-University, Berlin, Seminar for Agricultural Development, U.J. Nagel

Zimbabwe

1. Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) (FAO 1990)

The aim of the FAO-funded project was to set up an institutional structure to enable local co-operatives to develop management schemes for land use.

2. Projects with indigenous techniques in Chivi and Zaka (Hagmann & Murwirwa 1996)

In Zimbabwe, after the introduction of the plough, and maize as a food crop (around 1920), soil erosion increased. Agricultural Extension started in the 1930s but greatly declined during liberation. After 1980 farmers recognised the need for SWC but were not able to implement appropriate measures. Indigenous SWC, local institutions and government authorities as well as recent developments under the participatory approach have strengthened the farmers' confidence in their own capacity and created a new generation of SWC techniques which build on traditional knowledge but are adapted to modern conditions. The *Chivi Food Security Project,* carried out by the *Intermediate Technology Development Group (ITDG),* a UK-based NGO, is oriented towards extension of SWC techniques, whereas the *Department of Agricultural Technical and Extension Services AGRITEX/GTZ Conservation Tillage Project* is more research oriented. Both projects work in close collaboration with the farmers and use the participatory approach to strengthen local institutional capacities in order to promote SWC techniques. Farmer experimentation is geared towards participatory technology development.

3. Kukwanisa Project in Eastern Highlands

Kukwanisa remained deserted until 1993 when the government leased the area to *Development Aid from People to People (DAPP)* for a period of 25 years. One aim of the project is to fight soil erosion at low expense by actively involving the local people.

4. Sustainable Management *of* Soil Fertility/Tropical Soil Biology and Fertility Prooramme *(TSBF)* in Zimbabwe and Tanzania (SPAARIS 1997)

This programme is funded by the *Ministry of Agriculture, Rockefeller foundation, IDRC* and *UNESCO* and is co-ordinated by scientists from the *University of Zimbabwe. TSBF* aims at developing a productive understanding of the biological processes of tropical soils and their contribution to soil fertility for smallholder cropping systems. In order to decrease the resistance of farmers to new technologies, the project uses PRA in its work with local people to promote low-input, soil fertility management options based on environmentally-sound biological processes.

5. Research Project of National Resources Institute *(NRI)* and *Silsoe Research Institute* (SPAARIS 1997)

The objectives *of* the project are to improve the reliability of rainfed cropping and food-security in semi-arid regions, particularly for resource-poor farmers, as well as to improve soil and water management and weed control for smallholder farmers.

6. Community Based Catchment Rehabilitation and Exploitation in Masvingo [illegible] 1997)

The project has been initiated by the government which asked the Harare office of the *World Conservation Union (IUCN)* to formulate the *Save Rehabilitation Programme.* It is financed by the *Dutch Ministry of Foreign Affairs.* The objectives are to cooperate with the population of Save Runde Catchment in optimising agricultural methods with regard to the use of natural resources in sustainable development. Activities in the four Village Development Plans are, among others, soil improvement and erosion control. The Rural District Council *(RDC-Masvingo)* co-ordinates the project; other team members are from *AGRITEX, NRB* and *ZIRRKON* and co-operation exists with *IFAD.*

INTERNATIONAL / REGIONAL ACTIVITIES

- SADC Countries (FAO 1990, SIDA 1993, SPAARIS 1997)

The *Southern African Development Community* (Angola, Botswana, Mozambique, Malawi, Lesotho, Namibia, Swaziland, Tanzania, Zambia, Zimbabwe) was established in 1980. In 1981 SWC was included as a sector programme (the *Environment and Land Management Sector's* Co-ordination Unit, *ELMS).* In 1985 the Co-ordinating Unit for the *Soil and Wafer Conservation and Land Utilisation (SWCLU)* Programme was established in Lesotho with technical and financial support from *SIDA.* The unit has been particularly active in organising workshops and training courses, *e.g.* the SADC/SACCAR/SWCLU/*University of Botswana* annual research seminar on soil and water conservation and land utilisation. The objective is to establish a forum for research workers in basic and applied research and to facilitate intra-SADC exchange of knowledge about on-going research and results in the field of SWC and land utilisation, *e.g.* a research project on the impact of soil erosion on crop yields is being implemented with the SACCAR *Land and Wafer Management Research Programme (LWMRP).*

- RÈseau Erosion c/o ORSTOM, Montpellier (E. Roose)

- World Overview of Conservation Approaches (WOCAT), launched in 1992, is a project of the *World Association of Soil and Wafer Conservation (WASWC)* that collaborates with *ISRIC, CDCS, GTZ, OSS, FAO, RMS, University of British Columbia, SIDA,* and the *University of Wageningen.* It is co-ordinated by the *Group for Development and Environment (GDE)* at Berne University (Dr. H. Hurni). Donors are *SDC, RSCU, OSS, GTZ, FAO, IDRC.* It aims at promoting the successful integration of SWC into land use systems world-wide. After workshops and meetings, WOCAT developed a framework for the evaluation of SWC and initiated a data collection campaign. Through this work, it will help to obtain insight into elements of SWC which have been successful under certain conditions which were felt could not possible succeed.

- On-Farm Productivity and Enhancement Project (SPAARIS 1997)

  The project is funded and implemented by the *Winrock Infernational Institute for Agricultural Development (WIIAD)* and aims at strengthening community-level productivity of farming in Senegal, Gambia, Kenya and Uganda and through private voluntary organisations.

- Capacity Building in Soil and Water Management (CBFR) (SPAARIS 1997)

  The *African Academy of Sciences (AAS)* seeks to encourage and make a direct substantial contribution to the sustainable management of Africa's soil and water resources. The project supports research in all aspects of soil and water management (surveys on soil and climate, erosion, tillage, conservation farming, water resource management...)

- Development of Durable Production System in the Tropics (SPAARIS 1997)

  This project is implemented by the *Centre for Agrobiological Research (CABO).* The donor is the Dutch Ministry of Foreign Affairs. CABO aims at increasing the efficiency of methods to assess sustainability of agricultural production systems in a certain region and under specific socio-economical constraints. Research items include: optimising the use of external inputs, increasing the capacity of national agricultural research institutes (NARS) in the Sahel (Mali), and developing methods for identifying land use systems.

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