JOINT DISSEMINATION MEETING – LEARNING ALLIANCE FOR MICRO-AGRICULTURAL WATER MANAGEMENT TECHNOLOGIES FOR SMALL SCALE FARMERS IN SOUTHERN AFRICA

PRETORIA, SOUTH AFRICA
21st – 23rd June 2006

BACK TO OFFICE REPORT

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1. BACKGROUND

At the Southern Africa Emergency Coordinators Meeting in October 2005 it was agreed that a consultant should be employed by the FAO at the Regional Interagency Coordination Support Office (RIACSO) to carry out an evaluation of emergency small scale irrigation interventions. Felix Dzvurumi carried out this consultancy which looked into the effectiveness of emergency treadle pump, drip kit and smallholder irrigation projects in Lesotho, Malawi and Mozambique. The study also drew on his experiences in Zimbabwe.

Douglas Merrey of the International Water management Institute (IWMI) was commissioned by the FAO Investment Centre (TCIS) and the Office of Foreign Disaster Assistance of the United States Agency for International Development (OFDA) to carry out a similar study. This work looked into the effectiveness of small scale agricultural water management (AWM) techniques in Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia and Zimbabwe. While similar to the RIACSO study, this work was not necessarily looking at emergency interventions and did not include formal smallholder irrigation schemes. The technologies investigated included; treadle pumps, motorized pumps, drip kits, sub-surface pitcher irrigation, in-situ soil and water conservation techniques, ex-situ water harvesting and storage.

This meeting was organized by the FAO office in RIACSO to share the lessons from both of these studies with others working in related fields across southern Africa. The meeting agenda is included as Annex 1, the list of participants as Annex 2 and the abbreviations used as Annex 3.

2. PROCEEDINGS OF MEETING

The meeting was chaired by the Reporting Officer (RO) and opened by Mr George Mburathi, the FAO Representative in South Africa. Presentations were given on the two studies and the findings were discussed. In view of the importance of the findings, the two reports were included in the annexes as follows;

- ANNEX 4 – Evaluation of Emergency Small Scale Irrigation Projects in Southern Africa
- ANNEX 5 – Agricultural Water Management Technologies for Small Scale Farmers in Southern Africa: An Inventory and Assessment of Experiences, Good Practices and Costs.

These have been removed to reduce the file size but the reports are available from the RO.

The tables below attempts to draw from the presentations given and the full studies some of the main issues that should be taken into consideration in the design of future small scale agricultural water management projects.

2.1 General Issues

This section attempts to draw out cross-cutting issues that apply to all of the technologies discussed.

	GENERAL ISSUES
Institutional Issues	- Government policies and the macro economic situation sometimes undermine the potential for Micro AWM. - Governments should streamline policies for Micro AWM and create lead institutions to promote the technologies. - It is important to work closely with government to ensure future support from extension services and sustainability of interventions. - SADC could create larger regional market to offset high costs associated with small national markets. - Programmes and countries should share expertise and testing facilities. - It is better to adopt market based approaches but it may be possible to kick-start local manufacturing and back up capacity by subsidizing limited programmes - There is generally low competition for local procurement of equipment. Monopoly suppliers are content with Government and NGO tenders and have little incentive to go into extension and product support. - There have been many initiatives but not effective mechanisms for monitoring and sharing lessons in what works and why. - Participatory approaches are vital to success. - Projects should offer choices of technology and more support. “Drop and run” projects cannot be justified. - Donors often unwilling to fund the necessary software components in emergency programmes. - Irrigation in not always suitable as an emergency intervention. Food for Work Programmes can be used to do heavy work for the construction of schemes but this should ideally be as part of ongoing national programmes rather than schemes designed just to use food for work. - Where possible, use emergency money to support longer term programmes

Technical Issues	- All systems require a reliable water source close to suitable land. - Where there is competition for limited water, this should be understood and agreement reached locally before installing an irrigation system. - A suitable source of power is needed; this could be gravity, manual or mechanical. - Smaller scale technologies can have a more rapid impact. - There is no single solution, select technologies according to the local situation. - Water management should be integrated with soil nutrient management. - The technology must always be supported by suitable capacity building, management systems, markets and supplies of parts and technicians - Up-scaling of interventions across the country will not work unless the technology is seen as economically attractive and there is a network of local agents - Consider the need for an Environmental Impact Assessment, especially where using water from wetlands or rivers.
Social/Targeting Issues	- Often difficult to reach the poorest of the poor. May be better to target more active farmers who will be able to make the best use of the technology and may support disadvantaged family members. - The higher the technology and the capital costs, the less suitable a system is for the poorest. - Lower cost technologies such as Pitcher Irrigation are more appropriate for the poorest farmers. - Targeting requires an understanding of farming systems in a geographical area and the needs of individual farmers.
Economic and Food Security Issues	- Micro AWM technologies have a lower cost per household than larger formal irrigation schemes. . Cluster interventions in a geographical area if resources limited. - Interventions in this sector can lead to high returns in food security and income in cost effective manner.

2.2 Water Lifting Devices

The technologies described in this section are primarily for lifting water though they lead directly into distribution systems. While the treadle pump has proved itself to be a reliable low cost technology, the bucket and watering can should also be considered, especially where a project is targeting the poorest members of society and the aim is to irrigate small gardens. Motorized pumps have many operation and maintenance issues and careful economic analysis required to determine if the income will cover running costs.

	TREADLE PUMPS
Institutional Issues	- Coordination needed between projects with different agencies and Government to ensure a common implementation approach. - Subsidies or free distributions can undermine the establishment of a market driven system for sales and spares. - Development of high quality pumps with widespread network of spare part suppliers is recommended. This suggests standardization on one successful pump in any country. - Inlet and outlet pump should correspond with locally available pipes. - As long as Governments, NGOs and UN system do the majority of the procurement and distribution, the private sector will not have the incentive to develop networks of dealers.
Technical Issues	- Recommended for widespread promotion where water <7m deep, preferable <4m. - Water source should be between 5m and 200m from field. Pipes make it difficult to irrigate immediately next to pump. Field layouts may need to be changed. - No fuel is required but there must be sufficient manpower available. Women do not like to use pumps with high pedals. - Pumps are portable so they can be removed for safe storage. - Pumps are durable and require limited maintenance. Sometimes problems with rusting and stiffness so require more greasing.
Social/Targeting Issues	. Where public water sources used, the involvement of local leaders is vital to reduce conflicts over water use. - Multiple ownership of pumps causes social and technical problems - Carry out Environmental Impact Assessment if water source is river or wetland. Include selection criteria against stream-bank cultivation. - Treadle pumps can be targeted to poor/women headed households

Economic and Food Security Issues	- Low purchase cost of $50 -$100. - Generally cheaper to buy from India than from local manufacturers in Southern Africa. For sustainability it is better to buy locally but this may go against procurement policies. - Pumps increase the productivity of labour and can therefore improve income/food security. - Cost recovery is a good way of screening for sustainability but 100% recovery may be too high during first years of production, especially if targeted to the poorest.

	MOTORISED PUMPS
Institutional Issues	- Weak policy and institutional support. - Largely a technology for the future in SADC.
Technical Issues	- Poor availability of pumps, spares and expertise to carry out repairs
Social/Targeting Issues	- Better for larger scale farmers. - Better targeted at productive and innovative farmers than at the poorest.
Economic and Food Security Issues	- Pumps can give dramatic gains in productivity. - High capital and operating costs. - May be a limited markets for the scaled up production

2.3 Water Distribution systems

These range from the simplest pitcher irrigation to formal small holder irrigation schemes using a variety of technologies. Widespread distributions of drip kits have often yielded poor results. The implementation of any such programme should only be considered in specific situations and where adequate support can be given. So far there has been little interest from the private sector in direct sales of this technology to farmers which says something about its economic benefits and sustainability.

	PITCHER IRRIGATION
Institutional Issues	- Not much experience with this technology in Government or other agencies in SADC. - Recommended for more research and promotion with pilot schemes if there are favourable results.

Technical Issues	- Indigenous unglazed pots buried adjacent to crops, filled with water which seeps out into the root zone. - Low cost and easy to install. - Can be installed incrementally - Low maintenance.
Social/Targeting Issues	- Low labour so easier for handicapped. - Low input programme which suits the willing and capable poorer households.
Economic and Food Security Issues	- Low cost for potentially high returns so can contribute to food security.

	DRIP KITS
Institutional Issues	- Government involvement in policy and extension support is vital if emergency projects are going to be sustainable. - Project implementation and exit strategies should be well defined. - The choice of implementing partners for a project should be determined by their available capacity to implement effectively. - In view of procurement delays, orders should be placed to secure delivery in time to produce a crop within the project period. - Technical specifications should be standardized and the private sector involved in product development and the provision of parts and services. - Implementing agents need adequate training. - All farmers should be trained over long term in the use of drip irrigation, not just lead farmers. - A cohort of farmers should be identified to keep reliable quantitative data for monitoring.
Technical Issues	- Drip irrigation is recommended where water is scarce or expensive, water is clean, land availability limits production and soil structure allows for lateral movement of water. - There must be a low threat from animals and thieves. - Labour must be available to fill the tank.

	- Projects should be flexible to meet the requirements of different regions in terms of fencing, inputs etc. Research should be done under local conditions. Budgets should include kits for testing and demonstration. - To enable speedy implementation of emergency projects, geographical area guidance could be developed on the best format drip kit intervention (garden siting, water resource, need for seed and input packs etc.) - If seeds are supplied a suitable mix of seed for optimum nutrition and income generation should be distributed. - Drip irrigation reduces water losses and minimizes weed growth - Water tanks should be large enough to run the system all day without having to return frequently to top it up.
Social/Targeting Issues	- No good example in the SADC region of effective programme targeting the poorest. Drip kits are more effectively used by the more skilled and energetic farmers. - Generally reduced labour over direct watering of gardens but some farmers find applying water with buckets more efficient than filling up tanks. They are not always the best solution. - Consolidated gardens may make it easier for extension work but group dynamics, walking distances and crop management should be considered. - Cluster targeting when resources limited for support and monitoring.
Economic and Food Security Issues	- 100sq. m. is too small to get farmers out of nutrition security and onto income security levels. There is often no great increase in production. -Often high costs to install - around $200-400 for 500 sq. m. kit. - For farmers who successfully adopt the technology there is a need for bigger and more commercially viable sites.

	SMALLHOLDER IRRIGATION SCHEMES
Institutional Issues	- Match the expected outputs of the programme to the institutional capacities of implementing partners. - Capacity building should be included at all relevant levels; field level extension/irrigation officers. Water users groups and individual farmers. - On farm demonstrations, competitions and field days are effective extension methods. - Need to develop more Monitoring and Evaluation as part of projects. - Evaluation needs reliable baseline information which is rarely available.

Technical Issues	- The order of preference for successful smallholder schemes is; 1. gravity sprinkler 2. gravity surface 3. pumped sprinkler 4. pumped surface. 5. drip schemes (only for good, commercially orientated farmers). - Work on these schemes is only viable with project of > 1 year. - Emergency projects that coincide with rainy season may need to concentrate on pressurized systems as difficult to work on surface irrigation at that time. - Emergency projects should work on schemes which already have feasibility reports. If they do not, it is necessary to do a rapid appraisal. - EIA should be part of every project and this should address health and gender issues. - Schemes <50Ha have less organizational and management problems and are more likely to succeed. - Schemes should be <20Ha to allow completion in emergency timescales. - Must have qualified engineers and technicians to design and supervise construction. They must cooperate with agriculturalists, socio-economists and other professionals to provide a full package. - Projects should upgrade all aspects of schemes, particularly management systems; it is not enough to rehabilitate the infrastructure. - Rehabilitation may be cheaper than new schemes but must address the reasons for the original failure. - Provide training in seed production for open pollinated varieties, production, post harvest handling and use of crops.
Social/Targeting Issues	- Develop guidelines for selecting irrigators - they should have a proven capability in rain-fed farming or gardening. - Farmers may need access to affordable credit. - Access to inputs and markets is critical.
Economic and Food Security Issues	- Apparent improvements in nutrition and economic status in some schemes but hard to get data on financial and agricultural performance - New crops can be introduced but take into account; eating habits, traditional crops, food security issues and agro-ecological zone.

2.4 Water Collection Systems

These are methods by which water is collected on or off site for use in gardening/agriculture. Generally the techniques fall outside the remit of national irrigation departments so there may be no coordinated push for introduction of these techniques, even though they may have advantages in soil fertility and can be used to enhance dryland farming.

	SOIL AND WATER CONSERVATION
Institutional Issues	- Lack of institutional and policy support.
Technical Issues	- Many techniques to maximize availability of soil and water in root zone e.g. terraces, bunds, ditches, mulching, minimum tillage, conservation agriculture etc. - Technologies should be selected that are adapted to local situation. - Africa has low rate of fertilizer use and soils being depleted. These techniques help to address this problem. - Special tools e.g. ripper needed for some practices.
Social/Targeting Issues	- High labour requirement and/or cost to establish but can be implemented incrementally. - Less labour once established as less land preparation and weeding. - Need participatory approaches to encourage farmers to try new methods and combinations.
Economic and Food Security Issues	- Generally good potential for increased and stabilized yield. - Lower fertilizer requirements. - High costs and low returns for some practices.

	RAINWATER HARVESTING
Institutional Issues	- Lack of policy support - Lack of expertise to design and construct.
Technical Issues	- These systems have a lot of potential and are worth scaling up - Range of techniques to harvest water and store it above or below ground - Underground storage cheaper but also requires mechanism to lift water and are more vulnerable to contamination. - Possible water quality issues depending on catchment area

Social/Targeting Issues	
Economic and Food Security Issues	- Potentially high returns in production and nutrition. - Cost effective only for small areas as limited amounts of water collected.

3. LEARNING ALLIANCE FOR MICRO-AWM IN SOUTHEN AFRICA

The last section of the meeting was devoted to discussions on how practitioners in this field could gather and share information and experiences across the region.

IWMI was proposed as a central information source on small scale irrigation and it has the knowledge of irrigation technologies to impart to NGOs and others. The services of FAO were offered to the proposed Learning Alliance and it was agreed that IWMI and FAO would investigate future steps in this direction.

A regional conference on small scale irrigation was discussed as a good way to share information. All invitees could inform the meeting of their activities. It was stressed that the private sector must be fully incorporated into and become a central part of this process.

Information on technologies programmes and funding of small scale irrigation is needed. Standards for small scale irrigation equipment should be developed. Successes should be identified and the factors which led to this success should be disseminated widely so that experience is put to good use for the up-scaling of successful schemes.

It was proposed that a team be put together to assemble information, to set up a Website with appropriate links to relevant websites. Information could also be distributed on CD and through a mailing list.

The need to invest more in innovation was stressed. New approaches need to be tested and Action Research must be done.

The learning alliance could be used to assist traveling agronomists and irrigation specialists to meet the people who are implementing small scale irrigation in various countries.

4. FOLLOW UP ISSUES

The RO to liaise with colleagues within FAO and at IWMI with regards to the various initiatives proposed for the Learning Alliance for Micro-AWM in Southern Africa.

ANNEX 1 – AGENDA OF MEETING

Agenda
for Meeting On Learning Alliance
23 June 2006

Micro-Agricultural Water Management Technologies
For Small-Scale Farmers
In
Southern Africa

FAO-IWMI-USAID/OFDA

Venue: Kopano Conference Room,
Campus of ARC- Institute for Agricultural Engineering (ARC-ILI)
International Water Management Institute (IMWI),
141, Cresswell Street, Weavind Park, Silverton, Pretoria 0127.

Chairman: Martin Ager, Water Resources Officer, FAO Regional Office, Harare

08.30: Registration and Coffee

09.00 Official Opening by Mr. George Mburathi, FAO Representative in South Africa

09.15: Presentation by Dr. Douglas Merrey of Final Report on Agricultural Water Management Technologies for Small Scale Farmers in Southern Africa: An Inventory and Assessment of Experiences, Good Practices and Costs.[1]

09.45: Presentation by Mr. Felix Dzvurumi, FAO Consultant, of his Evaluation of Emergency Small-Scale Irrigation Projects in Southern Africa[2]. This evaluation is focused on Mozambique, Zimbabwe, Malawi and Lesotho

10.30 Coffee

10.45: Discussion of both papers

11.45: Synthesis of lessons learned, follow-up actions and next steps.

12.15: Discussion on formation of Learning Alliance for Micro-Agricultural Water Management Technologies in Southern Africa

[1] Study commissioned by United States Office of Foreign Disaster Assistance (OFDA), Southern Africa Regional Office, United States Agency for International Development and Investment Centre of the Food and Agriculture Organization (FAO –TCI)
[2] Study commissioned by FAO-TCE and funded by the Government of South Africa through Project OSRO/RAF/510/SAF.

ANNEX 2 – LIST OF PATICIPANTS

Studies on Micro-Agricultural Water Management Technologies for small-scale farmers: 23 June – Dissemination

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ANNEX 3 - ABBREVIATIONS USED

AGLW	Water Resources, Development and management Service of FAO
AWM	Agricultural Water Management
EIA	Environmental Impact Assessment
FAO	Food and Agricultural organisation of the United Nations
IWMI	International Water Management Institute
NGO	Non Governmental Organisation
OFDA	Office of Foreign Disaster Assistance of USAID
OiC	Officer in Charge
PRA	Participatory Rural Appraisal
RIACSO	Regional Interagency Coordination Support Office
RO	Reporting Officer
SADC	Southern African Development Community
SAFR	Sub Regional Office for Southern and Eastern Africa of FAO
TCEO	Emergency Operations Service of FAO
TCIS	Southern and Eastern Africa Service of the Investment Centre of FAO
USAID	United States Agency for International Development

ANNEX 4

EMERGENCY OPERATIONS AND REHABILITATION DIVISION (TCE)

FINAL REPORT

Evaluation of Emergency Small Scale Irrigation Projects in Southern Africa

15 July, 2006

Felix Dzvurumi, Consultant
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REGIONAL INTERAGENCY COORDINATION SUPPORT OFFICE
(RIACSO)

JOHANNESBURG, SOUTH AFRICA

ANNEX 5

Agricultural Water Management Technologies for Small Scale Farmers in Southern Africa: An Inventory and Assessment of Experiences, Good Practices and Costs

Final Report Produced by the
International Water Management Institute (IWMI)
Southern Africa Regional Office
Pretoria, South Africa

For
Office of Foreign Disaster Assistance, Southern Africa Regional Office,
United States Agency for International Development
Order No. 674-O-05-05227-00 (USAID/OFDA/SARO)
Investment Centre of the Food and Agriculture Organization of the United Nations
Letter of Agreement No. PR 32953

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