Supporting Farmers' Land Literacy; Tools for learning about soil and water conservation

by

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SUPPORTING FARMERS' LAND LITERACY; TOOLS FOR LEARNING ABOUT SOIL AND WATER CONSERVATION

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For many years conventional extension in Zimbabwe emphasised oral communication, with very little effort put on visualisation, as farmers were frequently assumed to be illiterate. Teaching and demonstrating of standardised techniques and practises are central to conventional extension work. This perpetuates farmer dependence on solutions from outsiders and does not allow farmers to develop solutions for themselves. Furthermore, women, who carry out most farming operations, are just considered as the farmers' wives and therefore feel inhibited in the male dominated groups, rather than encouraged to get actively involved in extension training.

Introduction

Soil conservation has always been an important topic for extension in Zimbabwe. It was promoted through coercion during the colonial era, and later through promises of higher yields and sometimes through food for work. Despite all these efforts, soil erosion remains a major concern, with estimates and measured annual soil loss rates of up to 40 tons per hectare (Elwell and Stocking, 1988; Chuma and Hagmann, 1995). The adoption of appropriate conservation techniques is generally poor. Another major contributing factor to erosion is the poor performance of the adopted mechanical conservation structures. A recent evaluation of conservation contours revealed that in two thirds of the fields studied contour ridges did not stop erosion but often accelerated it (Hagmann 1996).

Development of soil and water conservation practices, together with farmers in Masvingo, showed that small, site-specific measures such as building check dams in rills, leaving grass strips and creating small barriers to prevent concentrated flow from anthills and depressions are more effective than standardised mechanical conservation designs. However, if farmers are to benefit from the superior soil and water conservation potential of these techniques, they need to be able to 'read their land'. Farmers need to be able to explore the causes and effects of soil erosion and be able to monitor them in their own fields. Farmers need to understand the dynamics of their environment and the biophysical processes at work in their fields. In that way farmers will have a higher capacity to generate creative land husbandry solutions and will be able to develop and apply small, site-specific measures for soil and water management. Farmers must also have access to a variety of ideas and technical options so that they can experiment with and identify the strategies most suitable for their specific situation.

The principal of understanding processes through discovery, and learning about technologies for site-specific soil management, applies to all aspects of farming. Discovery learning is a method that enhances farmers' creativity and their capacity to use technical principles, elements and ideas to arrive at a solution appropriate to the situation. If farmers do not develop this understanding, they remain dependent on the 'knowledgeable outsider' and their motivation to adopt standard techniques will remain low because invariably such techniques will fail to meet specific requirements.

Raising the capacity and interest of farmers in land husbandry

The most effective, pedagogic way to come to an understanding of complex issues is through 'learning by doing', 'action learning', 'experimental learning' and 'discovery learning'. All these principles stress the need to get involved in action and debate in order to build up experience, to share these experiences with other people and to learn more in a process of action, reflection, self evaluation and new action. Instead of being taught techniques in extension, farmers are inspired to analyse their situation together, to put forward their own ideas, and to try out these ideas and known technical options. These experiences and lessons are then shared with other farmers and the larger community. This extension approach is being practised in Southern Zimbabwe and contains an individual and a social learning component: the platform on which learning is based is one of experimentation and sharing (Hagmann, Chuma & Murwira, 1997). 'Learning tools' are key components of the process.

Tapping visions and values

In community workshops, the learning process is initiated by stimulating debates on people's visions of development. With questions such as "If you came back as a spirit in 100 years time, what would you like to see in your village?", farmers are stimulated to think about non material values. The subsequent discussions reflect the farmers' concern for environmental issues. These debates are guided towards retrospection (for example, mapping) and to exploring the reasons for environmental and social change. Raising awareness through debate and the joint analysis of change combined with social learning activates negotiations on values and social norms and creates interest in working towards the visions formulated in the group. Through use of codes, the issues of different perceptions on development and the need for a common goal are also discussed.

Tools for learning

There are a variety of tools that can be used to stimulate the process of group exploration, discovery and learning. Some of these are described below.

Comparing soils

Two simulated soil profiles contained in glass boxes with an outlet at the bottom are compared (Fig. 1). One profile is eroded and as a result has shallow topsoil. The other profile simulates well managed, non-eroded soil. An equal amount of water is poured into the two soil columns. The shallow, eroded soil has a lower water retention capacity and half of the water immediately flows away. The non-eroded profile is able to hold most of the water. Having observed this simple experiment, the farmers' learning process is facilitated by questions such as "What happened?", "Why did it happen?", "What effect has this on plants growing on these soils?", "Have you seen this happen in your fields?", and "What is the effect in your field and has this changed over the last few decades?". In that way farmers discover and analyse biophysical principles and relate them to their situation. The analysis reveals the link between human-induced drought and soil erosion.

Figure 1: Simulation of two soil profiles, one of which is eroded and the other which has been well protected.

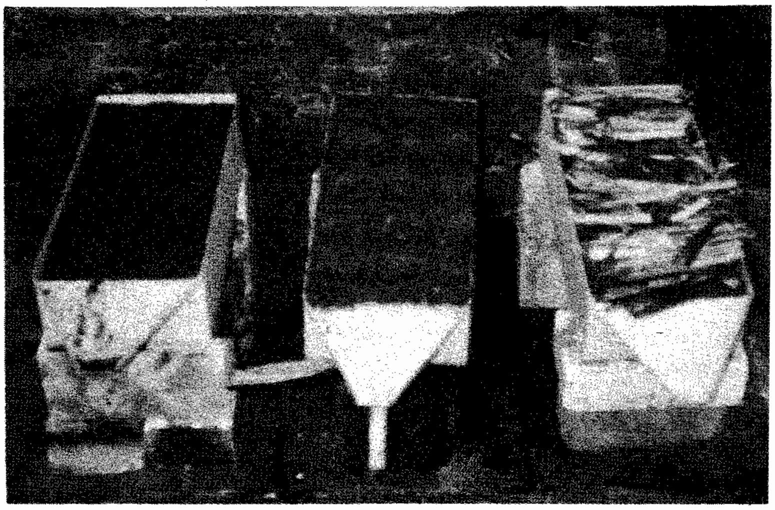
The rainfall simulator

Three fields, the first (a) being bare ploughed, the second (b) ridged and the third (c) mulched, are compared during a simulated 'rainstorm' induced by a watering can. The fields are simulated by boxes measuring 0.3m × 0.5m × 0.1m with an outlet in the bottom and a chute in the top (Fig. 2). Runoff, soil loss and groundwater outflow are collected in glass beakers from the three 'fields'. High runoff and soil loss occurs on the bare ploughed field, whereas on the mulched and ridged fields, runoff and soil losses are low and groundwater outflow high. Questions similar to those mentioned above are asked to encourage farmers to analyse these observations and relate them to their own environment and practices.

Metaphors, sayings and codes

In the discussions, the use of an imaginative language, sayings and codes relating to the life world of the farmers is encouraged. For example, a farmer compared the dynamics of water in the soil to the workings of blood in the body; a gully becoming a wound which allows blood to drain away. This is related to the drying up of wetlands through gullies. To encourage experimentation common sayings like "once upon a time an old lady from Chivi cooked stones and produced a tasty soup" are mentioned to show that the idea of trying out has been known and encouraged in society.

Figure 2: Simulation of rainfall in three fields with different levels of protection (Elwell 1986).



from a distance. These codes provide an entry for a debate on farmers' perceptions. The type of facilitation that takes place, however, is extremely important. Questions on the situation depicted in the picture/game/role play are asked and these are then developed into questions that create links with the 'real life' situation. The farmers then discuss the various answers generated by the group. The facilitator's function is restricted to summarising the discussions and guiding the process.

Think tanks

Think tanks, where numerous technical options are shown in the field, are used to expose representatives selected by communities to the technical options available in land husbandry. The sources of these innovations are creative farmers, training centres and research stations. Visits to 'think tanks' are organised and farmers are encouraged to identify 'think tanks' and organise visits to these sites. Feedback to the community after such excursions is an extremely important step in encouraging

Metaphors together with songs, stories, proverbs and dances are used to relate environmental processes to the farmers' everyday reality. Pictures of degraded landscape, for example, with people struggling to get firewood, or a variety of games that simulate the use of common resources, are also important. Role-plays depicting situations help rural people to analyse their own situation

Figure 3: The simple paired experiment in a farmers field.

other community members to experiment with new ideas. Visits by farmers can also have the effect of introducing changes at research-station level. Farmers' feedback encourages researchers to test and demonstrate farmer-generated technologies on station.

Simple paired design experiments for comparison

Conventional practice and new ideas are compared by placing them side by side in one field (Fig. 3). The possibility of making comparisons in this way allows farmers to continually monitor and analyse what they see. This leads to an understanding of the processes and factors that influence the performance of technologies (learning by experimenting).

Competitions for the best ideas

Competitions help revive the farmers' own knowledge and generate a willingness to try out new things. Trying can be a new, positive social norm that replaces the common fear of failure in an experiment. That way the tendency to wait for outsiders' solutions is replaced by farmers' own knowledge. To avoid innovators being victimized by fellow villagers, a two-way competition can be introduced: individuals in a community compete, and then different communities compete against each other. In this way innovators are accorded more respect by their community since if they are to win as a community, as many 'ordinary' farmers as possible are likely to copy their ideas. Criteria for judging the competitions are set by farmers in co-operation with extension workers.

Sharing know how and experiences

The experience gained during field days, farmer evaluations, exposure visits and workshops, for example, are extremely important tools in facilitating group/social learning. They also ensure that most community members have equal access to knowledge. The presentation of a farmer's own experiments and experiences to others can strengthen his or her confidence and pride.

Impact of the tools

The main impact of the learning tools has been that farmers understand the processes that take

Table 1: Example of a farmer's experiments:
Mr. Ephraim Muzongoza's trials in the 1996/97 season

Innovation/Experiment	Source of Idea	Motivation
Manure planting in holes (a form of Zai tillage)	Extension worker	Land shortage
Intercropping	Uncle	Land shortage
Relay cropping	Own idea (traditional practice)	Land shortage
Infiltration pits	Another farmer	Low rainfall
Infiltration pits and compost	Own idea	Manure shortage
Comparison of humus and ash type compost	Own idea	Lack of knowledge on best compost type
Comparison of planting rice in lines and broadcasting	Own idea	Saving labour
Mulching	UZ researchers	Soil erosion
Planting crops in contour drains	Other farmers	Land shortage
Establishment of vertiver grass	Other farmers	Soil erosion
Mulching with shells of wild orange fruit	Own idea	Shortage of mulch
Planting of two fruit trees in one station	Own idea	Problem of animal damage
Use of hot pepper to control pests on vegetables	Traditional practice	Cost of chemical pesticides

place on their fields and as a result their own experimentation has been strengthened. Farmers' experimentation takes place in several forms that include experimentation with soil conservation practices, fertilizers, varieties, implements, planting techniques and many more. Reasons for experimentation are also several and varied. They include curiosity, just to try out what comes to mind, to solve problems, to find solutions for current pressing problems, to adapt technologies to local conditions and to farmers' specific interests and preferences. The experiments of one farmer in Chivi are shown in Table 1.

Conclusion

Some of the learning tools utilised in the process of participatory extension and research have been presented in this article. More are available and many more should be developed. They can be highly effective in enhancing the self-analysis and learning of farmers for land literacy and land husbandry. The tools, however, are only as good as the facilitation. In terms of diversity in technology, it appears that once farmers understand the dynamics of the environment, they themselves come to apply an integrated land husbandry approach. Experience in developing soil and water conservation techniques in Southern Zimbabwe has resulted in many technical options and effective soil and water conservation (Hagmann *et al.*, 1997). Farmers call this capacity building process – the school of trying (*Chikoro che kuturaya*).

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