From teaching to learning

Tools for learning about soil and water conservation

Experiment-based participation research in Southern Zimbabwe has shown that land literacy leads to land conservation. Farmers who understand the dynamics of their environment are more effective in their soil preservation and water management strategies. Regional studies in Masvingo, a dry zone to the south of Harare, have shown that conventional contour ridging had little positive effect in two-thirds of the fields studied. Small, site-specific measures, however, revealed considerable potential but to use them effectively farmers need to understand the bio-physical processes at work in their fields. Whilst teaching and demonstrating standardised techniques – practices central to conventional extension work – perpetuate farmer dependence on 'knowledgeable outsiders', land literacy stimulates their capacity to generate creative land husbandry solutions.

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For many years conventional extension practices in Zimbabwe emphasised oral communication at the expense of visual stimuli - farmers were frequently assumed to be illiterate - and little attention was paid to women farmers who often felt inhibited in male-dominated groups. The authorities used promises of higher yields, material benefits and coercion to motivate farmers to carry out technical interventions in the interest of halting soil degradation. The fact that farmers adopted techniques such as contour ridging in more than 90% of their fields seemed promising. A less favourable picture emerges, however, if the impact of soil conservation measures rather than the extent to which farmers adopted soil conservation techniques are taken as the critical indicators. Recent research shows that in two-thirds of the fields studied contour ridging did not stop erosion but often accelerated it (Hagmann 1996).

The effectiveness of taking 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 was demonstrated by these studies. 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". By exploring the causes and effects of soil erosion and monitoring them in their own fields, farmers come to an understanding of bio-physical processes. They 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 site and situation.

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

Farmers have many motives for undertaking conservation. In our studies we found that high yields were an important factor but farmers also wanted to minimise other off-field damage such as dams silting up and wells and rivers drying out. We discovered that farmers and their communities valued their environment highly. However, before these values can become criteria they must be identified and discussed: only then can they actively influence farmers' decision making.

How to raise farmers' capacity

The most effective, pedagogic way to come to an understanding of complex issues is 'learning by doing', 'action learning', 'experiential learning' and 'discovery learning'. All these principles stress the need to get involved in action and debate in order to build up experiences, share these with other people and learn more in an iterative process of action, reflection, self-evaluation and new action. Instead of being taught extension techniques, farmers are inspired to analyse their situation together, to put forward and try out their own ideas and known technical options. These experiences and lessons are then shared with other farmers and the larger community.

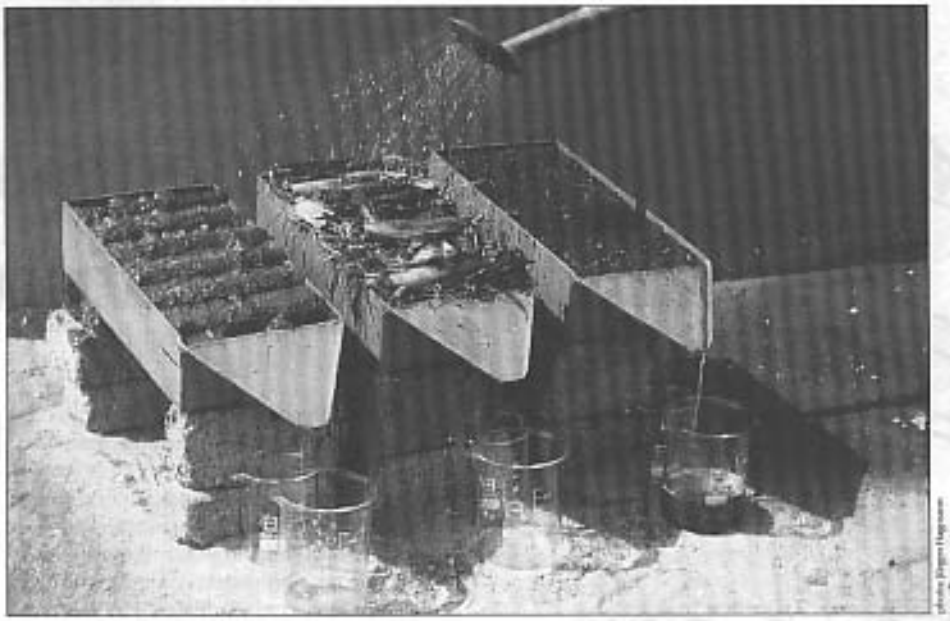
This extension approach is being practised in Southern Zimbabwe and contains an individual and a social learning component: the platform on which learning is based is one of experimentation and sharing (see Hagmann, Chuma and Murwira 1997). In putting ideas developed in this way into practice we use a variety of 'learning tools' by which farmer awareness is increased and processes are discovered.

Tapping visions and values

We initiate this learning process in community workshops 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?" people were stimulated to think about non-material values. The subsequent discussions often reflected the farmers' concern for environmental issues.

Debates were guided towards retrospection (for example, mapping) and to exploring the reasons for environmental and social change. Raising awareness through discussion and the joint analysis of change in combination with social learning gives form to values and creates an interest in working with concrete learning tools to realise the visions formulated in the group.

The 'two soils' in action during an awareness field day.



The rainfall simulator

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. One profile is eroded and as a result has a 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 water. Having observed this simple experiment, the farmers learning process is facilitated by such questions 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?", "What is the effect in your field and has this changed over the last few decades?". In this way farmers discover and analyse bio-physical principles and relate them to their situation. The analysis reveals the link between the (man-made) drought and soil erosion.

The rainfall simulator

Three fields - one ploughed, one ridged and one mulched - are compared during a 'rainstorm' induced by a watering can. In reality these fields are boxes measuring 0.3 m x 0.5 m x 0.1 m with an outlet in the bottom and a chute in the top. Runoff, soil loss and groundwater outflow are collected in glass beakers from the three 'fields'. High runoff and soil loss occurs on the ploughed field, whereas on the mulched and ridged fields runoff and soil losses were low and groundwater outflow was high. Questions similar to those mentioned above were asked to encourage farmers to analyse these observations and relate them to their own environment and practices. (tool/learning aid adapted from Elwell 1986).

Metaphors and codes

Discussions encouraged the use of imaginative language derived from the farmers' life world. For example, a farmer compared the dynamics of water in the soil to the workings of blood in the body: a gully becomes a wound which allows blood to drain away. Such 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 games such as the nuts game which simulate the use of common resources are also important. Role play depicting situations in play form help rural people to analyse their own situation 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. First, 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 function is restricted to summarising the discussions and guiding the process.

Think tanks

Think tanks, where numerous technical options are explored, are used to expose representatives selected by communities to the technical options open in land husbandry. In our case the source of these innovations are creative farmers, training centres and research stations. Visits to think tanks have become so popular that farmers hire and pay for buses to visit these locations themselves on their own initiative .

Comparison

Conventional practice and new ideas are compared by placing them side by side in one field. The possibility of making comparisons in this way allows farmers to continually monitor and analyse what they see.

Competitions for the best ideas

Such competitions help revive the farmers' own knowledge and generate a willingness to try out new things. In many communities trying out has become a new, positive social norm and the idea that an experiment or an idea can fail is largely ignored. This spirit has replaced the tendency to wait for outsiders' solutions and has re-valued farmers' knowledge. To avoid innovators being victimised by fellow villages, a two-way competition has been introduced: individuals in a community compete, but different communities compete against each other. In this way innovators are accorded more respect by their community, whilst it is also in their interest - if they are to win - that as many 'ordinary' farmers copy their ideas as possible.

Sharing know-how and experiences

Sharing and debating know-how and 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.

Conclusion

These are some learning tools used in the process of experimentation-based participatory extension and research. More are available and many more should be developed. They can be highly effective in enhancing farmers' self-analysis and learning for land literacy and land husbandry. This leads ultimately to effective soil and water conservation. Farmers call this capacity building process *Chikoro chi Kuturaya* - the school of trying. ■

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