Formal and informal knowledge networks in conservation forestry in Zimbabwe

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In view of the alarming rate of deforestation in Zimbabwe's rural areas, the government has initiated a Rural Afforestation Programme which is now being implemented by state agencies, with the help of national and international non-governmental organizations. The main objective of this programme is the growing of trees, mainly gum trees (Eucalyptus spp.), in order to provide communities with a source of fuelwood and poles for construction. The aim of the programme is to shift people's attention to the use of gum trees, as a means of saving the few remaining indigenous forests. Programme implementation has been facilitated by the relaying of information and recommendations from top government departments and research centres, an information flow that has come to represent formal knowledge networks. At the same time, local farmers, in their day-to-day struggle to survive, have come up with their own answer to the exchange of information on conservation forestry, establishing informal knowledge networks. This article, which is based on studies dealing with the Chinyika Resettlement Scheme which became operational in 1983, reviews both formal and informal processes of knowledge generation and dissemination, emphasizing the necessity to integrate these two parallel and complementary knowledge networks.

The study

The present study was conducted in the period July-September 1994 at the Chinyika Resettlement Scheme. This scheme, established in 1983 as part of the government's land redistribution exercise, is located in Makoni North District in the northeastern part of Zimbabwe. At present (1994/1995), this pioneer scheme extends over 121,280 hectares, making it the largest resettlement scheme in Zimbabwe. Rainfall averages 800 mm per annum and half the scheme experiences uneven rainfall and mid-season dry spells. Vegetation is of the mixed bush savanna type, the dominant tree species being Munondo (Julberardia globifora), Muthechani (Combretum hereroense; mouse-eared bush willow), Mufuti (local variety of the Acacia tree family), Musasa (Brachystegia spp.) and Acacia sp.. This dwindling resource greatly contributes, directly or indirectly, to the household economies of the indigenous Maungwe people, who comprise the majority of resettled farmers.

The objective of the study was to establish the factors behind the paradox of continued deforestation despite reduced population pressures and intensified forestry extension efforts. This was done by analyzing and documenting the de jure (official) and de facto (actual) objectives, instruments and strategies of policies and programmes aimed at conservation forestry. Data were collected by means of formal and quantitative methods such as questionnaire surveys, and informal and qualitative methods which included rapid rural appraisals, participatory rural appraisals, anthropological techniques of recording oral histories, and participant observation in case-study situations. The surveys were based on the responses of a selected 10 per cent of the households (500 in total) in each of 11 villages (representing 10 per cent of the scheme's 112 villages), while the case studies involved six representative key informants.

Formal knowledge networks

The Forestry Commission is the agency which officially implements the state-initiated Rural Afforestation Programme. The Commission's mandate includes conservation forestry, forestry research and forestry extension. As the Forestry Commission is understaffed, most of the field work is carried out by the Department of Agricultural, Technical and Extension Services (AGRITEX), which makes it the de facto implementer of the Rural Afforestation Programme. Other agencies which are directly or indirectly involved include the Natural Resources Board (NRB), the Department of Rural Development, the International Development Research Centre (IDRC), the University of Zimbabwe, the World Development Bank, the African Development Bank, and several NGOs, such as the Netherlands Development Organization (SNV), the Africa 2000 Network, and the Organisation for Environmental and Developmental Activities (ENDA). The linkages and networks connecting these agencies, through which knowledge and information are generated and disseminated, constitute formal knowledge networks.

Much of the forestry research is carried out by the Forest Research Centre in Harare, which is part of the Forestry Commission's country-wide network of forest research centres. Research has tended to concentrate on exotic trees, while indigenous trees--both research into and the actual establishment of woodlots--have been neglected, due to what Forestry Commission technical researchers describe as serious germination problems and disappointing growth rates. Researchers feel that farmers are not interested in planting indigenous trees, since these can be found in the forest. They also believe that farmers are not sufficiently knowledgeable when it comes to planting indigenous trees, let alone experimenting with them. In their perception, research is the domain of scientists who are steadily pushing forward the frontiers of knowledge and developing new technologies. This perception has always been a part of the 'new scientific' attitude. According to Reijntjes, Haverkort and Waters-Bayer (1992), indigenous practices, no matter how innovative, have traditionally been regarded as static, almost as if they emerged by a happy coincidence at some point in the evolutionary process, and were then copied without further thought, generation after generation.

The formal knowledge network, which is used to transfer research results, has achieved a great deal in terms of the establishment and management of communal woodlots. However, weaknesses within the network, among other factors, are now rendering the programme less effective in dealing with more complex social challenges, such as the establishment of woodlots by individuals and the necessity of reducing the destruction of vegetation. In the first place, forestry extension by the Forestry Commission and AGRITEX, whose extension workers see themselves as educators and consciousness-raisers, is based on the Transfer of Technology (TOT) model. According to this model, participation at the various 'stages' in the process of technology development, such as development, dissemination and utilisation, is restricted to a specific set of actors, consisting of researchers, extensionists and farmers. Both in the field, and during what R''ling (1988) refers to as 'the calibration of the science-practice continuum', technical recommendations are dispatched from one group of actors (researchers), via another group (extensionists), to the utilisers (farmers). For the government agencies involved, this results in an almost linear--one-way--relay of information and recommendations, which are passed down from policy makers at the ministerial and departmental head-office level in Harare, through the provincial and district offices, to the ground staff in Chinyika who are responsible for implementing them.

Past research efforts, such as Drinkwater (1992), and failures with the World Bank-funded Training and

Visit (T&V) system, have highlighted the weaknesses of the classical diffusionist model which is adhered to in extension circles. Due to the lack of a feedback mechanism in the system and the 'straight-jacket' mode of research, as in the TOT model, indigenous knowledge has not been incorporated into research and extension; this has also resulted in inappropriate recommendations and low levels of adoption by individual farmers. The outcome of TOT and diffusionist models seems to indicate that local knowledge is superfluous to the development process: local knowledge is seen as inferior to scientific, Western knowledge. For this reason, it is left untapped by development agencies, despite the fact that farmers continue to use, perpetuate, and build on this type of knowledge. It is generated and exchanged within a specific institutional framework, i.e., the so-called informal knowledge networks. Furthermore, there is poor horizontal and vertical communication between researchers, extensionists and some groups of farmers, especially the poorer 'non-adopting' farmers. This has been aggravated by differences in attitudes, perceptions, strategies and real objectives between the three main groups of actors. Examples include the introduction of exotic trees, which are not compatible with the sociocultural life of the local people, and the 'compartmentalisation' of holistic traditional agriculture into forestry, cropping systems, animal husbandry, and water management (Hanyani-Mlambo, 1995). The long lines of communication are compounded by the largely one-way nature of communication within the Forestry Commission, AGRITEX and NRB, among others. This means that many of their perceptions of the problems encountered by their front-line staff staff are inaccurate.

The various organizations involved in the conservation forestry programme in Chinyika also maintain formal networks among themselves, which have enhanced the successes attained by components of the Programme. Efforts at coordination have been made in staff and farmer training, extension and general information dissemination, advisory services, and the identification and mobilisation of farmers and farmers' groups. The latter aspect highlights formal knowledge networks between the farmers themselves. The formal relationship between these local actors is reflected in the formation of village groups which act as extension groups, as well as gum woodlot establishment and management groups. Such groups also form the basis of formal networks linking farmers and the intervening actors.

The informal networks

The discussion on formal knowledge and information networks, while exposing the weaknesses within them, has also revealed that these interlinkages are important for the coordinated implementation of the Rural Afforestation Programme. Equally important, however, are the informal networks which emerge from the partial accommodation and cooperation between and within various state agencies, NGOs, other international organizations and groups of farmers. Informal networks are characterized by the development and exchange of knowledge through regular interaction or informal contacts between different actors. In addition, informal networks are characterized by multifaceted knowledge generation. But what makes these networks so different from formal networks is the effort by individual departments, staff members and local communities to create and maintain them. Again, the emphasis is on a one-to-one networking effort, as opposed to the 'organizational culture' that characterizes most formal networks. The most interesting groups of the informal networks which we see emerging are those involving local actors--the indigenous farmers.

Contrary to common belief, indigenous farmers--like technical forestry researchers--are experimenters. They have always been experimenters and empirical evidence from Chinyika and elsewhere indicates that farmers today are also involved in informal research. In the past, many indigenous cultivators saw

agriculture not just as a means of production but as a way of life. Therefore, greater importance was attached to reducing or spreading the risk than to maximizing production. Special strategies were developed to minimize risk; for example, diversity was promoted by using combinations of crop varieties, species, animals and farming systems. One such strategy was agroforestry, in which farmers combined the cultivation of food crops with livestock production and long-term crops such as trees. This purposeful integration of different resources and farming practices, one of the strong points of agroforestry, provided the Maungwe people with crops, fruits, vegetables, meat, firewood, timber and medicines. Using similar processes of innovation and adaptation, indigenous farmers developed numerous different farming systems, each of which was fine-tuned to its ecological, economic and sociocultural environment. However, reading through the current literature, one would be inclined to conclude that local-level experimentation was externally initiated, and that agroforestry started only five or six years ago (Chambers et al., 1989; Scoones and Thompson, 1994).

Today, farmers are still experimenting, in order to minimize risk, adapt technical recommendations to local conditions, solve specific problems, test existing technologies or ideas (Hanyani-Mlambo, 1995; Rhoades and Bebbington, 1988), and adjust to the changes in climatic and socioeconomic conditions. In Chinyika, one innovative farmer in the study has been experimenting for many years with both exotic and indigenous trees , and devising ways of protecting these resources. But what makes him exceptional is the fact that all the trees at his homestead (both exotic and indigenous) started out as seedlings transplanted from his own nursery. These include Gum tree (Eucalyptus spp.), Jacaranda (Jacaranda mimosifolia), Avocado (Persea americana), Mufuti (Brachystegia boehmii; member of the Acacia family), Muthowe (Azanza garckeana; snot-apple tree), and Mukute (Syzyglum cordatum; water berry). This is an example of a single-handed effort at sustainable development. Moreover, it was the success of his trial-and-error experimentation with indigenous trees that got technical forestry researchers thinking, since in their perception, farmers are not knowledgeable about such subjects.

This farmer and others like him prefer to use various strategies to combat termites and ants, rather than the Marshalsuscon termite remedy recommended by AGRITEX, which is not readily available and extremely expensive. Termites are the major destroyers of gum and orchard trees, especially during the early stages of their growth. Through their informal experiments, farmers discovered that either ashes or a mix of Munyambanje (a small smelly plant) ground together with onions and paraffin or used oil can be used as termite and ant repellents. Farmers also burn the bottom of poles in order to lengthen their life span, rather than using creosote or used oil, as recommended by AGRITEX. This preserves poles longer, since termites cannot eat the blackened surface; moreover, the effect does not fade with time.

There are other sources of indigenous knowledge besides innovative farmers. These include indigenous experts, opinion leaders, and village elders. Locally-generated knowledge is disseminated through farmer-to-farmer interactions, usually involving neighbours or friends (sahwira), which take place during personal visits, at farmer group or village gatherings, in social clubs and especially at beer meetings. Actually, most innovative farmers have set up around them networks of other experimenting farmers who have the courage and creativity to go their own way, and to develop technologies which have thus far been overlooked by mainstream researchers, and which extension staff do not consider relevant. However, these farmers continue to maintain formal and informal links with forestry and agricultural extension agents. In the course of the resettlement scheme, informal farmer networks have been established to deal with common practice production problems, resulting in multiple and overlapping networks. In spite of all these initiatives, one problem remains: that of the 'subordination' or

'ignorance syndrome'. There are two sides to the problem. On the one hand, farmers display ignorance or subordination towards external experts like extensionists. On the other hand, extensionists and experts often approach the farmers implying naturally that they are ignorant. This leads to much disappointment or frustration among the farmers, sometimes resulting in the loss of their own initiatives. The cause of this problem may be both the conservative and self-effacing nature of resettlement farmers, and the top-down approaches that have been used for so long by extension agents.

Informal knowledge networks are also built around traditional channels of communication, such as the use of the 'folk media', word-of-mouth, and example (as in apprenticeships). These have been employed in the past and are still being used to pass on general conservation knowledge and information related to conservation forestry from generation to generation and from one individual farmer to another. The information relayed includes the types, names and parts of trees traditionally used for, say, cattle fodder, such as the fruits and leaves of Mupangara, Muunga, Mupani, Mutowa and Musekesa, and ethnoveterinary medicines such as the fruit of the Mutamba. Using the same channels, unwritten traditional and religious laws have been passed on to other locals; these are concerned with such questions as who should deal with tree resources and how this should be done, and how to ensure that certain trees are preserved or their use limited. These laws were usually integrated into belief systems and cultural norms, and expressed in traditions and myths. For example, traditional elders conserved specimens of special trees such as the Mukute, Musambangwena and Munzambare (used to identify areas with large amounts of underground water), Mutiusinazita (used for rain-making ceremonies), Musoswafa (used on graves) and fruit trees (prized for their contribution to food security and economic value).

Another process used in Chinyika and most rural areas is the consolidation of local havens of knowledge through inter-regional and cross-border networks involving distant relatives and members of the family who are migrant workers. According to research work done by the Social Forestry Unit of the Forest Research Centre, not only eucalyptus, but up to 90 other tree species are being planted by farmers, without the establishment of any formal agency; these species were 'discovered' by farmers on their visits to towns and distant workplaces (Clarke, 1994, personal communication). Research in Chinyika has revealed that other source areas include surrounding resettlement schemes and communal area villages. Such externally acquired knowledge is internalized, used and adapted to suit local conditions. The generation and dissemination of location-specific, technically appropriate and socially compatible experimental results has greatly increased the adoption of techniques for establishing and protecting woodlots.

In addition to these informal networks, most farmers still maintain formal and informal links with forestry and agricultural extension workers and other mediating and intervening agencies. Farmers have always been known to take considerable time to explore various possibilities, and to carefully integrate knowledge and information from various sources within their circles of confidence before making decisions. The whole networking process is set up in such a way that knowledge is transferred from the formal to the informal network and vice versa. However, the reverse flow is weak, while the informal network is shunned and underutilised by official state agencies and NGOs. Despite these weaknesses, the articulation of the formal and informal networks is still vital for the overall conservation forestry programme. In other words we should not glorify either local indigenous knowledge or Western, scientific knowledge, but rather critically analyze both in order to see how they come together in the farmers' practices. Both local people (in our case farmers) and agricultural specialists are engaged in

research. But the manner in which they conduct that research is very different.

The way forward

Empirical evidence from Chinyika and elsewhere has shown that the central source of innovation model does not conform to reality (Hanyani-Mlambo, 1995; R"ling, 1988; Box, 1990). This, together with the obstacles and limited success of current conservation forestry programmes, makes it imperative to adopt changes to research and extension approaches so that they can make better use of the complementarity of the formal and informal knowledge networks.

In the first place, forestry researchers at both the station and the national level, and other technical interveners such as extension agents, should take into account the agroecological and socioeconomic situation, the local knowledge, and the informal research carried out by local communities. Research will then seek to address farmer-identified problems and constraints. Researchers will begin by examining the needs of local people, and what they already know, and then go on to adapt farmers' own practices, while treating them as partners in research. This participatory approach means involving local people in all stages of the technology development process, which includes the generation, dissemination and utilisation of technology, as well as research planning, implementation and evaluation processes. The proposed approach, is presented as a two-way interactive model with strong linkages between researchers, extensionists and local farmers, a strong feedback mechanism, and active participation by all sets of actors.

In contrast to current top-down extension approaches, the extension agents using the new approach will cease to be educators and consciousness-raisers; they will assume a new role as facilitators in farmers' own forest resource management and tree-growing activities. The extension system will facilitate the exchange of knowledge between researchers and innovative farmers, thereby establishing the feedback system in forestry technology development processes which is so sorely needed. By the same token, extensionists will strengthen farmers' informal knowledge networks by assisting farmer-to-farmer knowledge exchange processes through such platforms as field trips, field days and innovative farmer workshops.

Finally, given the positive complementarity between the formal and informal knowledge networks in the conservation forestry sector, it is clear that the success of the overall conservation forestry programme will be guaranteed if the authorities concerned exploit this complementarity by integrating the two networks.

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Endnotes

* If available, the local, Latin and English names are given.

* TOT stands for Transfer of Technology model and is an example of the diffusionist approach. Working in the TOT mode means actually overlooking local forms and sources of knowledge, which are seen as inferior to scientific or Western forms of knowledge.

* The Training and Visit (T&V) system of extension is based on the idea that extension resources can be made available to a particular farmer, who than further disseminates the technical message to his neighbours. The T&V system has been seriously criticized because of its focus on the better-off members of the farming population, and the fact that it does not take into account the unequal power relations in the rural areas (see Van der Ban and Hawkins (1988) and R"ling (1988) for a critical overview of extension methods and systems).

* The diffusion model is based on the relatively simple idea that new technologies generated elsewhere can easily be introduced into the agricultural sector. The assumption is that these innovations will first be used by the richer and more entrepreneurial sections of the rural community, but later, as result of a trickle-down process almost automatically percolate through to the poorer sections of the community.

Highlights

The objective was to establish the factors behind the paradox of continued deforestation despite reduced population pressures and intensified forestry extension efforts

Researchers feel that farmers are not interested in planting indigenous trees, since these can be found in the forest

Village groups form the basis of formal networks linking farmers and the intervening actors

Informal networks differ from formal networks in the effort put in by individual departments, staff members and local communities to create and maintain them

Most innovative farmers have set up around them networks of other experimenting farmers who have the courage and creativity to go their own way

Extension agents will assume a new role as facilitators in farmers' own forest resource management and tree-growing activities

By facilitating the exchange of knowledge between researchers and innovative farmers, the sorely needed feedback system in forestry technology development processes will be established

The success of the conservation forestry programme will be guaranteed if the two networks are integrated

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