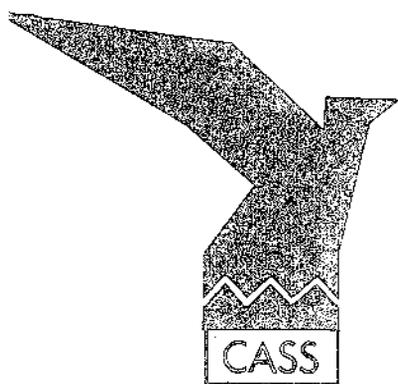


Centre for
Applied
Social
Sciences



**'A Participatory Model of Agricultural
Research and Extension: the Case of Vleis,
Trees and Grazing Schemes in the
Dry South of Zimbabwe.'**

by

Ian Scoones* and Ben Cousins**

Reprinted July 1993

University of Zimbabwe

**CENTRE FOR APPLIED SOCIAL SCIENCES
University of Zimbabwe
P O Box MP 167
HARARE**

(CASS - NRM Occasional Paper Series ; 1993)

**'A Participatory Model of Agricultural
Research and Extension: the Case of Vleis,
Trees and Grazing Schemes in the
Dry South of Zimbabwe.'**

by

Ian Scoones* and Ben Cousins**

Reprinted July 1993

***Imperial College, University of London and University of Zimbabwe**

****Centre for Applied Social Sciences, University of Zimbabwe**

TABLE OF CONTENTS

1. THE NEED FOR A NEW MODEL OF AGRICULTURAL RESEARCH AND EXTENSION	1
2. THE TRANSFER-OF-TECHNOLOGY MODEL	2
3. AN ALTERNATIVE MODEL: FARMER-FIRST-AND-LAST (FFL)	2
4. AGRICULTURAL RESEARCH AND FARMERS IN THE SEMI-ARID AREAS OF ZIMBABWE	5
5. EXPERIENCES OF FARMER PARTICIPATORY RESEARCH AND EXTENSION IN ZVISHAVANE DISTRICT: (I) THE VLEI PROJECT	8
5.1 Initial characterisation: historical surveys	8
5.2 Classification and typologies	9
5.3 Agroecosystem functioning	9
5.4 Sustainability analysis	10
5.5 Defining the action/research agenda	11
6. THE TREE RESOURCES PROJECT	12
7. METHODOLOGICAL ISSUES	14
7.1 Indigenous Technical Knowledge (ITK)	14
7.2 Group workshops	15
8. GRAZING SCHEMES AND PARTICIPATORY RESEARCH	16
9. CONCLUSION	19
REFERENCES	20

LIST OF TABLES

Table 1. Typical Contrasts in Physical, Social and Economic Conditions	3
Table 2. Contrasts in Learning and Location	4
Table 3. Food Scarcity and Drought Vulnerability by Natural Region	6

LIST OF FIGURES

Figure 1. Procedures Used in the Tree Resources Project, . . .	13
--	----

1. THE NEED FOR A NEW MODEL OF AGRICULTURAL RESEARCH AND EXTENSION

Why have peasant farmers in Africa not adopted modern agricultural technology more readily? In the past the most common diagnosis was peasant ignorance or cultural conservatism. The answer then 'obviously' lays in programmes of education and extension - hence the major investments in improving extension services in the 1950s and 1960s. The oft-repeated exhortation to 'educate the farmers' can still be heard today in some quarters.

In the 1970s and 1980s a new trend of thought emerged amongst agricultural economists and development planners which proclaimed the rationality of decision-making in rural farm-households. Obstacles to improved production were seen to be mainly external constraints on decision-makers - constraints such as restricted access to resources and the need of such farm-households to minimise risk. Thus improved understanding of the nature of these constraints by agricultural research scientists and extension agents became important, so that more appropriate technologies and more adoptable extension recommendations would be passed on to the farmers. Other suggested interventions were better prices for agricultural produce, upgraded transport and other infrastructure, the wider provision of credit, improved inputs supply and marketing systems, and so on.

The results of these kinds of diagnoses and prescriptions have, however, generally been disappointing. Significant improvements in 'practice-adoption' and increases in production have generally been achieved by only a minority of resource-rich farmers (RRFs). The bulk of the rural population of Africa is made up of resource-poor farmers (RPFs), defined, as those 'whose resources of land, water, labour and capital do not currently permit a decent and secure family livelihood' (Chambers and Ghildyal 1985). and here success has been much more elusive.

As a result attention is being shifted to the deficiencies of the technology itself, and even more importantly, to the process by which the technology is generated. In the older models the roles of research scientist, extension agent and farmer were well defined and seen as unproblematic; researchers generated the technology, extension officer communicated it, and farmers adopted (or failed to adopt) the solutions to their problems.

In some versions of this model, such as the Training and Visit (T & V) system of extension, the problems that farmers faced were communicated back to research scientists by field extension staff, who also assisted in the adaptation of standard recommendations (eg for fertilizer application) to suit particular conditions. Farmers, however, remained essentially passive recipients of the 'medicine' prescribed for them by development experts. It is these roles that are now increasingly being brought into question, and the active participation of farmers in the whole process of technology generation is at the heart of the search for a new paradigm for agricultural research and extension.

2. THE TRANSFER-OF-TECHNOLOGY MODEL

One of the most influential voices in this debate is that of Robert Chambers. Chambers and Ms co-authors have typified the dominant paradigm, as described briefly above, as the Transfer-of-Technology (TOT) model. In their analysis the main reason why this model has not been effective with regard to resource poor farmers is because

technologies . . . bear the imprint of the conditions in which they are generated. They are then adoptable in similar conditions, but often not adoptable where conditions differ (Chambers and Ghildyal 1985, p6)

Because conditions on research stations, where most agricultural research has been carried out in the past, are often similar to those on resource-rich farms, and usually very different to those on resource-poor farms, it is hardly surprising that the technology generated through this process does not meet the latter's needs. The contrasts in conditions which give rise to this phenomenon are summarised in Table 1.

In the Zimbabwean context the model fits reality most closely if we equate resource-rich farmers with Large Scale Commercial farmers, and indeed this would have been entirely apposite before independence. But even within the major reorientation towards communal area farmers by research and extension that has taken place since 1980 the same kinds of contrasts may be found. If we see 'resource-rich' as a relative term, then the bulk of current agricultural research programmes are still servicing farmers in the high-potential regions of the country, and within these regions those farmers who are either users of purchased inputs or cash crop growers.

3. AN ALTERNATIVE MODEL: FARMER-FIRST-AND-LAST (FFL)

Chambers and his colleagues have suggested an alternative model of agricultural research which entails fundamental reversals of learning and location. *In* their Farmer-First-and-Last (FFL) model one starts with the perceptions and priorities of RPF families rather than those of scientists. Research and learning are located on the resource-poor farm rather than on the research station and in the laboratory. Problems in need of research are identified by reference to the needs and opportunities of the farmer, and the research station has a referral and consultancy role serving the RPF family. Success is judged not by the rigour of research or by yields in resource-rich conditions, but by the spread of technology amongst the resource poor. These reversals are summarised in Table 2.

Table 1. Typical Contrasts in Physical, Social and Economic Conditions
(Not all apply all the time, but most apply most of the time)

Stations	Research Farm (RRF)	Resource Rich Farm (RPF)	Resource Poor
<u>Physical conditions:</u>			
Soil	Deep, fertile	Deep, fertile	Shallow, infertile
Topography	Flat or terraced	Flat or terraced	Often undulating, sloping.
Nutrient Deficiency	Rare	Occasional	Common
Plot size and nature.	Large, square	Large	Small, irregular.
Hazards	Nil or few	Few, usually controllable	More common: floods, droughts -
Size of management unit	Large, contiguous	Large or medium, contiguous	Small, often fragmented
<u>Social and economic conditions:</u>			
Access to inputs	Unlimited, reliable	High, reliable	Low, unreliable
Access to credit	Unlimited	Good access	Poor access
Labour	Unlimited, no constraint	Hired, few constraints	Family, constraining at seasonal peaks
Prices	Irrelevant	Lower than RPF for inputs, higher than RPF for outputs	Higher than RRF for inputs, lower than RRF for outputs
Priority for food production	Neutral	Low	High

(Adapted from Chambers and Ghildyal 1985, and Chambers and Jiggins 1986)

Table 2. Contrasts in Learning and Location

	TOT	FFL
Research priorities determined by	Needs, problems, perceptions and environment of scientists.	Needs, problems etc. of farmers.
Crucial learning is that of:	Farmers from scientists.	Scientists from farmers
Role of farmer:	'Beneficiary'.	Client and professional colleague.
Role of scientist:	Generator of technology.	Consultant and collaborator.
Location of research and develop.	Research station, lab, glasshouse.	Farmers' fields and conditions.
Features of research and development determined by:	Farmers' needs and preferences. Research station resources.	Scientists' needs and preferences. Farm-level resources.
Non-adoption explained by:	Failure of farmer to learn. Farm-level constraints.	Failure of scientist to learn from farmer. Research station constraints.
Evaluation by:	Publications, scientists' peers.	Adoption, farmers.

(Adapted from Chambers and Ghildyal, 1985)

Thus the three major components of FFL are:

- (i) a distinctive diagnostic procedure, learning from farmers
- (ii) generating technology on-farm and with-farmer
- (iii) evaluation of technology by adoption or non-adoption.

Is this not the same as the now widespread practice of Farming Systems Research (FSR)? It is clear that in a number of ways FSR has departed from a conventional TOT approach. It seeks to understand the complexity of farm-household systems, including the needs and objectives of farmers and their families, and does so by means of multi-disciplinary teams which encompass **biological**, social and economic dimensions. In the diagnosis phase FSR involves consultation with farmers on their problems. Relatively homogeneous groups of farmers who are likely to encounter similar problems and opportunities are identified as 'recommendation domains'. On-farm trials are often farmer-managed, and farmers assist in the evaluation of research results.

But does this go far enough? Chambers and Jiggins (1986) consider FSR an adaption of the TOT model rather than as a fundamental break with it. They claim that in FSR the power of choice remains primarily with the scientists, who make the important decisions about what to try and what to do. The linear sequence of classical TOT has been modified by building in feedback loops and cycles of referral and evaluation, but 'in the absence of farmers' determination of research agendas, the process remains **TOT**, with the scientist first and the farmer last', (Chambers and Jiggins 1986, **p.19**).

These views have been criticized recently by Farrington and Martin (1987), who see a need for participatory approaches which complement FSR rather than attempt to replace it. In their view

Chambers and Jiggins' misgivings relate more to the application of FSR than to the basic concepts involved, and the extreme farmer-centric stance of FFL is unjustified: scientists and the scientific method do have an important role to play. The critical component is the partnership between researchers and farmers.

4. AGRICULTURAL RESEARCH AND FARMERS IN THE SEMI-ARID AREAS OF ZIMBABWE

In Zimbabwe two thirds of the communal area population live in Natural Regions IV and V and both of which are characterised by low and erratic rainfall. They are recommended for extensive and semi-extensive livestock production, although drought-resistant cash crops can be grown in favourable localities. Yet, communal area farmers do not own enough cattle or indeed have sufficient land to engage in commercial ranching, and hence all grow food crops for subsistence and occasional sale as well as cash crops such as cotton and sunflower. The hazards of crop production in these semi-arid areas are emphasised when one considers the probability of a 'normal' season (one in which rainfall is adequate to sustain plant growth without adverse dry spells) occurring in these regions

is of the order of 40 per cent in Natural Region V and 35 per cent in Natural Region IV (Hussein 1987).

Since Zimbabwe attained its independence in 1980 communal area farmers, with the help of increased levels of credit and improved supplies of inputs, have begun to purchase significantly larger amounts of fertilizers and chemicals, and marketed surpluses from this sub-sector have risen dramatically, Zimbabwe has been hailed as a rare success story in respect of peasant production for the market.

However, these increases in production and sales have not occurred 'across the board' but rather reflect an increasing differentiation of the communal area population which is based both *on* agro-ecological differences and inequalities in the means of production. Thus in 1983/4 63.1 per cent of the maize marketed by communal area farmers came from Natural Regions I and II where only 15 per cent of the communal area population lives (Moyo 1986, p189). A survey conducted in 1984 found that rural households in the drier regions are much more likely than those in the higher rainfall zones to experience food scarcity in most years, and that the great majority of households in Regions IV and V received drought relief food in 1983 (see Table 3).

Table 3. Food Scarcity and Drought Vulnerability by Natural Region

Natural Region	"food is scarce in most years"	Received drought relief food in 1983
II	13,9 %	1,0%
III	16,0 %	41,3 %
IV	20,4 %	67,4 %
V	57,1 %	87,5 %

Source: Weiner, forthcoming

Class-based differentiation is indicated by the marked differences between rural farm-households in all communal areas in respect of land holdings, livestock availability of draught power, access to off-farm income and access to credit. It is suggested by many researchers, currently investigating this issue that the increases in marketed surplus are benefiting only a minority of better-off families. (Moyo 1986, Jackson et al 1987, Adams 1987, Weiner forthcoming).

How has agricultural research and extension attempted to meet the needs of the majority of communal area farmers who mostly live in the dry south and west of Zimbabwe? For many years of course this was not even recognised as a problem let alone seriously addressed. From the point of view of large scale commercial farmers these regions have no dryland cropping potential, and hence the attention of researchers was mostly focused on beef ranching or irrigated crops like sugar cane. Since independence this has begun to

change, and the Farming Systems Research Unit within the Department of **Research** and Specialist Services (**DR & SS**) in **particular** has **attempted** to test potential **technological interventions** aimed at overcoming or alleviating the powerful constraints on mixed crop-livestock **fanning** in the semi-arid areas.

Thus trials involving the **traditional drought-resistant** small grains (sorghum and the millets) have been initiated on **both research station and on-farm** sites (**FRSU 1985**). The Lowveld Research Station in Chiredzi has been working on techniques of water **conservation and concentration, appropriate fertilizer regimes**, relay cropping, variety selection **and sowing** dates. (Jones, Nyamudeza and Nyati **1987**). Attention has also been turned to research aimed at improving **the productivity** of communal area **livestock**, which have **been** almost completely ignored and hence "almost nothing is known **about** them" (**Mombeshora 1985**).

However, to date few reliable **recommendations** have resulted from this research **programme** and it may be **many years** before they do. Some of the results of the **Communal** Area Research Trials programme have thrown **DR & SS** researchers into **confusion**, with a senior scientist revealing in 1986 **that** there was now a need **to reduce** the total number of trials in order to make the programme more manageable, and also to concentrate **on** understanding basic **soil-plant-climate** interactions in **the** sandy soils which **predominate in the communal** areas (**Whingwiri 1986**).

In the **meantime** extension field staff in **the** semi-arid areas have continued to promote 'packages' of **improved practices** which include hybrid **seed**, fertilizers, **pesticides**, **knapsack** sprayers - and indeed in **the** absence of any more appropriate **knowledge**, what else could they be expected to do?

Research in Chiramanzhu (which is in Natural Region III) has shown that the **few farmers** who do make a profit on crops like **maize** do so by applying much less than **the** recommended **amounts** of fertilizer (**Drinkwater 1987**, p 21). And a recent analysis of the economics of fertilizer **use** on maize in Regions III **and** IV suggests that the most **economic** level of application is around **half of that contained** in the present **Agricultural** Finance Corporation (AFC) package on **offer**, and around a quarter to a half of the recommendations based on soil analysis (**Whingwiri et al 1987**).

A few extension officials do **listen to farmers and** attempt to modify **standard** recommendations on the basis of local experience. Dialogue at the extension agent: farmer interface has even **led to innovations being developed**, as in **Maranda** where farmers are advised to plough twice in every second or third furrow to achieve the same effect as a ripper tyne. These are the exceptions **though** - on the whole extension practice still reflects a 'top-down, message-oriented **approach**', even though many **Agritex** staff recognise that 'the **research** that has backed them until now looks neither at the generation of sustainable levels nor the viability of **communal** area production' (**Drinkwater 1987**, p2). The dominant mode of **agricultural research** and extension is still **TOT**, and the result is a dearth of appropriate **technical** recommendations for peasant **farmers in the** semi-arid areas of Zimbabwe,

5. EXPERIENCES OF FARMER PARTICIPATORY RESEARCH AND EXTENSION IN ZVISHAVANE DISTRICT: (I) THE VLEI PROJECT

Participation is the central theme of two projects being developed in Mazvihwa Communal Land in Zvishavane District, which is located in **Natural** Regions IV and V, Both have resulted from local demands generated as a consequence of research, work being carried out in the area. The Oxfam-supported community water resources project is investigating the potential of vlei utilisation and the ENDA-Zimbabwe trees project is concerned with the development of community forestry initiatives. Both projects tackle individual farm potentials (arable production on vleis; agroforestry in fields and at homes), as well as communal resource issues (vleis in grazing land; indigenous woodland development). Both involve the close interaction of research and extension activities. Neither are aspects currently addressed by government policy on dryland agriculture or forestry. It is the general contention of this paper that this policy gap on crucial issues (at least as perceived by farmers) can in part be attributed to the lack of appropriate Research and Extension techniques that can effectively address these types of problems.

Close contact with farmers and a continuing dialogue resulting from research being carried out in Mazvihwa has highlighted vlei areas as being "**key** resources" crucial to the sustainability of the dryland agropastoral system. (Wilson 1986; Scoones 1987). However, very little *is* known about vlei systems especially in the drylands. A more detailed appraisal of their functioning and potential for sustainable use was called for.

The aims of this focussed appraisal have been:

- i) The characterisation of dryland vlei systems in terms of their potentials for use and constraints to sustainable development**
- ii) The investigation of local innovations for testing**
- iii) The identification of key issues for policy, further research, institutional development and extension.**

The appraisal techniques used have been simple and rapid, aimed at encouraging a close alliance between farmer, Extension Worker and researcher at all stages.

5.1 Initial characterisation: historical surveys

Historical precedents are often central to highlighting development constraints and potentials. Recollections of past experience can point to local sources of knowledge of earlier technologies or management practices and institutions that may assist current development attempts. Historical surveys can also show up the shortcomings of previous policies and help to avoid the simple resurrection of past failed approaches. The value of a historical survey has been particularly significant in the vlei project, since nineteenth

and early twentieth century production in the dryland hilly areas of Zimbabwe is thought to have been largely reliant on vlei land (Wilson, 1986). As a consequence a number of production techniques (e.g. ridging, intercropping) were developed and are still remembered. Historical surveys are best carried out on the basis of a selection of key informant interviews to derive a locally specific view of major changes and recollections of particular practices. Older, long term residents, both men and women, are obviously the best source of such information.

5*2 Classification and typologies

Initial investigations require a preliminary categorisation of system types. This is the initial phase of defining relevant " recommendation domains". These need to be flexible and iteratively redefined. In the vlei research a number of different vlei types, differentiated according to environmental characteristics, have been recognised:

- i) Wet vleis: central marshy area; waterlogged in wet years; highly concentrated drainage; multiple catchments; sandy soils surrounding vlei.
- ii) Dry vleis: shallow sloping catchments; no year-round surface water; vegetation distinct from wet vleis; sandy soils surrounding vlei
- iii) Red soil vleis: heavy red soil catchments; rarely water logged; variable catchment types.
- iv) Eroded vleis: gully erosion often stopped; normally in grazing areas. These vlei types can be located either in grazing areas or in arable blocks. In arable area vleis there is usually a seasonal grazing component of unfarmed portions. A working typology, that needs constant revision, can only be derived from a number of visits to different areas. It is developed through direct observation and discussion with farmers. Farmers often have useful local classifications with associated terminologies that can form the basis of further elaboration.

5.3 Agroecosystem **functioning**

A focussed appraisal of system functioning **requires** the investigation of a number of interrelated aspects **which can be subsequently analysed**. The context we **have** found most useful for this appraisal is a group **workshop**. **The** workshop is facilitated by **the** extension worker (EW) and researcher together, who encourage the open discussion of selected issues. In the vlei research these have **been: vlei production and use, environmental determinants, intervention potential and institutional issues**.

~~in and use: the parameters of economic sustainability~~

Discussion of production and use is aimed at assessing the **constraints** and potentials of the existing **production** system. An attempt is made to get a picture of the range of

practices rather than a description of the ideal. A useful technique for qualitative and rapid description is the construction of a flow diagram of production activities. This can incorporate both agricultural and economic factors in the same framework and can be constructed whilst in the process of discussing with farmers. A flow diagram can be a useful tool in identifying problems and opportunities that may involve interactions of agronomic issues, management practices and economic factors.

Seasonality has a great impact in dryland agroecosystems and an appropriate way of looking at this is through the construction of a seasonal calendar. Again interactions and tradeoffs (e.g. between arable and livestock use) are highlighted.

minants and ecological sustainability

A full understanding of the production system requires an investigation of the environmental factors that underlie it. In vlei workshops we discuss in detail soil structures, hydrological patterns, vegetation ecology and the problems of environmental degradation. This is based on farmers' often very detailed local observations and impression of causality.

Issues of conflict, for instance between grazing and arable use or between technical development and local beliefs surrounding sacredness of wetlands sometimes arise (usually obliquely) in discussion. These need to be carefully investigated and we have used interviews with selected informants to gain a better understanding of the issues before raising the question of community management of resources in open discussion.

potential: innovator exchange workshops

A discussion of farmers' experiences of their own development efforts is a useful starting point for prioritising development options and testing/adapting farmer designed interventions. The exchange of ideas among local innovators is a good way of encouraging the dynamic of farmer controlled development. These discussions can serve as an entry point for "outsider" suggestions that can be incorporated into local attempts without imposing solutions. In the vlei project the Oxfam EW has attempted to form farmer groups with a mutual interest in vlei development and it is hoped that these can be the focus for the design and testing of vlei cultivation techniques, low cost irrigation technologies, vlei wells and ponds/fish farming systems in the future.

5.4 Sustainability analysis

A vast array of often disparate, apparently unconnected information and ideas can be generated through a single farmers' workshop. The aim, however, is to generate useful questions for research and development, and flow diagrams and seasonal calendars help to distil out the ecological and economic problems and opportunities. One example from the vlei project illustrates the results of their 'sustainability analysis'. The phenomenon of

dry season (August/September) water-rise, is central to the production success of vleis, allowing relay cropping, diversification of crops and early marketing. The key questions now become: what are the determinants of this phenomenon? What aspects of watershed management are necessary to ensure its continuation? How can late dry season water be more fully exploited in the development of vlei production?

5.5 Defining the action/research agenda

The process of appraisal involves taking an interdisciplinary view based on farmers perspectives and local knowledge. Hopefully what is generated is a set of useful questions for further attention, some of which will need to be addressed by different components of the administration/extension/research structure.

Some examples:

- (i) Policy questions: vlei cultivation is officially discouraged for conservation reasons.
- (ii) On-farm research questions: some farmer-derived technologies can be tested immediately, but other trials may need to be more structured and be either farmer-or researcher-managed.
- (iii) Basic research questions: can be referred to appropriate institutions such as research stations (e.g. the causal factors in the rise of dry season water tables)
- (iv) Extension/implementation questions: practical issues of what further action needs to be taken.

6. THE TREE **RESOURCES** PROJECT

Tree resources have been another problem area pointed to by farmers in Zvishavane district. Farmers argue that trees are needed for a wide range of uses - as firewood, timber and browse in the communal woodlands; for fruit, shade and windbreaks around homes; and for fertility inputs and fencing in arable lands. This calls for a multispecies approach to rural afforestation. In dry areas trees adapted to the local environment can help to meet this need. People in different areas point to different problems. For some firewood or poles may be in critical shortage; others want to increase trees in fields or establish fruit trees at homes is the major priority. The resource problems require a locally focussed planning approach and an adaptive strategy of extension using a variety of tree species. Current policy which essentially offers just the gum tree/woodlot package has failed to consult farmers in the dryland areas about their priorities.

The trees project is evolving a local planning approach to extension that is aimed at providing locally appropriate community forestry options. The techniques used are basically the same as those used in the vlei project described earlier: a combination of group and individual interactions between EW, research and local communities that are aimed at encouraging participatory planning and involvement in natural resource development

An outline of the procedure being followed is given in Figure 1. It is managed by a locally resident EW and is closely supported by a small research effort. In contrast to the vlei project which has been focussed on problem and opportunity identification, the trees project is implementation oriented. This leads to different requirements. Discussion workshops, especially when held at ward level when the project is being introduced are preferably large groups since the project is aimed at whole community involvement at the outset rather than encouraging participation of a representative sample in the research and design process.

However, there is still a need for focussed appraisal, concentrating on particular "user groups" (e.g. women and the firewood question) and a continuing requirement for a research input to study the historical context, to investigate local suggestions and monitor progress. The EW does much of this investigation in the course of extension activities, but is supported by the project coordinator.

The project aims to assist tree planting in fields and around homes, but also aims to encourage planting and community management initiatives in the communal indigenous woodlands. The VIBCO structure is proving a more or less appropriate scale for community planning of tree resources. The pilot project has completed the local planning phase in Mototi ward, MAzvihwa C.A.

Figure 1. Procedures Used in the Tree Resources Project

Procedure	Procedure	R E S E A R C H	Aims
Key informants: elders, political officials, chiefs.	DETAILED INTERVIEWS (1-2 hrs)		Historical survey: context for problem in area.
Open meeting for all in community; attendance 50-80 people.	WARD WORKSHOP (3+ hrs)		Definition of key issues and local priorities; discussion of problems; introduction of project.
Interviews with local informants; rapid assessments of environmental situation (maps, lists etc).	VIDCO APPRAISALS		Appraisal of VIDCO level problems, local management practices. Noting of tree key areas for reforestation.
VIDCO members, including committee, village heads; 30-40 people.	VIDCO WORKSHOP (2-3 hrs)	M O N I T O R I N G	Planning planting activities; lists of trees needed; discussion of rules for woodland management.
Local nursery run by group, school or individual.	WARD NURSERY		Provision of trees to VIDCOs in line with requirements.
VIDCO organised planting.	PLANTING ACTIVITIES		Community planting activities.

This has revealed an immense diversity of extension needs. This is not only determined by differences in the local environment (e.g. hilly sand soil areas vs heavy soil plains), but also by differences in management abilities and locally specific requirements. For instance, among the six VIDCOS two have planned for indigenous tree planting in the communal grazing area, one needs a gum tree woodlot for a local pole shortage, one was particularly concerned about woodland management and needed to resolve a conflict between neighbouring communities over the use of trees within the grazing area, and all wanted a mix of indigenous and exotic fruit trees for planting around homes.

This diversity reflects a very real patchiness in natural resource situations and highlights the necessity of a localized planning and management approach. This allows communities to become involved in their own resource issues and empowers them to act upon perceived problems,

7. METHODOLOGICAL ISSUES

7.1 Indigenous Technical Knowledge (ITK)

The use of local knowledge can be an invaluable tool in designing focused research agendas, suggesting appropriate technological interactions and adapting extension messages, ITK's important advantages, as experienced in the Zvishavane project, should be reiterated:

- i) The identification of problems. Farmers necessarily have a holistic view of the farming system, unconstrained by disciplinary training, which enables the identification of key problems and opportunities often unapparent from a commodity based/single enterprise perspective. The identification of the vlei resources potential for arable and livestock production is an example.
- ii) Detailed baseline observation. Farmers are often skilled observers and can contribute an immense amount to the basic understanding of agroecosystem functioning. Detailed observation, often with an extended time frame, allows a qualitative insight for further investigation that is often ignored.
- iii) Classification. Local classifications or typologies are essential to make the subsequent appraisal workable and locally applicable. Classifications derived from indigenous perceptions of organisation are generally very effective (Howe and Chambers, 1979)
- iv) Historical/local context. The value of gaining a local and time based perspective to appraisals for development has been repeatedly stressed above. The only source of this contextual information is local knowledge.
- v) Rapid assessment. With limited resources available for exhaustive research on

1 GRAZING SCHEMES' AND PARTICIPATORY RESEARCH

The Communal Lands are generally viewed as being both overstocked and overgrazed. The consequences are said to be low levels of productivity and a serious threat of irreversible degradation. The two most commonly suggested solutions are (a) a restriction of stock numbers to within the carrying capacity of the veld and (b) improved grazing management by means of fenced paddocks (i.e. 'grazing schemes')

These are not new ideas: in one form or another they have informed state interventions in peasant land use systems since the 1930s, when Alvord introduced the notion of 'centralisation'. An examination of the history of these interventions reveals that virtually all of them failed in their objectives, in some cases (eg. the Native Land Husbandry Act of 1950) because they generated widespread political opposition. Coercive state action to enforce compulsory destocking has always been resisted, either covertly, with farmers 'hiding' their animals in various ways, or in the form of support for guerillas promising an end to state interference in peasant agriculture. (Beinart 1984, Ranger 1985).

In the early 1970's, however, the promotion of Short Duration Grazing (SDG) grazing schemes proved more successful, particularly in Masvingo Province. No mention was made by extension staff of destocking measures, and instead the benefits to veld and cattle were emphasised. A much greater effort was also made to involve community leadership in the delineation of resource boundaries and in the active management of these schemes (Froude 1974 Danckwerts n.d.)

Since independence grazing schemes have again been promoted and a number of pre-independence schemes have been resuscitated. A survey in December 1986 revealed 50 schemes which claimed to be operating and a further 56 at the planning stage (Cousins 1987). Voluntary adoption and community mobilisation have been strongly emphasised by Agritex. Recently the National Conservation Strategy has reiterated the need for 'planning (which) will involve the active participation and commitment of the local communities and not be imposed upon them' (Republic of Zimbabwe 1987, p23).

On the other hand government policy has continued to pull strongly in the direction of 'adjusting stocking rates to within carrying capacity' (National Conservation Strategy, p25) and 'destocking where necessary' (Five Year National Development Plan (1986 - 1990, Republic of Zimbabwe, p.27). These two objectives - popular participation in land use planning on the one hand, and reduction in stock numbers on the other - sit very uneasily together. The overwhelming evidence from research carried out by the Farming System Research Unit and others is that 30% to 40% of households in the communal areas own no cattle at all, and that the majority of households have insufficient access to draught power (CSO 1984, FSRU 1985). Lack of adequate draught power constitutes a major bottleneck in crop production, and so most people have a strong need to increase rather than decrease their herds (Shumba 1984, Cliffe 1986).

This is a complex issue and clearly not amenable to simple solutions. Part of the answer undoubtedly lies in policy shifts which would allow a much more substantial resettlement

programme, more 'Model D' resettlement schemes, and the granting of permission to communal area farmers to purchase adjoining farms or ranches. All of these would address the problem by increasing the grazing area available to herd-pressed communities, and are currently the subjects of discussion within rural communities themselves.

Institutional development which allows for the effective management of common property resources also needs to be encouraged, and those communities which are already operating grazing schemes are an important source of learning about what is likely to work. In the Taganika scheme in Mwenzezi District, for example, the community has begun to discuss the principle of allocating equal shares of grazing rights, with redistribution effected by means of traditional mechanisms of loaning out cattle ('Kuronzera') rather than 'setting a price on grazing'.

But there are also technical issues to be addressed, in particular the thorny question of stocking rates and carrying capacity, and again a participatory approach to research and extension may assist in the development of sustainable solutions to this pressing problem.

It has become clear over the last few years that terms such as 'carrying capacity' are not as unproblematic as they were once thought to be. An intense debate on the precise definition and application of such concepts is now underway, with at least three different new points being expressed: the conventional wisdom of mainstream veld and pasture science, the dissenting voice of Sandford and other, and the provocative stance adopted by Savory and advocates of Holistic Resource Management (HRM) (See Cousins 1987 for an extended summary of these positions).

These debates have been prompted by contradictory sets of evidence: on the one hand, the vegetation of the communal areas is undoubtedly very heavily utilised by livestock, and in some areas the soil is very poorly covered. In these situations serious soil erosion is probably occurring, although we have little in the way of direct measurements of the extent of permanent soil loss (van den Wall Bake 1986).

On the other hand, although concern over stocking rates and environmental degradation in communal areas was first expressed in the 1920's, livestock numbers have continued to increase and are today probably well over the 3 million mark. Most Communal Lands are carrying numbers of animals which are at least twice those recommended using conventional estimates of carrying capacity. But many cattle, particularly in the higher rainfall regions, can be observed to be in excellent condition right at the end of the dry season, and after a drought year. As Sandford has commented:

When actual stocking ratesare far in excess of carrying capacities for long periods of time then one should ask whether this apparent prolonged defiance of the Laws of Nature may not have been due to an initial underestimate of the true carrying capacity. (Sandford 1982, p57).

Sandford recommended basic research on the relationship between stocking rates, primary productivity and soil erosion, and applied research on optimum stocking rates related to the needs of peasant farmers. Unfortunately this recommendation was not acted upon, and valuable time has been lost. Tensions between the central state and local

communities on the issue of land use and settlement patterns are emerging again as the result of the pilot villagisation programme, and the National Conservation Strategy announces that Agritex will undertake land use planning in all VIDCOs within seven years. To avoid a damaging confrontation on stocking rates we need urgently to have a much better idea of the true, ecological, carrying capacity of Communal area grazing land.

Grazing schemes, as currently designed, are a technological intervention based on an ecological model which is increasingly in question. The assumption has been that if Short Duration Grazing works on large scale commercial ranches then it must surely be appropriate for communal areas as well - in short, a prime example of the Transfer-of-Technology paradigm.

The community-based research being carried out in Mazvihwa has begun to address both the underlying issue of ecological carrying capacity and the question of appropriate management strategies for improved and sustainable livestock production. Again, the methods have been participatory in character and similar to those used in the vlie and trees projects. Since this aspect of the research is still in an embryonic phase, it will be only briefly summarised.

From interviews with individual farmers, group discussions of the kind described above, and also from direct observations of farmers' practices and livestock behaviour, some of the properties of the dryland farming system have been identified. Two types of savannah ecosystem may be distinguished: a dystrophic type, characterised by granitic sands, in which soil nutrients constitute the major constraint, and eutrophic type, in which soils are either clays or loams and the major constraint is soil water. These correspond broadly to the local classifications of soil types and vegetation known as 'Mucheche' and 'Chiwomvo'.

Also important are riverine areas, vleis, drainage lines, and alluvial soils. These form only a small proportion of the total land area, but together with browse are crucial to the survival of livestock at the end of the dry season. They are also important for crop production, as discussed above. They thus constitute 'key resources' in an essentially heterogeneous agro-ecosystem.

In this environment a common method of coping with drought is to move livestock from the eutrophic areas to the dystrophic, which often involves loaning animals for a period of time to individuals in neighbouring communities. Mobility is a strategy that reflects spatial as well as temporal variability of forage production.

Taken together, these insights into how the existing farming system functions suggest an alternative strategy for the management of forage resources. Instead of the costly fencing of large areas of poor quality land into paddocks, for the purposes of operating a conventional rotational grazing system, it may be more useful to concentrate on community regulation of access to the 'key resources'.

For example, portions of the grazed vleis could perhaps be fenced off and reserved for selected draught or milking animals, particularly towards the end of the dry season. In

general the heterogeneity of **the** environment needs to be **recognised** and **flexible, adaptive** management strategies need to be devised to **make optimum use** of it.

Most **importantly**, however, to develop workable strategies the farmers themselves would have to be involved **in the planning process, contributing their** own knowledge of the local, **environment** and suggesting possible avenues for **further** investigation and trials. The TOT model, which present-day **grazing** schemes seem to largely derive **from** needs **replacing** with an approach which involves **research**, extension and resource **planning** in a dynamic adaptive **and** learning process.

9. CONCLUSION

In effecting a marriage of **extension** and research in a **participatory** framework the analytical techniques and adoptive extension procedures used by the vlei and **trees projects** may prove useful. A participatory approach necessarily acts in a complementary way to existing strategies. It is not intended to replace mainstream R & E efforts, but to assist in their effective operation through existing institutional structures. The failures of the TOT and package model, especially in the **dryland** areas of Zimbabwe, suggests that the time is right to try an **alternative** approach.

REFERENCES

Adams J.

1987 'Wage Labour in Mutirikwa Communal Land, Masvingo' Paper presented to seminar at C.A.S.S. University of Zimbabwe, Harare, 10/6/87.

Beinart W.

1984 'Soil Erosion, Conservationism and Ideas about Development: a Southern African Exploration, 1900-1960' Journal of Southern African Studies, 11 (1): 52-83.

Cliffe L.

1986 Policy Options for Agrarian Reform: a Technical Appraisal. FAO, Harare.

CSO.

1984 Report on Demographic Socio-Economic Survey Communal Lands of Masvingo Province 1983/84. Central Statistical Office, Harare.

Chambers R. and Ghildyal B. P.

1985 'Agricultural Research for Resource-Poor Farmers: The Farmer-First-and-Last Model' Agricultural Administration, 20(1): 1-30.

Chambers R. and Jiggins J.

1986 'Agricultural Research for Resource-Poor Farmers: a Parsimonious Paradigm'. Discussion Paper 220, IDS, University of Sussex.

Cousins B.

1987 A Survey of Current Grazing Schemes in the Communal Lands of Zimbabwe. Centre for Applied Social Sciences (CASS), University of Zimbabwe, Harare.

Danckwerts J.

n.d. A Socio-economic Study of Veld Management in Tribal Areas of the Victoria Province. Tribal Areas Research Foundation of Rhodesia, Salisbury.

Drinkwater M.

1987 'Exhausted Messages, Training and Groups: An Evaluation of Zimbabwe's Training and Visit System' (Working Paper) mimeo 25pp. University of Zimbabwe, Harare.

Farming Systems Research Unit.

1985 Annual Report. Department of Research and Specialist Services, Harare.

Farrington J. and Martin A.

1987 Farmer Participatory Research: a Review of Concepts and Practices. Agricultural Administration (Research and Extension) Network Discussion Paper No 19., O.D.I., London.

Froude M.

1974 'Veld Management in the Victoria Province Tribal Areas' Rhodesian Agricultural Journal, 71(2): 29-37.

Howes M. and Chambers R.

1979 'Indigenous Technical Knowledge Analysis, Implications and Issues' In: Rural Development: Whose Knowledge Counts? IDS Bulletin, 10(2): 5-11.

Hussein J.

1987 'Agro-climatological Analysis of Crop growing Seasons in Natural Regions III, IV and V of Zimbabwe'. Paper prepared for Agritex Workshop on 'Cropping in the Semi-Arid Areas of Zimbabwe' Harare, 24-28 August, 1987.

Jackson J. C., Collier P. and Conti A.

1987 Rural Development Policies and Food Security in Zimbabwe: Part II, ILO, Geneva.

Jones E., Nyamudza P. and Nyati C.

'Rainfed Farming in Natural Region V' Paper prepared for Agritex Workshop on 'Cropping in the Semi-Arid Areas of Zimbabwe'. Harare 24-28 August, 1987.

Mombeshora B.

1985 Livestock Production Research. In: M Avila (ed) Crop and Livestock Production Research for Communal Areas. ZAJ Special Report no 1. Department of Research and Specialist Services, Harare.

Moyo S.

1986 'The Land Question' In: I.Mandaza (ed) Zimbabwe. The Political Economy of Transition: 1980-1986. Codesria, Dakar.

Ranger T.

1985 Peasant Consciousness and Guerilla War in Zimbabwe. Zimbabwe Publishing House, Harare.

Republic of Zimbabwe.

1986 First Five Year National Development Plan 1986-1990, Volume 1. Government Printers, Harare.

Republic of Zimbabwe.

1987 The National Conservation Strategy. Ministry of Information, Harare.

Sandford S.

1982 Livestock in the Communal Areas of Zimbabwe. Report prepared for Ministry of Lands, Resettlement and Rural Development, Harare.

Scoones I.

1987 'Key Properties of Dryland Farming Systems in Zimbabwe's Communal Areas: Issues for Research and Development'. Paper presented to seminar in Dept of Agricultural Economics and Extension, University of Zimbabwe, 23 September 1987.

Shumba E.

1984 'Animals and the Cropping System in the Communal Areas of Zimbabwe' In: Zimbabwe Science News, 18(7/8): 99-102.

van den Wall Bake G.W.

1986 'The Siltation and Soil Erosion Survey in Zimbabwe' In: Richard F. Hadley (ed) Drainage Basin Sediment Delivery IAHS Publication no.159, IAHS Press, Wallingford.

Weiner D.

(forthcoming) 'Land and Agricultural Development' in C. Stoneman (ed.) Zimbabwe's Prospects.

Whingwiri E.

1986 Remarks at Agritex Senior Officers Conference, University of Zimbabwe, Harare, January 1986.

Whingwiri E., Natarajan, Makombe G., Mataruka D., Low A., Cameron T., and Kunjeku P.

1987 'The Package for Higher Maize Yields in the Semi-Arid Zones (Natural Regions III and IV)- Is it Economical?' Paper prepared for Agritex Workshop on 'Cropping in the Semi-arid Areas of Zimbabwe' Harare, 24-28 August 1987.

Wilson K.

1986 'Aspects of the History of Vlei Cultivation in Southern Zimbabwe's Communal Areas.' Dept. of Civil Engineering, University of Zimbabwe, Harare.