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11

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## *Contents*

# 1 Introduction

Land reform is a key part of government policy, spurred politically by the claims of the landless, as well as the land reform pressures in countries like Zimbabwe. It is clear to national and provincial governments that land reform should be speeded up. Municipalities are, therefore, being placed under a lot of political and governmental pressure to increasingly make their commonage land available to emergent farmers.

The effective management of municipal commonage can contribute to land reform, food security, local economic development and sustainable natural resource use. Commonage land is, in many towns, the only natural resource available to poor communities.

The issue of resource utilisation in the Karoo is becoming ever more pressing, to address the question of 'how the vast and biologically diverse, but unproductive Karoo region should be used in a country with a growing land-hungry population' (Dean & Milton 1999:xxii). This sets the stage for an urgent inquiry into land-people interactions – particularly with reference to some kind of people-centred development – but as yet, this issue has not been confronted systematically in an interdisciplinary way.

This paper makes the following argument: Municipalities need assistance with establishing viable commonage management systems; such systems need to be based on the voluntary and committed participation by the users (that is 'people-centred'); and this, in turn, requires an understanding of the emergent farmers' knowledge base of the environment.

This paper considers the prospects for commonage use in the arid areas of South Africa, notably the Nama-Karoo, or non-succulent Karoo, characterised by small shrubs and grass species. This geographic area should be differentiated from the Succulent Karoo of the Namaqualand and southern Cape areas, which have different rainfall and vegetative patterns. The Nama Karoo is the northern part of the Karoo, and is the largest biome in South Africa. It is characterised by low and variable rainfall, mainly in the summer months. It stretches up to the southern Free State. This geographical demarcation is also significant because of its land tenure characteristics. The phenomenon of 'commonage' in the Nama-Karoo area refers to municipally-owned land, whose overriding purpose has been for the use of urban residents.

## 2 A history of agricultural impacts

The main reason for the heavy environmental impacts of modern agriculture in the Karoo is the superimposition of alien land use practices over inherently incompatible indigenous ecosystems. Early white colonial pastoralists adopted the migrant herding strategies of the Khoikhoi herders. Transhumance practices (migration with livestock to more productive areas, as and when seasons or rainfall dictated it) constitute an appropriate and sustainable environmental management strategy in the Karoo. Where rainfall is sparse and patchy, this arid, 'event-driven' eco-system system could only be used on an opportunistic basis by highly mobile human groups taking advantage of highly localised conditions (Smith 1999:243).

But by the early 1800s, the large transhumance cycles, utilising common lands, was replaced by:

> *perpetual quit-rent tenure, which gave property holders all agricultural rights and security of freehold tenure, on a surveyed area in exchange for an annual rental. The colonists' imperative to establish constant patterns of settled subsistence, characteristic of northern European environments, was fundamentally at odds with an arid environment. Settlement around privately owned water sources and rangeland meant that grazing orbits shrank dramatically. Livestock was herded from rangeland to water source to kraal on a daily basis, partly as a protection from predators. This kraaling system has been blamed for a great deal of the degradation of the Karoo rangelands*
> (Hoffman et al. 1999:264).

Ironically, the settled agricultural system would probably have failed if decades of government subsidies and interventions had not propped it up (Siegfried 1999:241), thus enabling settlers to continue to practise a land use which conflicted with the indigenous ecosystem. It was only with the erection of large numbers of windmills and the advent of fencing in the late 19$^{th}$ century that new management systems were initiated. This enabled different types of rotational grazing systems.

In the context of municipal commonage, which is currently used communally by large numbers of renters, with growing numbers of livestock, fundamental questions arise about the suitability of different management approaches. These will be discussed briefly. But whichever management approaches are adopted, there remains a fundamental need to focus on the knowledge base of users.

# 3 Municipal commonage – a strategic resource

Historically, municipalities administered commonage agricultural land for the benefit of white residents. Now, as part of the government's land reform programme, municipalities can obtain financial and other forms of support to convert commonage into a livelihood and developmental resource for their poor residents. According to the 1997 White Paper on South African Land Policy:

> *In large parts of the country, in small rural towns and settlements, poor people need to gain access to grazing land and small arable/garden areas in order to supplement their income and to enhance household food security. The Department of Land Affairs will encourage local authorities to develop the conditions that will enable poor residents to access existing commonage, currently used for other purposes. Further, the Department will provide funds to enable resource-poor municipalities to acquire additional land for this purpose.*

Municipal commonage holdings are significant. At least 367 817ha are owned by municipalities in the Northern Cape alone, excluding the large Namaqualand and Mier areas (Benseler 2003). The demand for commonage land is intensifying, due to rapid urbanisation. The farming sector is shedding jobs at an alarming rate. In the 11-year period from 1988 to 1998, a staggering 140 000 agricultural jobs were lost, a decline of almost 20% of the agricultural labour force (Simbi & Aliber 2000:1). The reasons for this significant demographic trend are partly political (farmers' fears of land tenure legislation), and partly economic (farmers have to compete in difficult agricultural markets, with virtually no tariff protection). The majority of evicted or unemployed farm workers drift to the nearby towns. In the Free State, for example, the small towns are showing the most rapid rate of growth, amounting to an average of 3.5% increase in population per annum (Marais 2004).

Typically, these residents now live in shanty homes on the edge of towns, in severe poverty, often exacerbated by extremely poor environmental health conditions. Yet many of these residents do have some agricultural skills, as a survey of recently urbanised farm workers shows (Atkinson 2003). Valuable human resources are now going to waste. Formal and informal jobs are hard to come by. Many of these new arrivals would like to farm, and some have attempted to do so, either on municipal commonage, or by keeping stock in their backyards (with very negative consequences for environmental health).

These land holdings currently offer virtually the only land reform option to poor landless agriculturalists. The LRAD [Land Redistribution for Agricultural Development] programme remains out of the reach of all but a very few applicants, due to high land prices and poor capital resources.

Many people look to commonage as a basis for eking out a livelihood in the towns. This has resulted in severe pressure on commonage land. In such a context, the concept of carrying capacity is controversial. Some commonage users are suspicious that the principle of carrying capacity is enforced by government to justify racially-based motives for keeping them away from pastures. The emerging farmers interviewed raised the point that they already have more livestock than the land that has been allocated to them is able to support. They argue that the real problem is not too much livestock, but too little land (Cartwright et al. 2004:127).

Several research agencies have become increasingly concerned about the inability of municipalities to manage their agricultural lands (commonage) in a developmental and sustainable way. Commonage management is difficult in a context where municipalities are under pressure from urban residents who are asserting their rights to use commonage for survivalist activities as well as some commercial agriculture.

For many municipalities, the transition to pro-poor commonage use has caused a great increase in their management responsibilities. The difficulties of dealing with large and complex groups of farmers, who can often not afford infrastructure maintenance, or who have little incentive to limit their stock numbers, or who have a poorly developed response to institutional rules, have placed a

heavy burden on the shoulders of overworked municipal officials. Agricultural extension is a function of the provincial departments of agriculture, which have their own difficulties with regard to shortages of funding and staff. What is needed is a realistic and practical approach to supporting municipalities in their approach to commonage management.

Despite the difficulties, municipal commonage remains a valuable asset for development. In many small towns, it is by far the greatest developmental asset for the poor, and often makes an important contribution to household food security. Furthermore, many township residents are, in fact, erstwhile farm workers, who have some experience and skill with cultivation or stock-farming.

# 4 Environmental degradation on municipal commonage

In the context of poor municipal capacity, heavy pressure on the commonage land is likely to lead to varying degrees of desertification. Additional research on this issue should be done, but impressionistic evidence suggests that environmental damage has been severe in some towns. A useful botanical study, conducted in Middelburg (Eastern Cape province) analysed the condition of the communally utilised rangelands in Middelburg, with the aim of assisting emerging farmers with proper management of their stock without deterioration of the veld. The study found that:

> *The overall cover indicates veld retrogression. The species composition reflect the veld dominated by a combination of perennial and annual sub climax species with low grazing values e.g.* Eragrostis lehmaniana, Aristida diffusa *and* Tragus koelerioides*, and annual pioneer grasses like* Aristida congesta*. The sub-shrub component varies from the palatable (*Pentzia incana), *less palatable* (Eriocephalus spinescens) *to those with variable palatability like the* Eberlanzia ferox.
> (Ntlakaza 2003:4)

A study in Khai Ma Municipality (Pofadder) by Benseler (2003a:23), suggests that there are several reasons for over-grazing:

- Poor water distribution and infrastructure causes the animals to concentrate on few water points and overgraze the land in that area, although the land on the rest of the farm is in a good condition.
- There are insufficient marketing channels and opportunities for the stock and the animals are not in a good condition, which makes it difficult to sell them.
- The extension officer provides environmental awareness guidance, but the people fail to comply with the grazing regulations.
- Emerging farmers do not declare the real numbers of their stock on the commonage, which makes it difficult to enforce grazing regulations.

Far too little has been written on the environmental aspects of commonage land, and it is an urgent necessity that a proper assessment is done. However, rapidly increasing usage of the commonage suggests that overgrazing is taking place (Atkinson & Benseler 2005).

Overgrazing can have serious consequences. Thinning of vegetation by grazing leads to increased runoff, higher soil temperatures, increased soil moisture evaporation and accelerated erosion. Regular trampling by livestock can reduce soil absorption. Furthermore, overgrazing may suppress the growth of perennial plants, leading to a dominance of annuals. Perennial grasses or palatable long-lived shrubs do not have dormant seeds (as do annuals), and may become locally extinct if disadvantaged by persistent heavy grazing. This can lead to a sudden shift in favour of unpalatable species (Palmer et al. 1999:218).

In the Karoo, different levels of grazing have different impacts. When grasses are removed by grazing, the result is a change from a multispecies, productive landscape into a low-production single-species community.

> *It is almost certain that artificially high intensities of herbivory [such as high intensities of domestic livestock], typical of current management strategies, will continue to alter community structure in Karoo vegetation'*
> (Midgley & van der Heyden 1999:106).

Given the intense grazing pressure on municipal commonage land, for example, this statement has great strategic significance. However, the issue of overgrazing is a theoretically contested one. Significantly, there are major differences in opinion as to what constitutes the predominant cause of desertification, with proponents of the 'disequilibrium rangeland ecology' approach maintaining

that stocking rates are not primarily responsible for desertification. Such theorists point to environmental causal factors. In terms of such 'disequilibrium' (Behnke 1992) or 'state-in-transition' (Westoby et al. 1989:266) analyses of rangeland dynamics, stocking rates in accordance with carrying capacity do not guarantee stable rangeland productivity. Different possible alternative environmental conditions may exist, caused by complex interactions of different events and factors, (for example grazing pressure, rainfall patterns, episodes of seed production, topography and soil nutrients) (for example, Novellie 1999:180). Holders of this view argue that temporary localised declines in productive capacity, resulting from droughts or episodes of intensive grazing, do not constitute degradation. They therefore suggest that it is inappropriate to adopt a single stocking rate throughout the Karoo. Appropriate stocking rates should be site-specific. It follows, then, that conservation efforts should be based on an understanding of the *dynamics* governing veld ecology, the manner in which grazing varies, and the innate response of the veld to environmental factors.

The 'disequilibrium' or 'state-in-transition' approaches to veld management are associated with land tenure questions. Commonage farmers may be able to stock their lands fairly heavily, as long as the users can utilise 'opportunistic' or tracking strategies traditionally utilised by African pastoralists. An 'efficient opportunism' can be encouraged by certain support programmes, such as providing more water points for livestock, encouraging forage cultivation for years of low rainfall, and improving indigenous breeds of livestock (Cousins 1996:9–10).

Whether one selects the 'disequilibrium' approach, or the principle of constant stock rates, the environmental knowledge base of emergent farmers remains important. In the light of these arguments, an important line of inquiry would be the local knowledge or thinking about environmental change. In fact, the disequilibrium approach would place a particularly great premium on emergent farmers' environmental knowledge resources. Successful management of the environment would depend on an understanding of a wide range of factors that may influence local environmental conditions. In this context, local knowledge and thinking about degradation, and how that should be managed, is a key variable.

The particular circumstances of commonage users must be appreciated. Not only have black African and coloured people not had access to land for over a century, but many of the recent generation of emergent farmers (on municipal commonage) have lived in towns for a long time. The recent immigrants to the towns tend to be farm workers. Is it likely that some or most commonage users would still have sufficient environmental knowledge to engage in opportunistic farming practices? This needs to be investigated empirically, in different localities.

As noted above, much of commonage land is now overgrazed, with little prospect of immediate recovery. Like the question of stocking rates, the reversal of grazing-induced change is a controversial topic in the Karoo. Research has shown that the resting of rangeland is insufficient to initiate rehabilitation (Palmer et al. 1999:219). Much more vigorous measures need to be taken, in addition simply to the 'resting' of the land; but this, in turn, will place even more pressure on commonage users. It will also require environmental knowledge as a key component of rehabilitation strategies.

# 5 'People-centred development', participation and local knowledge

Community participation, in a people-centred environmental project or programme, can mean many different things. But it can hardly be disputed that the use of local knowledge is a valuable indicator of the type and level of participation and 'ownership' of a development process by the local residents, producers or users. Where such a knowledge base exists, for example with reference to veld, plants, insects, animals, soil and weather, it can add a massively important dimension to local development. The range of local knowledge transcends empirical facts, since it includes information, attitudes, values, skills and practices concerning a high diversity of biological resources.

In the context of the Karoo, with its fragile ecosystem, it is important that commonage farming operations be conducted with substantial knowledge of veld maintenance, so that sustainable livelihoods are created.

At present, local and indigenous knowledge is in danger of being lost. Most young people now grow up in the towns and townships, with little connection to their natural heritage. Impressionistic evidence suggests that only the elderly have significant botanical knowledge. Many young indigenous people have embraced the European view that traditional knowledge is no longer relevant, particularly where they no longer have the opportunity to interact with their land and their elders. This is part of a global trend of the erosion of local knowledge, and its displacement by modern scientific knowledge (Kothari et al. 1998:30). Theorists such as Sean Sullivan (1999) and Robert Chambers (1983) would argue that ecologists have an opportunity to assist indigenous people to maintain their knowledge by promoting its validity.

At this stage, researchers, policy makers and programme managers know little or nothing about the existing knowledge base of commonage users. Various research and conservation initiatives have been undertaken in the Karoo, but these mostly involve established commercial farmers. Virtually no research has been done on commonage users' agricultural skills, or their knowledge of the environment.

In the meantime, five tentative hypotheses may be suggested (and should be earmarked for further research):

1. Environmental knowledge is unevenly distributed, due to commonage users' varying personal experience.
2. Longer-term land users (particularly those commonage users with previous experience of agriculture, possibly as farm workers) are likely to have more environmental knowledge than recent farmers.
3. Amongst recently urbanised communities (of all race groups and economic strata) in the Karoo, environmental knowledge is probably dwindling fast.
4. As local knowledge breaks down (particularly where people continue to use the land, as in the case of municipal commonage), this leads to negative consequences for biodiversity.
5. Where common property institutions are fragile, environmental management is poor. The system would tend towards free-for-all use, turning the resource into an open access property (Kothari et al. 1998:31).

Is the protection (and even revival) of local knowledge a possibility in the Karoo? Some researchers claim that it is, particularly where extension officers learn to work with communities, create mutual confidence and trust, and allow for mutual learning in an atmosphere of openness (Kothari et al. 1998:46).

Impressionistic evidence suggests that many commonage farmers in the Karoo have significant knowledge about stock animals, but very little about the environment. This impression needs to be

tested by empirical research. What is needed is a methodology for agricultural extension workers and environmental officials, so that they can engage meaningfully with commonage users to determine their current level and type of environmental knowledge. On the basis of this assessment, appropriate participatory land management mechanisms can be developed.

The most urgent priority is to find out what commonage users *actually know*. This suggestion depends, fundamentally, on the argument that land users with substantial environmental knowledge would have very different skills, motivation and interest in long-term environmental sustainability than would land users with little or no environmental knowledge. It is likely that people with environmental knowledge would have a more intrinsic and enthusiastic appreciation for environmental dynamics, and a greater willingness or passion to maintain or restore biodiversity on the land. Conversely, it is hypothesised that people with little environmental knowledge would tend to use the land more exploitatively, for short-term gain. There may be a direct causal link between the 'tragedy of the commons' and the lack of environmental knowledge.

To take the discussion forward, there are two theoretical and methodological approaches to analyse people's environmental knowledge. The first is the concept of 'ecosystem services'; the second is the study of ethnobotany. Both approaches also share a desire to build on people's own knowledge and understandings, to enable effective and meaningful people-centred development. These approaches are discussed below.

### *Ecosystem services and benefits to farmers*

Ecosystem services are defined as processes of natural ecosystems that support human activity and sustain human life. They encompass all the benefits we derive, directly or indirectly, from the effective functioning of the ecosystem (O'Farrell, no date). Specific ecosystem services and ecological processes which are important to farmers can be identified, both by outsiders, (for example, ecologists), or – significantly – by farmers themselves. Ecosystem services maintain biodiversity and produce ecosystem goods, such as wild game, forage, timber, firewood, and natural fibres.

This ecosystem services approach formed a key part of the Conservation Farming Project, launched by the National Botanical Institute (NBI) in various localities in the Eastern Cape, Western Cape, Northern Cape and KwaZulu-Natal. In the Karoo, a set of commercial farms were selected in the Beaufort West area (NBI 2004b). The project came to an end in mid-2004. The objectives of the project were, *inter alia*, to identify and evaluate the economic and ecological costs and benefits (in terms of biodiversity, carbon sequestration, ecosystem stability and resilience, and response to climate change) of farming practices. The project aimed at evaluating the role of conservation farming as part of national and regional strategies to conserve biological diversity in South Africa.

The Conservation Farming Project was of major importance. Previous attempts to conserve biodiversity were a function of conservation agencies which concentrated mainly on reserves, or only on specific threatened species, whereas farming has been the concern of agricultural departments who have focused on productivity. Farming with biodiversity *per se* has not received much attention. The term 'agrobiodiversity' has recently been coined to describe the elements of biodiversity that have direct or potential value for agriculture, but the definition remains vague (Donaldson 2003:1500). There is still a gap between what could be of value to farmers (the value of *potential* environmental services) and what is perceived to have value as a resource for agriculture (the *realised* value).

The value of the Conservation Farming Project is that it made a start in analysing this gap. One issue which was investigated was farmers' perceptions of ecosystem services. 'Societal values may significantly influence the way in which various aspects and components of the landscape are considered and therefore managed' (O'Farrell & Collard 2003:1517). The project included a social survey, as well as numerous participatory events (mainly workshops with farmers). The social

assessment set out to determine the causes of prevailing attitudes among farmers, and to determine why they engage in particular land uses and farming practices. A strong emphasis was placed on securing the support of commercial farmers, who shared their knowledge with the scientists.

There are several ecological aspects of arid Karoo areas which are potentially significant to farmers. Scientific studies have shown that these aspects are indeed significant in environmental management; but it remains an open question how many commercial and emerging farmers have some working knowledge of such environmental issues as:

- the impact of different types of sheep on the environment
- the enormously destructive impact of goats on the environment (Parris 2005; Sigwela et al. 2003)
- the impact of sheep and goats on flower production, which can reduce seed production of palatable shrubs (Milton et al. 1999:188)
- the role of small hills (*koppies)* as seed banks (and hillside vegetation is often very vulnerable to destruction by goats)
- the role of plant litter fall (dead leaves) in promoting the fertility of the soil and infiltration of water (Sigwela et al. 2003:1522)
- the impact of defoliation on crusting of the soil
- the role of insect pollinators in the procreation of many plant species in the Karoo (Esler 1999:128), including bees, wasps, butterflies, and beetles
- the role of ants and termites in concentrating organic matter in patches underground, thereby influencing the local distribution of moisture and plant nutrients in the soil
- the importance of termite mounds, which function as larders, storing grass seeds (Milton et al. 1999:193)
- the toxicity of some Karoo shrubs to domestic livestock, and the competitive and reproductive advantage of such shrubs in rangelands
- the impact of large numbers of livestock on the soil, for example urine and dung deposits, which promote nitrogen recycling and seedling establishment (Hoffman et al. 1999:269).

We need to know more about the indicators which local users employ to assess the condition of the veld. O'Farrell and Collard (2003) observed that commercial farmers usually have an intimate knowledge of their farming areas. Unfortunately, the issue of emergent farmers or commonage users was not addressed in the NBI project reports. The crucial question, for our purposes, is whether commonage farmers have a similar level of knowledge of their natural resource. As O'Farrell (no date:5) notes:

> *Ecosystems are in decline worldwide largely due to poverty, ignorance of their value to humans and inadequate mechanisms to encourage investment to maintain them… The lack of awareness of the value of ecosystem services and the conflict between short-term gain over long-term value is a factor which can drive the conversion of natural ecosystems to human-controlled systems, at the expense of ecosystem functioning, and long-term economic stability.*

Does this statement characterise commonage farmers? Further questions need to be asked. O'Farrell notes that land use practices are also influenced by farmers' preferences and their individual risk profiles. In the context of municipal commonage, this observation is particularly important. What are the risk profiles of commonage users, some of whom are very poor? What are their preferences? And what examples can they follow, in terms of sustainable commonage management? Do they have mentors who can guide them in making sustainable environmental choices?

### *Ethnobotany*

Following logically from the perspective of ecosystem services, ethnobotany is the understanding of the plant world *from the points of view of local residents*. Ethnobotany will, by implication, touch on other dimensions of natural knowledge, including zoology, entomology, and agriculture.

As argued earlier, local people's knowledge is an essential ingredient of people-centred sustainable livelihoods projects. Knowledge is a critical asset, which can and should be recognised, amplified, maximised and built upon. Even more significantly, it creates a zone of confidence for local people, who are thereby encouraged to trust their own judgment, take pride in their own achievements, and select and add new knowledge in ways that are compatible and integrated with their own inherited 'knowledge bank'.

How, then, can we understand local people's knowledge base more effectively? Ethnobotany refers, simultaneously, to a scientific study of local knowledge, as well as that local knowledge itself. Systematic research into local ecological knowledge allows us to create the conditions for local people, individually or collectively, to contribute to rural development and conservation projects. There is a definite urgency to record the ecological knowledge (and biological specimens) before they disappear forever.

Ethnobotanical projects can last from a few days, to several years. In general, the longer the project, the greater the opportunity a deep working relationship has to develop between an ethnobotanist and the community. Development workers have improvised various methods of making a fast, low-cost assessment of the use of local resources. Such techniques have been adapted from Participatory Rural Appraisal (PRA) techniques,[1], and they can be used as a valuable complement to more rigorous methods of botanical data collection.

In such methods, local people need to be full participants in the study, rather than being the objects of the investigation. They need to take part in the design of the study, data collection, analysis of the findings and discussions of how the results can be applied for the benefit of the community. Formally trained researchers may have a lot to learn from the insights of local people who are acknowledged within their own communities as experts on local vegetation (Cunningham 2001:10).

The involvement of resource users as research partners is an essential part of a successful conservation strategy for useful plant species that are vulnerable to overexploitation, for several reasons. Local users may be aware of scarcity long before any conservation biologists are. Dialogue with resource users is also a crucial part of developing conservation and resource management proposals (Cunningham 2001:1).

There are numerous ways in which local residents can participate in research. For example, they can play a role in research design, data collection, interpretation of data, laboratory work, and the presentation of the research results to the community. Together with local participants, a great deal of ethnobotanical data can be collected on how local people interact with the natural environment. This can take various forms, such as collections of plants and animals, recorded interviews, laboratory analyses, photographs, and market surveys.

Numerous developmental goals can be served by the involvement of ethnobiologists. This may include goals such as making research results available to local communities, strengthening traditional systems of agricultural production, encouraging the rational use of plants in health care, and promoting the sustainable use of the environment.

Ethnobotany can be complemented by other scientific disciplines, which are well placed to work with local residents and collating local knowledge. Anthropologists can make a significant contribution by 'unpacking' the social and symbolic world of local people (the *emic* categories used by local residents). Working with local residents, this can be done by participant observation, open-ended or semi-structured interviews, structured interviews, and quantitative methods. For example, anthropologists can ask questions concerning *inventories* ('What are all indigenous plant categories?'), *rankings* ('Which fruit are the best to eat?'), *similarities* ('Do local people classify

some plants as similar to others? Do all local subgroups classify plants in this way?'), and *competencies* ('Does everyone know the name for a certain plant, or what it is used for?').

In South Africa, an ethnobotany programme has been launched by the National Botanical Institute (NBI 2004a). The programme seeks to be a national focal point for research on the traditional uses of South Africa's plants, for their conservation, sustainable use and development. The programme promotes partnerships with government departments, parastatals, academic institutions, NGOs and community-based organisations. However, this programme does not appear to have reached commonage users yet.

# 6 Ecosystem services, ethnobotany and agriculture

> *Agriculture and particularly pastoralism not only depend on biodiversity, but can also be a significant cause of biodiversity loss. Conservation farming in pastoral systems is a delicate balancing act between extracting the maximum mass of high quality plant material and maintaining the productivity of the grazing resource*
>
> (Oettle & Koelle 2003:1).

This is easier said than done. At this stage, many municipalities do not have even elementary grazing management systems on their commonage land, partly because many of them do not have proper contractual and institutional arrangements. How do commonage users view these issues? Do they have experience they can draw on? Have they made their own observations and developed their own problem-solving techniques? This brings us to the question of the role of extension officers – not only to provide advice (the conventional view of extension services, which treats farmers as passive learners), but to find out what local people know, and to build locally appropriate solutions on that knowledge resource.

> *A more sustainable approach is to empower people by learning a process of thinking, questioning, doing and evaluating that can enable them to initiate and manage their own learning needs.*
>
> (Oettle & Koelle 2003:2)

Rajasekaran (1993:5) suggests several ways in which extension officers can facilitate the use of indigenous knowledge:

- *Recording:* Recording as much indigenous knowledge as possible, with reference to specific sites and conditions, and local refinements (the techniques of ethnobotany will be particularly useful).
- *Interacting:* Conducting on-farm farmer-oriented research; discussing all problems and solutions from the point of view of the local people; facilitating village-level experimentation workshops; and deciding which non-indigenous interventions would be compatible or useful in the local context.
- *Research:* Establishing participatory research stations in as many localities as possible.
- *Data collection and dissemination:* Establishing indigenous knowledge resource centres and data banks, to collect information, design training and dissemination materials, and to establish links between local people and development workers.
- *Training:* Designing training programmes for development workers regarding indigenous knowledge.
- *Capacity-building:* Strengthening indigenous organisations by promoting off-farm income generating activities, co-operative marketing, farmer-to-farmer seed and technology exchange, and tree planting.

In the Karoo, with its fragile natural environment, such people-centred extension techniques can be a breakthrough in creating co-operation between commonage users and development specialists. The most urgent interventions would be to conduct systematic environmental assessments of the current condition of all commonages, with the participation of the commonage users. This will require a common scientific methodology, but there must be room for flexibility to accommodate local preferences. It would be an ideal project for post-graduate students in the fields of environmental management and agriculture.

This research process would involve collecting and classifying veld types, veld condition and ecological features from the point of view of both the natural scientists and the commonage users.

Researchers would then compare scientific assessments of veld condition with the views of the commonage users, to determine the degree of divergence between 'scientific' and 'indigenous knowledge' perspectives. They can also determine the knowledge gaps of the users, both in terms of their self-identified knowledge needs, as well as using scientific knowledge as a standard for comparison.

In the discussions with the commonage users, practical interventions to restore veld condition and promote sustainable use of the commonage, would be explored. Based on these discussions, a range of policy and programme options could be identified and refined.

# 7 Conclusion

The creation of sustainable commonage management systems is only one of numerous issues concerning rural livelihoods. Rural poverty in South Africa is intensifying, leading to dysfunctional urbanisation patterns. Rural livelihoods will require innovative and mutually supportive strategies, using academic resources, public funding, and appropriate government policies and programmes. It needs to be output-oriented, practical, relevant, and meaningful to rural communities.

For this reason, the issue of commonage management offers a useful arena for social and natural scientists to come to grips with the lived experience and local knowledge base of commonage users. This should be done rapidly and urgently. The political pressure for land reform is mounting, and is likely to have catastrophic results if not addressed soon.

International and South African innovations show that people-centred extension services may have more success in promoting conservation farming than the conventional didactic approaches of extension officers. But this new approach will depend, fundamentally, on asking questions about the knowledge base of farmers, as well as a readiness to accept the validity and usefulness of their knowledge. The NBI project has begun to take important steps in this direction. What is now necessary is to bring these insights and skills to municipal commonage, for the sake of rapid but sustainable land reform.

## References


Archer, S. 2002. Technology and ecology in the Karoo: A century of windmills, wire and changing farming practice, in *South Africa's environmental history: Cases and comparisons*, edited by S Dovers, R Edgecombe and B Guest. Cape Town: David Philip.

Atkinson, D, & Benseler, A. 2005. *Review of municipal commonage programme of the Department of Land Affairs.* Unpublished report, Department of Land Affairs.

Atkinson, D. 2003. *Life on the farm: Shifting social and moral foundations of the farming community*. Unpublished Human Sciences Research Council report.

Behnke, R. 1992. *New directions in African range management policy.* London: Overseas Development Institute: Pastoral Development Network.

Benseler, A. 2003a. *A case study of commonage in the Khai Ma Municipality.* Unpublished Human Sciences Research Council report.

Benseler, A. 2003b. *Municipal commonage administration in the Northern Cape: Can municipalities promote emergent farming?* Unpublished Human Sciences Research Council report. Available from karoo@intekom.co.za

Cartwright, A, Harrison, T & Benseler, A. 2004. A developmental approach towards municipal commonage management. *Journal of Public Administration*, 39:1.

Chambers, R. 1983. *Rural development: Putting the last first.* London: Longman.

Cousins, B. 1996. *Range management and land reform policy in post-apartheid South Africa.* Cape Town: Programme for Land and Agrarian Studies, University of the Western Cape. (Land reform and agrarian change in southern Africa occasional paper; no. 2.)

Cousins, B. 2000. Tenure and common property resources in Africa, in *Evolving land rights, policy and tenure in Africa*, edited by C Toulmin and J Quan. London. International Institute for Environment and Development/ Natural Resources Institute.

Cunningham, AB. 2001. *Applied ethnobotany: People, wild plant use and conservation*. London: Earthscan.

Dean, WRJ & Milton, SJ. 1999. *The Karoo: Ecological patterns and processes*. Cape Town: Cambridge University Press.

Donaldson, J. 2003. *Issues affecting the value of ecosystem services in agricultural systems and implications for conservation farming*. Proceedings of the VII$^{th}$ International Rangelands Congress 26 July–1 August 2003, Durban, South Africa:1499–1504. www.nbi.ac.za/consfarm/cfdownloads/donaldson%20paper.pdf

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Esler, KJ. 1999. Plant reproduction ecology, in *The Karoo: ecological patterns and processes*, edited by WRJ Dean, and SJ Milton. Cape Town: Cambridge University Press.

Hoffman, MT, Cousins, B, Meyer, T, Petersen, A & Hendricks, H. 1999. Historical and contemporary land use and desertification, in *The Karoo: ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cambridge University Press.

Kothari, A, Anuradha, RV & Pathak, N. 1998. Community-based conservation: Issues and prospects, in *Communities and conservation: Natural resource management in south and central Asia*, edited by A Kothari et al. New Delhi: Sage.

Marais, L. 2004. *Post-apartheid demographic trends in the Free State and their implications for regional development*. Unpublished paper for the Advisory Council of the Premier of the Orange Free State.

Martin, GJ. 2004. *Ethnobotany: A methods manual*. London: Earthscan.

Midgley, GF & Van der Heyden, F. 1999. Form and function in perennial plants, in *The Karoo: ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cape Town: Cambridge University Press.

Milton, SJ, Davies, RAG, & Kerley, GIH. 1999. Population level dynamics, in *The Karoo: Ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cape Town: Cambridge University Press.

NBI (National Botanical Institute). 2004a. Ethnobotany programme. www.nbi.ac.za/research/ethnobot.htm

NBI (National Botanical Institute). 2004b. Project proposal: Conservation farming. www.nbi.ac.za/consfarm/pub/gefprop.htm

Novellie, PA. 1999. Dynamics, in *The Karoo: Ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cape Town: Cambridge University Press.

Ntlakaza, Y. 2003. *Report on the rangeland condition in the Middelburg commonage.* Unpublished report, Grootfontein Agricultural Institute, Middelburg, Eastern Cape.

O'Farrell, P & Collard, S. 2003. *Ecosystem services: An examination of approaches to investigating ecosystem services in agricultural landscapes in South Africa and Australia.* Proceedings of the VII$^{th}$ International Rangelands Congress, Durban. See www.nbi.ac.za/consfarm/consfarfram.htm

O'Farrell, P. no date. *Ecosystem services and benefits to farmers*, Conservation Farming Project for the National Botanical Institute. www.nbi.ac.za/consfarm/consfarfram.htm

Oettle, NM & Koelle, B. 2003. *New directions for extension in democratic South Africa: Enhancing farmers' initiatives to conserve their resources,* Conservation Farming Project for the National Botanical Institute. www.nbi.ac.za/consfarm/consfarfram.htm

Palmer, AR, Novellie, PA & Lloyd, JW. 1999. Community patterns and dynamics, in *The Karoo: Ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cape Town: Cambridge University Press.

Parris, M. 2005. Kill a goat if you want to save the planet. *The Spectator.* 22 January.

Rajasekaran, B. 1994. *A framework for incorporating indigenous knowledge systems into agricultural research, extension and NGOs for sustainable agricultural development.* Ames, Iowa: Iowa State University. (Studies in technology and social change; no. 21.) www.ciesin.org/docs

Siegfried, WR. 1999. Human impacts, in *The Karoo: Ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cape Town: Cambridge University Press.

Sigwela, AM, Lechmere-Oertel, RG, Kerley, GIH & Cowling, RM. 2003. *Quantifying the costs of unsustainable domestic herbivory for biodiversity and ecosystem functioning in succulent thicket, Eastern Cape, South Africa*. Conservation Farming Session. Proceedings of the 6$^{th}$ International Rangelands Conference, Durban, South Africa. www.nbi.ac.za/consfarm/consfarfram.htm

Simbi, T & Aliber, M. 2000. *Agricultural employment crisis in South Africa*. Pretoria: Trade and Industrial Policy Secretariat. (TIPS working paper; no. 3:1.)

Smith, AB. 1999. Hunters and herders in the Karoo landscape, in *The Karoo: Ecological patterns and processes*, edited by WRJ Dean and SJ Milton. Cape Town: Cambridge University Press.

Sullivan, S. 1999. Folk and formal, local and national: Damara knowledge and community conservation in southern Kunene, Namibia. *Cimbebasia,* 15:1–28.

Westoby, M, Walker, B & Noy-Meir, I. 1989. Opportunistic management for rangeland not at equilibrium. *Journal of Range Management,* 42.

## *Endnote*

[1] Such techniques include mapping, transect walks, timelines, seasonal calendars, matrix ranking, Venn diagrams, and wealth ranking (Cunningham 2001:25).