# THE NEED FOR CHANGES IN VELD MANAGEMENT TECHNOLOGY GENERATION AND DISSEMINATION

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***ABSTRACT***

*Veld deterioration in South Africa has been reported since 1775. Agricultural researchers and extension workers have since tried a variety of ways to address this problem and they came up with different explanations for veld deterioration and reasons for the non-adoption by farmers of recommended veld management practices.*

*Social science in general has gone through several phases that represent three distinct paradigm shifts. This paper shows that similar trends are apparent in veld management research and extension. Veld management technologies are firstly shown to be inappropriate for the needs of farmers. For all practical purposes farmers cannot implement those technologies. It has also become evident that veld management technologies have not been scientifically verified.*

*Both veld management research and extension are at cross roads and more participatory approaches by both fields are recommended to address the problem. Veld management extension workers and researchers and farmers must unify their efforts in addressing the complex issues concerning veld deterioration.*

## 1. INTRODUCTION

Since 1775 the appearance of veld deterioration has regularly been reported in South Africa and several extension and research programs have been launched to address this problem. Veld management principles were identified for the different agro-ecological regions and traditional veld management systems were formulated to be available to stock farmers. Many veld management systems have been conceived and recommended in South Africa (Scott, 1955; Edwards, 1981**)**. It seems that in earlier approaches, systematic resting of veld was emphasised. Since 1966 the emphasis changed to the control of the degree of utilisation of veld, largely by manipulation of the grazing procedure (i.e. number of camps, periods of absence and periods

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of stay) in a rotational grazing system. With this change in emphasis came the perception that periods of stay and absence in a rotational grazing system are the overriding factors determining veld reaction to grazing, and thus veld condition in the long term.

The rotational grazing philosophy predominant in South Africa stems from a pre-occupation with the problems of selective grazing (Booysen, 1969). Most researchers and extensionists in South Africa seem to favour rotational grazing of veld, and in particular multi-camp rotational grazing with at least six to eight camps per animal group for most veldtypes (Anon., 1984, Stuart-Hill, 1988 and Teague, Trollope & Aucamp, 1981). The farmers' acceptance of these multipaddock-grazing systems has, however been minimal (Wilken, 1970, Düvel, 1970, De Klerk, 1986, Scholtz, 1987, Terblanche, 1987 and Grossman, 1988).

Grazing ecosystems are quite complicated and modifications therein very difficult to predict, and sometimes even the scientific foundation of recommended systems is questioned (O'Reagain & Turner, 1992). This has obviously hindered the task of the extensionists and agriculturists to make daily recommendations. This article focuses on the paradigm changes that took place in several agricultural extension sister sciences, linking those with shifts in veld management related agricultural and extension research and the resultant reasons for veld deterioration.

## 2. CHANGES IN SOCIAL SCIENCE THEORY

During the 1960s and 1970s there was almost a universal faith in the ability of new scientific technology to solve problems. Enormous enthusiasm for scientific management, from the "space race" that culminated in the 1969 moon landing to the Green Revolution launched by Norman Borlaug and his associates in agriculture (Oakley, 1994). The rapid technological change of these decades was also reflected in agriculture and agriculture extension (Botha, 1995). The dissemination of the Green Revolution technologies in the South (less developed countries) during the 1970s was due not just to their inherent appeal or to the fortunate applicability of the North's high yielding varieties and fertilisers to developing countries with similar climatic conditions, but also to new extension methods.

The link made between communication and culture is ancient. In anthropology and archaeology communication forms are recognised as cultural indicators of people's development over centuries. Unmistakably,

communication is a driving force for cultural preservation, modification, projection and fusion of cross-cultural perspectives - all necessary for shaping development processes which will structure communities and cultures of the future. What many extensionists and pasture scientists have asked in the past up to now concerning veld management and land use, forms part of cultural changes and even cultural renewal.

Cultural renewal is a dynamic process of goal-oriented cultural and structural change facilitated by pro-active indigenous communication transactions amongst local people with a specific cultural context. The process identifies needs for change, confronts the forces which drive or restrain making changes, creates alternatives for local action, and enables the appropriate course of action for implementing the change – all within the framework of preserving cultural integrity and intercultural harmony (Nair & White, 1994).

Nair & White (1994) examine some relevant changes in social science theory and make some comparisons of shifts in emphasis in development and development communication theory. Examining and comparing the shifts in paradigms are helpful to understand the current state of affairs in veld management and to rethink future alternatives. The comparative shifts in paradigms within several fields of the social sciences for three time periods are shown in Table 1.

**Table 1: Comparative shifts in paradigms within social sciences for three time periods from the 1940s to the 1990s (Nair & White, 1994)**

| Theory | 1940- 1960 | 1960- 1980 | 1980- 2000 |
|---|---|---|---|
| Political science | Nation Building | Crisis of Legitimacy | Nation Breaking |
| Socio-cultural Science | Assimilation Melting Pot | Ethnic Resurgence | Cultural Pluralism |
| Communication | Subject-Message-Channel-Receiver | Subject-Message-Channel-Receiver-Effects | Convergence |
| Development | Modernisation | Dependency | Multiplicity |
| Development Communication | Diffusion of Innovations | Social Marketing | Participatory Message Making |

The most dominant theory for all social sciences since the 1940s has been modernisation with the underlying concept of unification. Supposedly the forces of modernisation were moving nations towards a "world community" through cultural assimilation (Nair & White, 1994). Communication was a

reinforcing process with 'one way' models, postulating a superior source. The intent was to persuade people towards change. Consistent with this general model, the diffusion of innovation model in development communication was a systematically defined process whereby the superior source would have its ideas adopted by the masses and bring about changed practices. From 1940's to 1960's the dominant paradigm of development was modernisation passed on to the Third World, essentially a product of the Western world. According to Lerner's model (1958) for modernisation, 'modern man' in contrast to 'traditional man' was well informed, efficient, independent in thinking and productive.

For agricultural technology this package was translated in the 'diffusion of innovations' model which became the dominant communication paradigm for agricultural extension. This model was predominantly a one way communication process in which messages travelled from top to bottom through the hierarchical structure, most often from government sources to the people. Message intent was to 'inform' and 'persuade' farmers to adopt technologies and practices which had been developed by the 'experts'. This modernisation paradigm for development, along with the diffusion of innovations paradigm, came under careful scrutiny and criticism in the late 1960s in regard to its effectiveness in explaining communication phenomenon. The general faith in science and the commitment to modernisation led to discrediting indigenous knowledge (Nagel, 1997).

The second period, i.e., from 1960-1980 represents a time of mainly reflection, debate, conceptual chaos and mainly questioning the morality of modernisation. During this period of questioning and chaos, an overreaction of polar extremes emerged: instead of nation building, nation breaking (multiple centres of power) and in place of assimilation, strong ethnic regrouping became the norm. In communication theory there was a gradual shift toward a 'receiver-orientated' model looking at communication effects and soliciting feedback.

Diversification and pluralism characterise the period from 1980 up to now, with much emphasis on 'appropriate technology'. Regional alliances, previously informal, are being formalised and new infrastructures coming into place to govern them. Ethnic resurgence - a quest for identity and search for roots - brought the demand for collective freedom (Nair & White, 1994). In communication theory the convergence model appeared. In the development theory multiplicity characterises the period -a development perspective which acknowledges the need for societies to search out their own unique approach to development but not overlook the realities of interdependence and resource

sharing on a global level. This led to farming system research and the 'rediscovery' of farmers' knowledge (Chambers, Pacey & Thrupp, 1989). Improved technology is a package of inputs and practices that usually comes from many sources. This development goal mandates a change in development communication to models that embrace a 'receiver orientation', participatory approach, and a capacity for human systems renewal.

## 3. CHANGES IN EXTENSION THEORY AND PHILOSOPHY

Since the field of development communication is closely related to extension, it is important to discuss the two in tandem. Two shifts in development thinking have influenced the practice of agricultural extension (Macadam & Wilson, 1993). Firstly, proliferating research and the information explosion in the North have placed the focus on farmers who utilise advanced technologies in their enterprises (Dunn, 1993, Heyman, 1993, Nitsch, 1993, Proost, 1993, Salas & Tillmann, 1993 and Van Woerkum, 1993).

Secondly, the failure of previous development approaches in the Third World countries has encouraged support for a more participatory approach to development (Korten & Klaus, 1984; Chambers, 1993; Röling, 1988). This reflected in the shift away from the transfer -of -technology (TOT) approach, which evolved with the Green Revolution agriculture. This has been graphically illustrated as a chain, comprising

**Research ⟶ Extension ⟶ Farmer**

Today this view is regarded as oversimplification and the equation does not do justice to the dynamics of the extension process. It also does not reflect the changes that have taken place over the last 10 years. This very narrow interpretation that leans on the notion that extension means "to advise" and does not suit complex, risk-prone and diverse farming systems of most smallholders in developing countries (Chambers, 1992, cited by Botha & Coetzee, 1993).

Since the late 1980's the traditional view of technology transfer (TOT) has been challenged, with the following underlying assumptions becoming outdated, unacceptable and in many cases untrue:

- the agricultural research system has the answers to farmers' problems
- the extension agent will get the information ('innovation") from the agricultural research system and communicate it to the farmers

- the farmers are required to change their behaviour and accept innovations
- the changes recommended will (hopefully) be acceptable to farmers and also benefit them.

What is recommended is that extension is seen to mean "to council" as well as "to deliberate". This implies that:

- people meet to discuss something
- the aim is to find new solutions to problems
- not only one person knows the best
- all those involved in the discussion process contribute their knowledge and experience.

This view that is built on the "to extend" and "to take council" perceptions, is more reflective of the true relationship between agricultural research, extension and farmers better, is illustrated by the following triad:


This implies that the three role players are moving towards a partnership in agricultural technology generation and dissemination. This further suggests that agricultural researchers, extension staff and farmers become like partners in agricultural technology generation and dissemination. There is a shift in power which is more favourable for farmers. The "deliberation" view is more in line with recent interpretations of the term extension. The shift from the authoritarian 'technology transfer' approach to a more considerate and participatory 'farmer first' approach is shown in Table 2.

The model of knowledge delivery that originally underlay agricultural extension favoured the individual client. Extension services therefore focused on the organisation of a transfer system, the generation of suitable technical messages and their communication to farmers (Chambers, 1993). According to Oakley (1994), it has long been felt that the distribution of benefits of development is unsatisfactory and that better ways should be found to reach

**Table 2: A comparison of the 'technology-transfer' and 'farmer-first' approaches (Chambers, 1992, cited by Botha & Coetzee, 1993)**

| Basis | 'Technology-transfer' | 'Farmer-first' |
|---|---|---|
| Main objective | To transfer technology | To empower farmers |
| Party responsible for analysing needs and setting priorities | Outsiders | Farmers assisted by outsiders |
| Knowledge and skills transferred by outsiders to farmers | Messages<br>Precepts<br>Package of practices | Methods<br>Principles<br>Basket of choices |
| The 'menu' | Fixed | Variable |
| Roles of farmers | To hear the message<br>To act on precepts<br>To adopt , adapt or reject the package | To use methods<br>To apply principles<br>To choose from the basket and experiment |
| Objectives of outsiders | Widespread adoption of technology | Wider choices for farmers<br>Enhanced adaptability of farmers |
| Main mode of extension | Agent-to-farmer | Farmer-to-farmer |
| Roles of extension agents | Teaching<br>Training | Offering and facilitating choices |

the farmer. The emphasis of participation in extension and research has increased over the past four decades (Table 3).

## 4. CHANGES IN VELD MANAGEMENT RESEARCH AND EXTENSION IN SOUTH AFRICA

This section will show how veld management research and extension in South Africa have followed very similar trends as has been discussed so far. With the benefit of hindsight it becomes clear that the development of veld management systems and recommendations show a shift in thinking, starting with the first articles in 1887 on the need to rest veld. It was only in 1935 that experiments embodying the two and three - camp systems were laid out at Towoomba (Irvine 1938). This can be called a shift in paradigm and is shown in Table 4 together with the shifts in veld management research and extension of the reasons given for veld deterioration.

By 1948 the two- and three camp systems, as well as other layouts, were recommended for various ecological regions of South Africa (Scott, 1947). The

**Table 3: Extension and research: The dominant modes from 1950-2000 (Chambers, 1992)**

| Decade | Explanation for failure of extension | Prescription | Key activities | Socio-economic research focus | Methods | Label |
|---|---|---|---|---|---|---|
| **1950s-1960s** | Farmers' ignorance | Extension Education | Teaching | Diffusion Adopters Laggards etc. | Questionnaire surveys | Diffusion research |
| **1970s-1980s** | Farm-level constraints | Removal of constraints | Input supply | Constraints Farming systems | Questionnaire surveys On-farm-research | Farming systems research |
| **1980s-2000** | Inappropriate technology | Farmer participation | Facilitation | Participatory approaches and methods | Discussion Observation Diagramming by and with farmers | Farmer participatory research Farmer first PRA (Participative Rural Appraisal) |

**Table 4: The paradigm shifts in veld management research and extension in South Africa for four time periods from the 1935s to 1991 and onwards**

| | 1935-1966 | 1966-1980 | 1981-1990 | 1991- |
|---|---|---|---|---|
| **Veld management research** | Ecological pasture philosophy and principles set:<br>Classification and description of veldtypes (Acocks)<br>Essentially plant based<br>Two and three camp systems: rest recommended (1947)<br>Autecological studies on major grass species | Development of grazing management procedures:<br>Acocks/Howell clarion (1966): more camps per herd and infrequent clean-up grazings. Either for or against Non-selective grazing (NSG) (1966)<br>Take the demands of the animal into account | Degree of utilisation of (6-8 camps per herd).<br>Role of fire in management of certain veldtypes, harmful in others.<br>Radical veld improvement and fortification by introduction of legumes<br>Veld condition assessment<br>Influence of stocking rate on veld condition | Grazing management recommendations and philosophies questioned upon empirical evidence<br>Simple grazing systems using adaptive management recommended<br>Economic returns from livestock enterprises based on veld<br>Loss of veld and pasture expertise |
| **Reasons for veld deterioration given by pasture scientists** | Overgrazing<br>Overstocking | Non-use of grazing systems | Period of uncertainty – reasons sought in grazing systems and answers on important veld problems needed. | Tools for farmers to monitor veld not practical and not scientific<br>Use of veld not in balance with nature<br>Lack of farmer involvement in research and extension |

| | 1935-1966 | 1966-1980 | 1981-1990 | 1991- |
|---|---|---|---|---|
| **Reasons given for veld deterioration by extensionists** | Farmers' ignorance | Farmers' ignorance<br>Farm-level constraints<br>Perception differences between farmers and extension workers<br>Poor communication of recommendations | Farmers' ignorance<br>Farm-level constraints<br>Perception differences between farmers and extension staff<br>Farmers' lack of knowledge<br>Extension workers' poor knowledge<br>Poor communication of recommendations<br>Poor management of extension<br>Extension workers not technically up to standard<br>Programmed extension not practised, ad hoc extension | Poor communication of recommendations<br>Extension workers not technically up to standard<br>Lack of proper linkages between farmer, extensionists and researcher.<br>Inappropriate technologies<br>Technologies not scientifically validated |

underlying theme in this period was the importance of applying rest during critical growth phases. Both within and outside the borders of South Africa, pasture science was suddenly emerging, and the need for greater in-depth research on a broad front came to the fore. In this regard Acocks' monumental work on veld types of South Africa which started during 1953 possibly played a greater role than any other single factor at the time in stimulating thought and encouraging further investigation, particularly in disciplines fringing on pasture science and hence collaborating in its more applied research efforts. Much of the early work was essentially plant based. It took little or no account of the demands of the animal in the forage system or the economic implications of the management procedures that were being advocated.

During the early sixties Acocks (1966) published his controversial non-selective grazing (NSG) approach. These writings, according to Roberts (1970) led to 'an unprecedented upsurge of interest in veld management' and it was referred to 'the Acocks/Howell clarion' because of the much publicity given during 1962 onwards by Howell both locally and overseas. This renewed interest also led to many new approaches and systems of management being put forward.

The plea was essentially for more camps per herd or flock and infrequent heavy clean-up grazings. Since then farmers, pasture scientists and extension workers have aligned themselves either for or against NSG.

The period 1980-1990 was characterised by the debate continuing on which grazing management procedure was more appropriate for a specific situation. It seems that many times the controversy was not argued on the basis of the underlying principles of veld management. It was therefore impossible to reach any form of consensus or agreement. The role of fire in the management of grassveld, veld fortification and radical veld improvement were emphasised in research programmes. The development of techniques for evaluating veld condition and determination of the influence of management on veld condition on animal performance also characterised this period.

In the period 1991 onwards an evaluation of the basis for grazing recommendations for rangeland was conducted. The empirical evidence of the grazing management recommendations was questioned, and a more critical attitude from the research community was asked to prevent the assimilation of untested hypotheses into accepted theory. The reasons for non-adoption of recommended veld management systems were also taken into consideration in the reviewing of current rangeland research, and a shift towards greater use of the peer reviewing process is evident in the planning, implementation and

interpretation of research work. The emphasis of research also changed toward the influence of stocking rate on veld condition and on economic returns from livestock enterprises based on veld. A deep concern about the dramatic collapse of veld and pasture expertise in South Africa was also expressed by the Grassland Society of Southern Africa during 1996. The statement was even made then that 'veld and pasture research is non-existent' in certain areas of the country.

The reasons put forward by researchers for veld deterioration during 1935-1966 were overstocking and overgrazing, especially after the catastrophic drought of 1933. During 1966-1980 the reasons for veld deterioration were seen mainly as the outcome of non-use of recommended grazing systems. Reasons for non-adoption of grazing systems were viewed as (i) small farms that prevent farmers from applying systems (Kolbe, 1962) and the tendency to carry too much stock and (ii) the absence of proven grazing systems which are adapted to the environment (Marais Commission, 1968). The ineffectiveness of the extension service was also diagnosed as reason for the poor acceptance of systems (Kok, 1964). Farmers' ignorance and the fact that farmers do not appreciate the advantages of systems in terms of increased production; managerial flexibility and financial gain were diagnosed to be some of the causes for poor acceptance of systems. Perception differences existed between extension workers and stock farmers concerning veld conditions.

The reasons and explanations put forward for the lack of response by farmers after continuous appeals by agricultural extension over a long period to apply veld management systems since 1935 are shown in Table 4. Since the final report of the Drought Investigation Commission (1923), the need for sufficient grazing camps has been recognised by pasture scientists as a *sine quo non* for efficient veld management. With the passing of the Soil Conservation Act in 1946, the initial enthusiasm was characterised by propaganda, education and declaration of Soil Conservation Districts measures. Farmers' ignorance and their complacent attitudes towards the effects of veld deterioration were pointed out as an important factor arresting the progress of conservation as a whole. The anticipation was that from 1958, the application of soil conservation measures would speed up, which did not materialise.

During 1980-1990 a period of 'uncertainty' characterises the explanations by researchers of the reasons for non-adoption of recommended systems. The problem of getting farmers to apply basic veld management principles and systems still remained unsolved, and the need for 'drastic measures taken by authorities to overcome this problem' was expressed. The perception differences between extension workers and farmers concerning the veld

condition were also given as an explanation, mostly by extensionists (Terblanche, 1987). During this period leaders in different spheres have sensed the presence of something wrong in the relationship between the amount of effort expended in veld management and the return obtained. So the extension services came under fire and reasons were sought in their ineffectiveness, the application of *ad hoc* extension, inadequate salaries and manpower problems.

During the period 1991 onwards extensionists still blamed poor communication of recommendations for veld deterioration, but also brought in the poor technical background of field workers as a possible reason. An important shift during this time is the realisation that the messages concerning veld management technologies were less important than the inappropriateness of the technologies. Some extensionists also began to point out that multi-disciplinary teams, which include the farmer are important and needed in veld management technology generation and dissemination. The important role of effective linkages in the technology generation triad has been debated elsewhere and is not duplicated here (see Botha, 1995).

Agricultural extension services and –servicing in South Africa need to respond to the paradigm changes that have been pointed out here. This will be discussed very shortly and introductory in the following section.

## 5. AGRICULTURAL EXTENSION AND THE PARADIGM CHANGE

Table 5 shows several of the key elements in the extension process which have to be transformed, with a view to bring in more participatory approaches (Botha, 1998).

Low, Seubert & Waterwort (1991) point out that on-farm research, problem-orientated research, and the 'farmer first' mode create 'translation problems', because extension services are unprepared to receive this new types of information. More attention must be paid to training extensionists in the new approaches. Extension staff also require training in extending what Chambers (1993) calls the 'basket of choices'. Training could include field meetings at strategically selected local farms, group discussions of common problems, informal visits by individuals o innovative farmers and more focused messages on veld management problems (Sutherland, 1988, cited by Low *et al.,* 1991).

**Table 5: Difference between traditional modes of agricultural extension and participative extension approaches (Botha, 1998)**

| Traditional Extension Approach | Participative Extension Approach |
|---|---|
| Be a good teacher, teach farmers about their problems | Be a good learner, and able to diagnose problems |
| Mission dominated to persuade farmers' behaviour and deliver | General and open-end support to farmers' development initiatives (understand reasons and circumstances behind farmers' behaviour) |
| Be a good communicator:<br>• delivering technical message to farmers | Be a good communicator:<br>• to develop a dialogue with farmers and to work with them to identify and<br>• solve problems(learning process) |
| Train farmers effectively, then they will change | Training is one of the many options |
| Help farmers to adult learning | Be prepared to do adult learning with farmers |
| Listen to farmers to get their respect and confidence | Listen to farmers to learn why they do what they do |
| Start at the farmers' level of understanding technology and build on this in giving advice. | Start at their own level of understanding farmers' circumstances and build on this in dialogue with farmers |
| Go out to farmers farms to give advice | Go out to farmers to learn how technologies perform under farmers' conditions |
| Work with groups since they are a good way of transmitting new ideas and knowledge | Work with groups, since they are a good way of getting to know how the community works |
| Demonstrate new farming practices on farmers' fields | First test new farming practices on farmers' fields and if they are acceptable to farmers they should be demonstrated |

Further, the drastic changes which this paradigm shift will effect in aspects of extension such as 1) the use of small groups, 2) the identification, drafting, implementing and evaluating of extension programmes, 3) in extension communication strategies 4) extension philosophy and so on, have to be considered carefully and built into and reflected at all levels and in all aspects of extension education, training and practice.

## 6. CONCLUSION

Veld deterioration has been a problem of long standing in South Africa. In their attempts to address the problem, agricultural researchers and extension

workers have tried a variety of avenues and came up with different explanations for veld deterioration and reasons for the non-adoption by farmers of recommended veld management practices.

The different phases in veld management research and extension can be plotted along the same lines as the changes in social science in general and development communication specifically. The latter is a close sister science of agricultural extension and therefore the similarities in changes between the two fields are not surprising.

The indications that veld management technologies firstly are inappropriate for the needs of farmers and practically not implementable, and secondly that those technologies have not been scientifically verified raise some serious questions concerning the road ahead for veld management research and extension. Both seem to be at cross roads concerning veld management and more participatory approaches by both fields are recommended to address the problem. The downsizing in research budgets and resources and the re-focus of state extension services pose a serious threat to the solution of this problem for all commercial stock farmers. This does however not decrease the importance of the need for agricultural extension, research and farmers to unify their efforts in addressing the complex issues concerning veld deterioration.

Veld management research and extension education, training and practice in general have to take cognisance of and reflect the leaning towards more participatory approaches to extension.

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