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# **DILEMMA: INCREASE IN HUMAN FOOD PRODUCTION OR USE OF GRASSLANDS FOR ENVIRONMENTAL AND / OR SOCIAL PURPOSES**

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In the title for this paper we find three major objectives: to feed the world, sustain the environment and provide resources for social purposes, and a dilemma. Even though the word 'dilemma' usually implies choice between undesirable alternatives, it is obvious that the alternatives here are not undesirable. Is the dilemma then, that we can only do one at the time, or that the consequences of favouring one over the other can lead to undesirable outcomes? It is my opinion that we are talking about the latter interpretation. It is the foreclosing of options by allowing one objective to dominate that concerns us and that poses a dilemma. How large this dilemma is depends on what we see the possibilities to be of using natural resources, i.e. grasslands in our case, to achieve all three objectives simultaneously.

The Europeans use the word multifunctionality to indicate the many functions (or objectives) that an environment (natural or man-made) can perform or achieve. Similarly with grassland, multifunctionality implies that they can, under certain situations and over certain ranges, be managed in such a way that they contribute to all three objectives at the same time. How this can be achieved is the subject of this paper. Before doing so however, it is important to discuss the three objectives in terms of their importance and their linkages. This knowledge is required to come up with management regimes and institutional structure able to manage grassland resources in a sustainable way and so contributing to all three objectives, i.e. not a dilemma where we have to choose one of the three.

Human food production is clearly an important objective in a world in which population will continue to increase for several more decades and in which we have finite resources (including grassland resources). To feed a growing population, land will have to be used more intensively and / or more land needs to be brought into production. Current indications are that there is no major concern about the agro-food sector being able to do so over the next 50 years (OECD, 1999; Schieb, 1999). However, to the optimistic conclusion should be added the following which states that (Pandya-Lorch and Rosegrant, 1999):

- developing countries will drive increases in world food demand
- demand for meat products will increase considerably in the developing world, particularly in China
- production increases must rely on higher productivity (increases in cultivated area will contribute about one-fifth of the increase in global cereal production needed to meet demand between 1995-2020.
- Food production will not keep pace with demand in developing countries
- World food prices will remain steady or fall slightly. Enough food will be produced to reduce real world food prices for the next two decades. This price decline, however, will be at rates slower than past trends.
- Hunger and child malnutrition will remain persistent in 2020.

It will be in the developing world where the major part of the 'conflict' mentioned above will play itself out. It is also in this part of the world where some of our richest environmental systems (in terms of biodiversity) are found. Therefore, the way in which the increase in production is going to be achieved will determine to what extent some of the other purposes for grassland management can/cannot be achieved.

Environmental purposes bring in ecosystem functions, biodiversity and sustainability. The world community has adopted sustainability as an overriding purpose in natural resource management. The reasons for doing so are:

1. Ethical: we are part of life ourselves, therefore there is a responsibility to ensure that the diversity of life is preserved, to the best of our ability.
2. Sustainability: this demands that we should preserve biodiversity for the benefits of our own and succeeding generations, and closely tied to sustainability is,
3. Reversibility. The most serious and unacceptable damage is the least reversible and there are few things as irreversible as a biological extinction.

Much emphasis is currently being placed on the better management of biodiversity if the twin challenges of improving living standards and enhancing the environment for all of humanity are to be met (Srivastava et al. 1996). Grasslands are important sources of biodiversity. Production for food can either be complementary or hinder the preservation of biodiversity. Land-use management can thus have major implications for species survival (Pagiola et al.1998).

At the same time degradation of natural resources, while affecting biodiversity also causes many other physical, social and economic effects. Much has for example been written about the problem of dryland degradation (Dixon et al. 1989).

Finally recreational, amenity and social purposes place other demands on grasslands. The task of reconciling the management of grassland for food production and economic development with the protection of the natural environment for social purposes has grown more difficult, especially in the developing world, with the increasing demand for food. The balancing of the use of the services of grasslands need to be carefully conducted and calls for economic, environmental and social considerations (Ledec and Goodland, 1988).

It is sometimes said that agriculture can be a friend or foe of biodiversity or social purposes. The purpose of sustainable grassland management is to achieve the 'friend' situation, but to be able to achieve this we must involve agriculture and those that represent agriculture. Or as Srivasta et al.(1996, 1) state "agriculture and biodiversity [and I add amenity and recreation in some regions] are intimately connected; one cannot survive without the other."

We have therefore a scarce resource (grasslands) with competing demands that we want to manage sustainably. Natural resources are, as seen by economists, 'biological assets'. In essence society chooses a portfolio of assets that it wishes to retain. Biological assets can be included in the portfolio or they can be excluded and this choice is made through the political and other institutions that constitute civil society (Van Kooten and Bulte, 2000). To make those decisions requires information from science on among other things, land-use capabilities and consequences re biodiversity of different uses and from economics on values. Many of the values associated with natural grassland have public good (as in contrast to private good) characteristics. Optimal decision-making requires information on all values ("total economic value"). To maintain sustainability will require some overarching decisions regarding sustainability constraints which reflect the current generation's concern for intergenerational equity as well as intra-generational equity.

As indicated earlier, to achieve all three objectives simultaneously where possible, we need appropriate policies and institutions. It has long been recognised that the 'market' fails to allocate resources inefficiently (when e.g. property rights are not well defined and externalities are not internalized), and inequitably (when the concern of future generations are not incorporated). In addition, macroeconomic policies of Governments can further distort the workings of markets through subsidies, exchange rate manipulation, trade barriers and other policies all of which lead to over-use or misuse of grasslands. Because of this we need to

carefully review the way in which grassland resources are allocated, especially in relation to pastoral tenure and other property right issues (Lane, 1998).

All this is not to say that markets do not have a role to play. They do but within constraints defined by objectives other than efficiency. At the same time there will be a place for market instrument to achieve some of those objectives.

Development and implementation of policies will require the involvement of those who currently own, occupy or have rights to the grasslands of this world. Some call for a constructive partnership (IPC, 1996; Kazmierczak and Hughes, 1997).

Sustainability calls for economic profitability, ecological integrity and equity. Or as Conway states, “the need is for a Doubly Green Revolution, a revolution that is even more productive than the first Green Revolution and even more ‘green’ in terms of conserving natural resources and the environment” (Conway, 2000, 13). While this applies to agriculture in general it can also be applied to grasslands. Of course grassland covers an enormous range of different types in both developing and developed countries. Applying the concept of sustainability to these different grassland types will be a major challenge as demonstrated in for examples, the arguments about multi functionality in Europe, the reorganization of property rights in the South Island High Country in New Zealand, or the management of grasslands in Amazonia.

The conclusion to the paper is that over a wide range of situations, grasslands can contribute to the different objectives mentioned in the title. To achieve this will require enlightened management and institutional structures and policies. When conflicts in use arrive, scientific, economic and social/cultural information will need to be used to decide on the optimal use mix that will contribute most to the sustainable development.

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