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Resource conservation or short term food needs? Designing incentives for natural resource management

F. Zaal, M. Laman, C. M. Sourang

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Acknowledgements

This paper is based on the results of a study carried out by the Centre for Development Cooperation Services, Vrije Universiteit Amsterdam (CDCS) for the International Fund for Agricultural Development (IFAD), Rome. The study was part of a project focusing on practical experiences regarding the use of incentives in natural resource management, as part of IFAD's preparations for support of National Action Programmes under the Convention to Combat Desertification. In addition to a review of the literature, two local consultants, Prof. Sidikou and Mme Toé, undertook case studies in Niger and Burkina Faso respectively. The resulting report was commented on by participants of a workshop held at IFAD, in March 1996, and by our colleagues at CDCS.

This paper also builds on a presentation by Mr. C.M. Sourang, Project Controller at IFAD, given at the International Forum on Local Area Development Programmes under the Convention to Combat Desertification, June 5, 1996. Both report and presentation focused on experiences with incentive systems in natural resource management projects in Africa, and extracted lessons for project implementation and policy formulation.

INTRODUCTION

This paper discusses the role which incentives systems can play in supporting natural resource management in dryland areas of the world. Improving the management of soils and vegetation is at the heart of the fight against desertification, a theme recently established as a major activity for funding by the International Fund for Agricultural Development, following negotiations for the Convention to Combat Desertification (CCD). Desertification, according to the CCD, means *'land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities'* (CCD, p.3). The idea that the deserts are advancing, for example in the form of moving sand dunes, no longer prevails. Instead, *'(dryland degradation) concerns the gradual impoverishment of agricultural and pastoral systems, which makes them less productive and more vulnerable to drought'* (Toulmin, 1995). Land degradation thus involves a loss of potential production and resilience.

Land users in dryland areas have long used various techniques to conserve soil and water, and to maintain soil fertility and rangeland productivity (Reij, Scoones, Toulmin, 1996). In past decades, many conservation techniques were introduced by projects and technical services but were rarely adopted by land users, nor maintained after construction (IFAD, 1986; Critchley et.al., 1992). A large number of reasons help explain this phenomenon. For *example, the techniques that were introduced were generally inappropriate and* expensive and emphasised on physical structures rather than soil management. To overcome the farmers' reluctance to adopt new techniques, food aid and other incentives were uncritically adopted, with each donor using a different approach in the same project area. However, this situation could not be sustained, and increasingly, new ways have been sought to solve the problem of dryland degradation.

The importance of beneficiary participation, the role played by women in production, the potential of indigenous soil conservation techniques, and the role of local institutions -including those that regulate access to common property resources- have gradually been recognised, and have changed perspectives on the role of incentives systems in natural resource management. There is now a lively discussion on improved incentive systems (i.e. cost-effective, replicable and sustainable) which would influence the

resource user's own decision making in terms of better natural resource management.

This paper presents a conceptual framework for this discussion, which can be used to assess past experiences, and which may help to design appropriate policy and project interventions. Included in the text are examples taken from various sources, illustrating past experience. The paper concludes that incentives systems are both necessary and feasible to assist resource users to maintain and improve their agricultural production and the natural resources on which this production relies.

A CONCEPTUAL FRAMEWORK

Natural Resource Management

Natural resource management projects and policy makers are faced with the challenge to find ways of stimulating the application of new or existing skills for use of natural resources so that production is adequate for present needs and productive capacity is maintained beyond the present use. Such a strategy must be carried out in collaboration with *local resource users* to identify ways of improving management of their resources.

Clearly, there are two goals: meeting present needs through agricultural production, and longer term conservation of resources. Where conservation takes priority, other goals, such as food production and generation of incomes by present resource users are easily forgotten (see box 1). Top-down projects, focusing on engineering approaches to soil and water conservation, often overlooked local institutions, while specific groups of local resource users, such as women, are sometimes completely ignored. The techniques chosen may even lead to greater degradation, while what has been achieved at great cost may not be maintained due to the limited interest, time and financial resources of those on whose land the structures have been built. From the perspective of the donor, long term considerations and the well-being of future generations may be appropriate for planning, implementation and cost recovery, but they are not likely to convince local people, whose priority lies with short term survival. They are more likely to be interested in yield increases achieved through soil conservation and fertility management.

Box 1. Keita Integrated Rural Development Project

KIRD (or *Keita project*) in Niger has been trying to restore and protect the environment of Keita Arrondissement since 1984. The interventions are dune fixation, planting of windbreak, construction of small water harvesting dams and above all, construction of *tranchées de reboisement* or small tree planting pits dug along the contour. Everything is huge about this project, which has treated about 1500 square km of the Arrondissement. In the past 10 years, more than 8 million person-days have been purchased by the project, primarily with food rations. Technically, the project is successful. But, with costs ranging between 166,000 and 344,000 FCFA per hectare (equivalent to US$ 270 to 560), the techniques will certainly not be adopted by farmers elsewhere. Migration has not stopped, on the contrary, there are those who claim that provision of food aid provides the men with an opportunity to leave the family, knowing there is a source of food at home. And, though women provide two-thirds of the labour force, they receive almost no rights to use of the rehabilitated land.

sources: FAO, nd.; Monimart, 1988; Rochette, 1989; Sombroek, 1994; Sidikou, 1996.

A similar dilemma can be observed when conservation techniques are introduced to generate employment, or as part of a relief programme in the form of food-for-work (see box 2). In those cases, very labour intensive techniques are usually preferred by the projects concerned. This generally makes it impossible for the local population to adopt these innovations once the project withdraws its support.

In response to these problems, there have been a number of adaptations in the design of programmes to combat desertification. An interest in the participation of resource users, in particular women, has been a point of departure for many recent projects. There is a growing awareness of the importance of indigenous conservation techniques, not only because they are often efficient, but also because they can serve as points of departure in the development of improved farming practices. Also, there is growing interest in common property resource regimes, and in village land use management, coupled with an increased recognition of the role of local institutions, both old and new. These trends form part of a new paradigm in conservation thinking, a concept that stresses the participation of resource users in planning, design and implementation of programmes. It may well be that desertification, both as a development related problem in the affected countries, and as a concern of the world community, needs to be tackled as both a short term production problem and a long term conservation issue, by using appropriate incentive systems to facilitate the merging of these two goals.

Box 2. *Frentes de trabalho*, Cape Verde

After 1975, the government of Cape Verde embarked on a large-scale, nation-wide employment scheme, carrying out soil and water conservation projects on a scale not found elsewhere in Sahelian countries. Work gangs or *'frentes de trabalho'* employ about 40% of the poor rural population. The concern with employment generation however has led to inappropriate techniques being used. Terrace building is the preferred method, combined with tree-planting, though improved crop husbandry may be potentially more effective. Since employment creation is the prime target, no clear financial criteria for selection of conservation measures and intervention areas exist, which has led to a sort of conservation fundamentalism. This draws heavily on scarce national resources, while having little impact on agricultural output and incomes. Effectively, and apart from wages for the *frentes*, social inequality has increased due to a transfer of benefits to large land owners, since they do not pay for erosion control measures.
Source: Haagsma, B., C. Reij, 1993.

Incentives schemes

Incentives play a role in '*making private and social objectives meet*'. They are designed to combine increased production with conservation of natural resources. When both the individual and society as a whole benefit from the application of a new technique or management system, no incentive should be necessary at all. In cases where a loss for the individual is balanced by a gain for society, incentives or subsidies may be justifiable. In cases where a gain for the individual is balanced by a loss for society, *disincentives* may be more appropriate, the most obvious examples being tax measures and legislation aimed at making certain types of resource-use illegal. A well known example of the latter is the ban on bush fires issued by the Burkinabé government in the early 1980s (and also by many other governments). An integral part of such disincentives is the need for effective 'policing' to ensure resource users keep to such rules.

It is sometimes argued that external inducements to motivate resource users to adopt innovations should more appropriately be termed subsidies. For this reason, Kerr (1994) for instance prefers to use the following definitions: an incentive is *something that motivates, or stimulates a person to act* whilst a subsidy is *a payment or a service provided to reduce the cost or raise the returns of an activity*.

Kerr's preference to distinguish incentives from subsidies is certainly attractive conceptually. In practice however, the use of the term *incentive* in natural resource management thinking has come to refer to *any inducement on the part of an external agency (government or non-governmental organisation), meant to both allow and motivate the local population, be it collectively or on an individual basis, to adopt new techniques and methods aimed at improved natural resource management*. Since this study aims to review practical experience we will adhere to this most common use of the concept. In theory as well, we argue that the concept of incentives should be as broadly defined as possible. Limits to financial resources are not the only problem with which resource users are confronted, and we feel that inducements facilitating access to and sustainable use of other production factors should also be included in the concept of incentives.

Typology of incentives

Practical experience tends to show that improved production in the short term is the most effective incentive for farmers. Reliable and higher yields or revenues as the outcome from improved technology provides a convincing argument for most farmers (see box 3).

But where this situation does not apply, a choice has to be made between a variety of incentives. Many different classifications and typologies of incentives are in use. Gamman (1991, p. 175) groups them into three broad categories: policy, economic and social. Van Campen (1993, p. 85) makes a distinction between economic incentives, which tries to influence behaviour by price policy, and non-economic incentives, which work through administrative regulations and legislation. Furthermore, he argues that there are *prerequisites for success* of incentives, notably provision of information and training, and the development of appropriate technical proposals and equipment.

Box 3. PSN, Niger.

The Programme Special National (PSN), supported by IFAD, supports -among other activities- the introduction of improved techniques for soil and water conservation in dryland farming in Tahoua Departement, Niger. Cash and food as incentives were avoided as far as possible, to prevent dependency. Tools-for-work were given for the construction of in-field stone lines. However, farmers preferred planting pits (*tassa*) and half-moon shaped pits. Measurements by the project confirm the beneficial effects on yields, and a lower labour input for construction of *tassa* compared with the stone lines. The large majority of adopters have rehabilitated large areas of degraded land with no help from the project at all.
Source: IFAD, var. yrs.; Sidikou, 1996.

For IFAD's work in practice, the following distinction has proved to be helpful (IFAD 1995): short and medium term incentives (food assistance, social infrastructure and services and other socio-economic equipment), longer term incentives (security of tenure, soil fertility management, fertiliser, agroforestry inputs), and decentralisation of decision-making. A further distinction has been made by some writers between direct and indirect incentives, as outlined next page.

Table 1: Direct and indirect incentives applying at individual, household and community level

DIRECT	In kind	• food aid, • agricultural inputs, • housing, school, community related facilities, roads, irrigation works, other infrastructure, • livestock inputs, • forest inputs
	In cash	• wages, • grants, • subsidies, • loans, • cost-sharing agreements
INDIRECT	Economic measures	• tax measures, • security, guarantees, insurance, • tariffs, input-output prices, • infrastructure (marketing, storage, transport)
	Legal measures	• tenure arrangements, property rights, • decentralisation of decision-making
	Social measures	• social services, • community organisation, • technical assistance, • education, training

Adapted from De Camino Velozo, 1987, and Warford, 1987.

Direct incentives are designed to have an immediate impact on individual and community behaviour. They can be subdivided into cash (wages, credit and rotating funds) and kind (food, agricultural inputs and tools). They may be provided by both governments and non-government organisations and other development agencies, directly to the resource user. Indirect incentives can be described as legal, social and economic measures designed as instruments of conservation policy. They do not directly influence or benefit the farmer or the community, but stimulate certain activities that in turn should positively affect natural resource management. Usually, indirect incentives fall into the realm of macro-level government policy. Examples are tax-exemption for land under particular crops or for land where specific measures have been carried out,

higher prices for products that come from traditional use of a forest, and secure land tenure arrangements.

Box 4. FSP, Zimbabwe.

The Food Security Project (FSP) in Zimbabwe, supported by the Intermediate Technology Development Group (ITDG), has tried to help the population in Chivi District to formulate its own priorities, and to help local institutions to identify and develop means to satisfy them. Government services and non-government organisations are actively involved and offer adaptive research and extension. The techniques introduced so far are restricted to cultivation and are very diverse. No material incentive has ever been given, the project focuses on training, knowledge, and the status of being an adopter as a means to encourage farmers to participate. For example, 'best farmers' share their knowledge with others in traditional fashion, obtaining additional prestige. The disadvantage seems to be that women do not appear prominently in this type of approach.
Source: Critchley, et.al., 1996.

Direct incentives that work in the short term are food for work, cash, and some inputs such as implements for carrying out soil conservation measures. The study on which this paper is based clearly showed that there are a number of problems attached to the use of these incentives (Laman, et.al., 1996). Short term incentives that indirectly influence resource users, such as taxation policy, price schemes and cheap access to fertilisers, may be a better alternative. The use of indirect incentives taking a long term perspective may be the most appropriate and promising approach, such as the provision of training and infrastructure, assuring decentralised decision making and affirming security of tenure. Status and recognition of an individual's success through competitions, prizes and farmer to farmer extension also falls into this category (see box 4). Many projects have followed a trend similar to that sketched out here: from top-down approaches, towards direct incentives such as food-for-work and cash-for-work, towards greater emphasis on indirect incentives, on both a short and long term basis.

Perspective of the resource user

From the perspective of the land user, current production is of primary importance. Existing economic models of farmer behaviour and decision-making usually distinguish between two sets of parameters (Ellis, 1989). The first set is related to the farmers' endowments and capacity, i.e. land

resources, equipment and inputs, knowledge, and access to labour. The other set of parameters is related to 'internal' goals, which concern the anticipated net income and return to labour, risks inherent in particular activities as compared with those of alternative activities, and the risk of investing in agriculture as compared to non-farm activities. Recent evidence from Kenya shows income generated through non-farm activities may be invested in making agriculture more sustainable (e.g. Tiffen, Mortimore and Gichuki, 1994; 265). In this case, a source of cash helped support the shift from extractive agriculture towards more sustainable agricultural practices and enabled farmers to respond to growing market demand for a range of farm outputs.

Other important parameters which are less easy to quantify include social values, cultural identities or religious world views. From an 'instrumental' point of view, these values and views may provide a substantial incentive to invest in resource conservation in some cases. They may generate a respect for nature, a cultural restraint in the use of common resources for personal gain. However, these values are not always adequate to balance the often negative effects of integration into a market economy, with its prospect of cash incomes, and immediate personal gains leading to increased pressure on resources and institutions for managing access to land.

Perspective of public policy

The cumulative effects of decisions by individual resource users and communities will determine the overall evolution and trend in natural resource productivity and management at local, regional and national levels. The challenge from the public policy standpoint is to establish a framework of incentives which can directly or indirectly change the production 'environment' in the desired direction. Often it takes time and regular feedback for government policy to adapt to ever changing local circumstances (see box 5).

Box 5. FISC project, Lesotho

Soil erosion is a well known phenomenon in Lesotho. In colonial times, highly mechanised programmes were initiated, with local land users paid to carry out works and European foremen hired to supervise. After independence, cash-for-work was replaced by food-for-work. Labour intensive methods were adopted, organised through local village conservation committees. In the early 1980s, new methods were tried, such as used in the Farm Improvement with Soil Conservation (FISC) project. Terraces and other measures were promoted on private and communal cropland and rangelands, using inputs such as seeds and fertilisers as incentives. The real goal of helping farmers to change to higher production and higher input use levels, was not attained however, due to the high risks faced by farmers under prevailing environmental and economic circumstances. By the early 1990s, the FISC staff realised that the use of all incentives was inappropriate, and that voluntary soil conservation based on information and training was a better solution.
Source: CDCS Internal memo, Turner 1993.

The goal is to change from a situation in which private and social costs and benefits are at odds, to a situation where both short and long term goals of meeting immediate needs while conserving resources for the future - can be met. There needs to be a thorough understanding of the production systems prevailing in a certain area and resource users must map out the constraints they face before any incentive schemes can be drawn up. Only then can land users themselves be convinced of the usefulness and fairness of subsequent taxation, regulation and incentive schemes.

CONCLUSIONS

This review of case study projects and IFAD's practice leads to a range of conclusions.

- When the primary objective of a programme is directed at employment creation, food relief, or commercialisation of agricultural production, conservation objectives will hardly ever be achieved.
- Approaches using food for work and cash payments have a poor track record and may have detrimental impact on natural resource management.
- It is difficult to provide general prescriptions: incentives are site and time specific - their ideal form varies from place to place and over time.
- When set against the role of indirect incentives, direct incentives have only very modest possibilities, with limited impact and spread.
- Indirect incentives derived from the framework of national rules and regulations, such as tenure arrangements, are so important that they should be taken into account in any natural resource management project or programme.

When are incentives necessary?

Incentives are sometimes a necessary evil: ideally, conservation related innovations should carry an economic benefit that is sufficient to convince resource users to adopt them. This means that these innovations are both worthwhile for the resource users, and reach long term goals of resource conservation. In this case of gains on both sides, incentives are unnecessary.

However, incentives may be indispensable in certain situations, such as in emergency and post emergency situations. Other situations also call for incentives, such as when innovations bring tangible benefits only in the longer term; and as compensation for the costs of switching to new methods. When interventions serve purposes of national policy, but do not benefit resource users directly, incentives can be a means to reach a balance.

When incentives are indispensable, the level at which incentives are pitched is crucial: too low and resource users are not influenced at all; too high and the incentive becomes a sufficient reward in itself, causing a distortion of behaviour. Ideally, incentives should encourage resource users to do something which makes sense in the medium to long term, by enabling them to overcome immediate constraints.

Tenure issues

The role of indirect measures cannot be overestimated, not only tenure and user rights, but also market access, prices, and decentralisation of decision-making. All are essentially institutional and political in nature, and are largely beyond the control of individual conservation programmes. Tenure issues are at the basis of balancing the costs and benefits, which in turn determines acceptance, adoption and spread of conservation techniques.

Institutional issues

The responsibility for allocating incentives confers power on the giver, which can be misused. Channelling incentives through a local institution can help to build up that body, while shifting the spotlight from project staff. However, local institutions can sometimes be in the grip of particular individuals, and under those circumstances a balance between local and donor institutions may be needed, to ensure the needs of the whole target group are met.

Where several projects are operational in one area, there is an urgent need for consistency with regard to the type and level of incentives being offered. Coordination and good working relationships between neighbouring projects take time and resources, but are necessary.

Gender issues

Most conservation oriented programmes have increased the workload of women, especially in areas with high male migration rates. This has not been balanced by a corresponding increase in women's participation in decision making or in their receipt of benefits (such as user rights to improved lands in rehabilitated areas) other than food or implements.

Techniques and activities have often been introduced which need more attention and time of women, but do not adequately provide them with an alternative to their own income generating activities. Well documented are cases where women can no longer work their own fields because they need to earn food in food-for-work projects, thus increasing dependency.

Further work could usefully highlight the experience gained by governments and projects with different forms of incentive systems. IFAD, like many other agencies working in this field, has a wealth of practical insights of value to the broader debate regarding design of local and national policy measures to achieve more sustainable drylands development. This experience could make an important contribution to the implementation of the Convention to Combat Desertification, over the next few years, and help guide those responsible for transforming the detailed commitments made within the text into practical activities.

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Drylands Programme

The Drylands Programme aims to contribute towards more effective and equitable management of natural resources in semi-arid Africa. It has built up a diverse pattern of collaboration with many organisations. It has a particular focus on soil conservation and nutrient management, pastoral development, land tenure and resource access. Key objectives of the programme are to: strengthen communication between English and French speaking parts of Africa; support the development of an effective research and NGO sector; and promote locally-based management of resources, build on local skills, encourage participation and provide firmer rights to local users.

It does this through four main activities: collaborative research, training in participatory methods, information networking and policy advice to donor organisations.

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