This paper was not peer-reviewed.
Pages 003-010. D.E. Stott, R.H. Mohtar and G.C. Steinhardt. 2001. Sustaining the Global Farm. Selected papers from the 10th International Soil Conservation Organization Meeting held May 24-29, 1999 at Purdue University and the USDA-ARS National Soil Erosion Research Laboratory.

Keynote: Achieving Sustainability - The Institutional Imperatives

David Sanders

ABSTRACT

In spite of some promising recent developments, the adoption of soil conservation practices is still very limited in many regions. The reasons for this are largely social, economic and political. If real and lasting progress is to be made, the right sort of policies and institutions must be put in place. These need to be supported by appropriate legislation which helps create a favorable environment for land users to practice profitable and sustainable forms of land use. However, to develop these a good understanding is needed of the underlying causes of the problem.

Soil conservation extension services need to adopt a people-centered approach to their work, in which the land users themselves are encouraged to fully participate in the whole process of identifying the problems, finding solutions and implementing whatever is necessary. But for this to happen, the extension staff must not only have a good understanding of the physical aspects of soil conservation but must also have an appreciation of the social and economic factors which affect the behavior of land users. They must also have the necessary skills to be able to act as facilitators, helping and encouraging land users to take control of their own programs. Soil conservation research workers also need a broad understanding of farming systems and the social and economic environment in which the land users operate.

Finally, if land users are to change to more conservation effective practices, there must be incentives for them to do so. Ideally, practices should be introduced which are profitable enough to make the need for any other incentive unnecessary. However, in many circumstances incentives are necessary to encourage land users to make the desired changes. Payment for these incentives may well be justified if society in general is to benefit.

INTRODUCTION

Great changes have taken place in soil conservation since the early 1980s. By using modern techniques such as remote sensing, modeling and new field and laboratory procedures, our knowledge of the extent and effects of soil erosion, as well as the actual processes, has increased substantially. At the same time, soil conservation technology has moved forward and large areas are now being farmed both profitably and sustainably through the introduction of such practices as minimum tillage in the temperate regions and sloping agricultural land technology (SALT) in the tropics (Palmer et al, 1999). However, undoubtedly the biggest breakthrough has come with the widespread realization that, for soil conservation to succeed, there has to be a far greater involvement of the farmer, and others who use the land, in the whole process of identifying the problems, developing solutions and implementing the necessary measures. This has resulted in a number of large and impressive programs, foremost of these being the Landcare Program in Australia. So successful has this program been that over a quarter of the country's farmers voluntarily joined the scheme within its first 10 years (Campbell, 1994). Nevertheless, in spite of these promising developments, soil erosion remains widespread and a major environmental problem internationally. The unfortunate truth is that the adoption of soil conservation practices is still very limited in many regions. There are a number of reasons for this stemming from the fact that it is socio-economic conditions, which primarily dictate how land users manage the land (Kerr, 1998). In spite of the advances that have been made, this is still not widely understood. Until it is, and the right types of policies and institutional support are put in place by governments, the effectiveness of soil conservation programs are always going to be limited. This paper is therefore devoted to examining some of the policy and institutional issues, which must be addressed if we are to see soil conservation being more effectively applied over large areas.

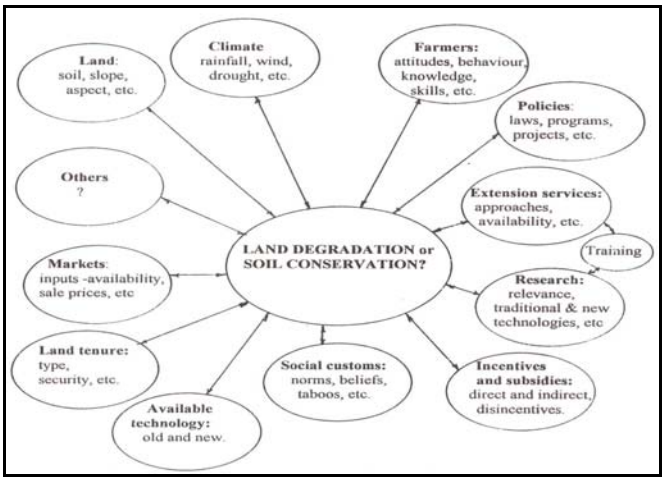

Figure 1. Forces deciding if there will be land degradation or soil conservation.

The diagram above illustrates how land users react to a number of interrelated forces, which combine to dictate whether or not land is allowed to erode or is conserved. All these forces, some of which may be very powerful, exert pressure, which either encourage or discourage sustainable land use. At any one time, some of these forces may be encouraging the application of conservation effective land use practices, e.g. government subsidies, while others may be discouraging them, e.g. poor market prices for crops. these forces should be taken into consideration in the development of soil conservation policies, strategies and programs. Neglecting any of them is likely to result in programs failing.

In this paper four subjects are briefly examined in relation to these forces: national policy, extension, training

for researchers and technicians and the use of incentives in conservation programs.

National Soil Conservation Policy and Laws

The basic aim of a national soil conservation policy should be to create the conditions, which will encourage all land users to utilize and manage the land in a sustainable way. Once national policy is developed, the necessary legal base and institutions must then be established if the policy is to be successfully implemented.

Identifying the underlying causes of land degradation

Farmers and other land users do not deliberately degrade the land from which they make their living and feed their families. Incorrect land use and bad management usually stem from economic, social and political pressures that force farmers to use the land in the way that they do.

The first step in developing national strategy, therefore, should be to analyze and understand why undesirable land uses are being practiced. There may be many reasons. Agricultural pricing policies may be inappropriate, inputs may be unavailable or land tenure systems may be forcing farmers to over exploit their land. Whatever they may be, without analysis the underlying causes of land degradation may well be overlooked and much time, effort and money wasted on dealing with the symptoms rather than the problem itself.

In many cases, the problem lies with existing government policies, which are actively encouraging land degradation. For example, several Middle Eastern and North African countries have, at various times, heavily subsidized the price of stock feed. While this has temporarily achieved the objective of increasing meat production, it has led to a large build up in sheep numbers and extensive damage being done to the region's rangelands. Follow-up programs, which concentrated on the physical manifestations of the problem, such as rangeland reseeding and water spreading, were bound to fail because they did not tackle the fundamental problem of how the animals were managed. Similarly, it has been found that land tenure systems play a profound role in how land is used and managed. People without long-term rights to land are seldom prepared to invest in it. Conversely, the awarding of land rights can quickly lead to a marked improvement in land use.

Population pressure is often the underlying problem. In such a case, the land is being used beyond its capability and no system of physical conservation measures is likely to succeed. The Association for Better land Husbandry (ABLH) is successfully overcoming land degradation in the highly populated areas of Kenya. Their early studies showed that the land was being degraded as farmers attempted to grow maize and other low value crops. Cash was not available for fertilizers and yields were dropping as soil fertility declined and land eroded. Rather than building erosion control structures, the project introduced systems of composting, and other ways to make the best use of the available organic matter, combined with deep digging and the growing of high value vegetables. The project has also introduced simple ways of processing farm produce, e.g. making pickles and processing honey, to increase incomes. This has resulted in an improvement in the diet of the people, increased incomes, improved soil fertility and decreased erosion. The problem of land degradation is being overcome indirectly but effectively.

People's participation

Soil conservation schemes used to concentrate almost entirely on technology. Land degradation was seen as a physical problem and it was believed that the answer lay in new technology that could be developed by research workers and then passed on to the farmers by the extension service. (Griesbach and Sanders, 1998). It has since been shown that this approach does not work. First, it overlooks the fact that land degradation is usually the result of social, economic and political causes. Secondly, the technical solutions offered have often been unattractive to the land users as they usually involved them in additional work and expenditure but offered little to overcome their immediate problems of improving yields, increasing their incomes or lessening the risks of farming.

In the 1980s this approach began to change as it was realized that, eventually, the way that land is used and managed depends upon the perceptions and behavior of the many individual land users. These people have the ability to bring about fundamental changes in land use for the better. It was seen that for this to happen the people themselves had to be more closely involved in the process of identifying the problems, working out solutions and then implementing what needed to be done. (FAO, 1990).

This has led to great changes in how soil conservation programs are implemented in most countries and a variety of new methodologies have been developed to make this possible (see Cornwell et al, 1994). Most importantly, it is now recognized that there must be adequate provision for the participation of the land users themselves if national soil conservation policies are to work effectively.

Developing and strengthening institutions

With the land users becoming more involved, the future role of governments will be to provide them with the technical support and back-up that they need to plan and implement their own programs. Countries vary and there is a huge range of environmental, cultural, political and economic conditions which make it difficult to generalize about institutional requirements. Nevertheless, all countries need an active extension service which can not only provide land users with technical advice, but which can also facilitate the formation of land user groups that can identify the local problems, develop solutions and work towards their implementation. This calls for special skills that are lacking in most extension services at present.

As governments have moved towards greater participation by the land users in the process of problem identification and the development of solutions, there has been a lessening of formal research by government institutions in several countries. This is particularly noticeable in Australia and New Zealand. As social and economic conditions change there is a growing need for the development of new technology and while some of this can

be performed by the land users themselves, there is still much that can only be done under properly controlled conditions on research stations. Also, soil conservation technology is notoriously difficult to transfer and there will always be a need for national and regional research institutions to develop and test new technology under local physical and socio-economic conditions.

Soil conservation is administered differently in different countries. While it usually falls under the Ministry of Agriculture, in some countries it may come under the jurisdiction of Ministries of Forestry, Environment or even Works. Some countries have independent departments or ministries for soil conservation. To complicate matters, soil conservation research may be found in one ministry while the implementation of field programs may be the responsibility of another. Even worse, in some countries a number of ministries may all be involved in soil conservation programs; all competing for government funds, staff and facilities. While each country must decide which system suits it best, for conservation to work effectively it is essential that there be one ministry, department or unit in government which has the overall responsibility and the authority to co-ordinate activities.

Finally, continuity is important. To start with a small number of staff, limited budget and facilities - which can be maintained or slowly built up over the years - is better than to embark on ambitious programs that cannot be maintained and that have to be cut back or abandoned in the future.

Selecting the right technologies

In the past, soil conservation programs tended to concentrate on physical erosion control measures such as contour banks and diversion works. While these are technically sound, in that they help to control erosion, they provide little if any immediate return to the land user; they take up valuable space and they can be costly and time-consuming to construct and maintain. Farmers are therefore reluctant to take up these types of works and they frequently fail through lack of maintenance.

For soil conservation to succeed it must be seen as a means of attaining increased production in a sustainable way, not just as a means of controlling erosion. National policies should therefore concentrate on the identification, development and promotion of practices, which are productive, as well as erosion control effective (Griesbach and Sanders, 1998)

This can be done in a number of ways. Practices should be promoted which make the best use of water where it falls. If this is done, the chances of healthy plant growth and better yields increases, while the effects of drought and crop failure decrease. Soil management practices must be promoted which increase soil organic matter content, prevent the formation of soil crusts and compacted layers and generally improve soil structure and water holding capacity. In practice, this means making more and better use of crop residues, introducing better crop rotations, promoting relay cropping, improving pasture land and so on. Once the technology has shown itself to be profitable, meeting the immediate needs of the land users and appropriate for the local socio-economic conditions, it is easy to promote and can be taken up over relatively large areas quickly and cheaply. This point has been demonstrated by the rapid spread of minimum tillage in Brazil.

The need for a sound legal base

Many large-scale soil conservation programs have been imposed on land users. This was particularly so in some African countries in the colonial period, when harsh penalties could be applied and farmers who did not carry out the required works could be fined or jailed. Not surprisingly, conservation became extremely unpopular in these countries. In East Africa, the conservation laws were transformed into an issue in the lead-up to independence and local politicians encouraged farmers to break these laws as a means of expressing opposition to the colonial administration.

Unfortunately, these events have led many who work in this field to believe that laws for soil conservation are counterproductive and best avoided. This is wrong and legislation can offer governments an important tool in promoting conservation. In fact, legislation is needed to make conservation work - to establish the necessary government institutions, to legalize their mandates and to ensure that they receive regular budgets (FAO, 1993).

A thorough review of all relevant legislation is an essential element of developing a national soil conservation policy. Particular attention should be paid to harmonizing legislation that may affect the responsibilities and powers of a number of different departments and ministries.

Several countries have recently reviewed, or are in the process of reviewing their soil conservation legislation. These include the USA, Australia, Canada, Thailand and Iceland. The reforms to legislation taking place in such countries reflect the changing attitudes of the community to the impact of land degradation on social, economic and biodiversity conditions. While the details of emerging legislation cannot be gone into here, it should be noted that recognition is being given to the sustainable limits of land use and to the provision of a greater role for the community in natural resources evaluation and decision making. Provisions that enable a greater emphasis to be placed on regional natural resource management plans, soil and land survey requirements, community advice and scientific research are increasing the ability of government and non-government agencies to control and manage soil and land degradation within the bounds of holistic resource management (Hannam, 1999)

SOIL CONSERVATION EXTENSION

The old approach

The conventional concept of soil conservation extension was that it is the role of the research worker to identify and analyze the land users' problems. Solutions should then be developed on research stations and transferred to the farmers via the extension service**.** In this way, a one-way link was established through which new technology can be put into practice by the farmer, usually with the aid of one or more incentives (Zobisch, 1997).

This conventional approach to technology transfer clearly separates the three actors in the process - researcher, extensionist, and implementer - putting them into a

hierarchical relationship. The information flow is in one direction, from researcher to extensionist to land user. Researchers tend to work in isolation and extensionists seldom have a good understanding of the farmers' constraints. Often extension is fragmented into separate specializations, sometimes with different specialists attached to different institutions with little or no interaction.

The use of this approach led to the development and promotion of new technologies, which addressed the symptoms of the problems rather than the real constraints experienced by the land users. The concept was flawed in that it does not encourage the free exchange of ideas and experiences between the three parties involved. A new and better approach is therefore needed.

A people-centered concept to extension

If the approach becomes people-centered, the old hierarchy is eliminated. Information flows freely and in all directions. The land users become equal partners in and have the opportunity to participate in the whole process, from problem identification to solution implementation. Consequently, the land users become not only recipients but active players in the development and testing of new technology and practices.

Farmers do not segment or subdivide their farming activities as researchers do. The whole farm - and related outside activities - dictates their thinking and how they manage the land. The farming system is seen as a whole. This, with their local knowledge and skills, can be used to develop new and appropriate solutions to erosion and other problems.

If a people-centered approach to soil conservation extension is adopted, it soon becomes apparent that other people are involved in the way in which land is used. These may include local leaders, schoolteachers, religious leaders, rural business people, government officials, and politicians. These people all have their own interests and may play a profound part in the way the farmers use or misuse their land.

Once these people become involved in the extension process, local cultural and social habits, traditions and norms start to become exposed. Quite frequently, farmers may wish to bring about changes for the better but are constrained because of local social pressures. These pressures may be very powerful and farmers may risk being marginalized if they do not conform. Understanding these pressures is essential if soil conservation extension is to succeed. This subject is returned to below.

The lesson to be learned from this is that the role of soil conservation extension in many countries has to be redefined to be people-centered. The extension worker needs to become the catalyst - someone who understands the community in which he or she works and its land use systems, a person who can facilitate the involvement of farmers, provide information on technology and act as a link between the land users, research workers and others involved in how the land is used and managed.

Training for Research and Extension Workers

To bring about the changes mentioned above implies changes in the way both soil conservation extension and research workers are trained. Traditionally, most research and extension workers have been trained in disciplines of the physical sciences such as soil science, agronomy and forestry. However, if the approach is to change from being technology-centered to being people-centered, both research and extension workers will need more exposure to the social sciences and a more holistic understanding of why the land is used or misused as it is. Research workers need the training to enable them to be able to appreciate the problems from the land users' perspective, to be able to work with the land users in developing solutions and the ability to test them under farm conditions as well as on the research station. While also needing a sound technical background, extension workers will in the future need a far better understanding of socio-economics and farming systems than most of them presently do. Their role is already changing in many countries from that of a person passing on new technologies and instructions from governments to that of a facilitator whose task it is to help and encourage land users to identify and solve their own problems. Few yet have the necessary skills to do this adequately and much more training is required in the skills of communication and facilitation.

Understanding farming systems

Farming systems, particularly the more traditional, small scale farming systems, tend be very complex. Problems such as soil erosion are not seen in isolation by the farmer but are seen as one of many factors in how the farmer manages the land. Soil conservation effective practices can be adopted more easily when they fit in with other practices already in use. They will also be more likely to succeed if they serve additional purposes, e.g. lead to increased yields, reduce costs or labor requirements or reduce risk. This explains why minimum tillage has been such an effective conservation practice in several countries in recent years - it leads to soil conservation but it can also increase yields, reduce costs and improve profits. It is therefore important that both extension and research workers are given sufficient grounding to be able to recognize the links within farming systems. Without this, they may not be able to develop and then promote conservation measures, which are acceptable to land users.

Related to this is the fact that many farming systems already contain conservation effective practices. These very from the contour terracing systems, which are extensively, used over much of Asia and the Middle East, to mixed cropping and shifting cultivation systems in tropical Africa and Asia. Many of these systems are now going out of use because of population and other pressures. Experience shows that it is easier to adapt and build on already existing traditional skills rather than try to develop completely new practices. If this approach is followed, farmers will be more likely to adopt practices, which they already know and understand.

The importance of the farm family and gender

A vital part of the farm is the farm family. How the land is managed depends largely upon the composition of the family, the skills and knowledge of its members and their

financial resources and equipment. Land management also depends upon the culture, religion and social norms and taboos of the area. Little progress is likely to be made unless these are all understood. These features of rural life are now well understood and documented in rural sociology but, unfortunately, not nearly enough attention has been given to this topic in the training of soil conservationists, it usually being expected that they will just pick up this type of knowledge as they go along. In fact, lack of understanding of these factors has led to numerous failures in conservation programs. This is particularly so in developing countries where the leadership on programs is often entrusted to outsiders who have very little understanding of local societies and how they function. For example, in many parts of Africa women spend many hours each day in carrying water as part of their duties. This, with their other household and farming responsibilities leaves them with little time for anything else. It may therefore be unrealistic to expect them to start other labour intensive work such as tree planting or terrace construction. An understanding of the situation may lead to first providing a better water supply or doing something else to lighten their existing work burden. After this, they may have more time to devote to more productive activities.

Gender issues are extremely important. In many rural communities, it is the women who do most of the farm work. This fact is usually overlooked and most extension workers are men who tend to work with the male members of the farm families. As a result, schemes often fail because they do not take into consideration the capabilities and responsibilities of women. All soil conservation staff need training in this subject and, in particular, more female extension workers need to be trained. This is particularly important in those countries where the culture does not permit male extension workers to work directly with women.

Don't forget the technology!

As social and economic conditions change, technology needs to change and soil conservation programs will only succeed if the right technology is available (Sanders, 1997). With the emphasis being placed on people's participation and the land users developing their own solutions to problems, there is a tendency to forget the importance of technology and the need for research to develop new practices. As a result, basic research work is being run down in some countries and fewer people are receiving the necessary scientific training. This is particularly noticeable in Africa where very little research is now being conducted in spite of growing problems with land degradation. This tendency can also be seen in some of the developed countries such as New Zealand and Australia. Not all the solutions can be found by the land users themselves, no matter how much assistance they are given, and there will be a continuing demand for well-trained research workers.

Similarly, if extension workers are to win the respect of the farming communities in which they live and work, they must be given the necessary technical training and be equipped with the skill that field works need to be able to operate effectively. Simply training soil conservation extension staff as "facilitators" is not enough. This fact is now gaining recognition in parts of Australia where there is now a shortage of experienced field staff able to help farmers with activities such as surveying dams and contour systems.

The Use of Incentives

Even it the underlying reasons for land degradation are identified, the land users fully involved and possible solutions identified, soil conservation programs may still not function effectively, simply because the solutions offered may not be sufficiently attractive for land users to adopt - for strong economic, social or institutional reasons (Sanders, 1997). Incentives in one form or another are frequently needed before land users will change their ways of using and managing land.

Just as people's participation was identified as an important prerequisite to successful conservation in the 1980s, the importance of incentives and disincentives is now being recognized in the 1990s. So important has this subject become that the World Association for Soil and Water Conservation (WASWC) has taken a lead and is currently producing a book on the subject (Sanders et al., 1999).

Direct and indirect incentives

The subject is complex and it is not possible to more than touch on some of the main issues here, but it should be noted that over the years a wide range of incentives and disincentives have been developed and used by governments and donor agencies and can be found in most conservation programs in one form or another.

Incentives (and disincentives) can be divided into two categories - direct and indirect. Of these, the indirect incentives are the most powerful and likely to have the most profound effect. They include such important factors as land tenure rights, markets and pricing. This underlines the importance that government policies and macroeconomics can have on land use.

Direct incentives, on the other hand, are generally easier to apply at the local level and can be very effective. This has proved to be the case with the Landcare program in Australia where a number of incentives, such as small grants, can be obtained under certain circumstances. However, there are many examples of direct incentives having had very little long-term effect, with the land users prepared to carry out works only for the sake of obtaining a short-term incentive and then quickly reverting to their old ways once the incentive has been used or withdrawn. This has been particularly so with many of the "food-for-work" programs in the poorer developing countries and cases from Ethiopia to Lesotho could be quoted where these schemes have been seen by the recipients as "work-for-food" rather than "food-for-work"! Certainly, incentives have been used, as little more than bribes in some cases to encourage land users to take up practices that would not otherwise interest them.

There are lessons to be learnt from this and de Graaff (1993) stresses the point that incentives, whether direct or indirect, should be relevant to what he calls "farmer needs pull" rather than "technology push". In other words, if incentives are to be effective in the long run, they must be

orientated towards the problems as perceived by the land users, instead of being focused on the wide scale implementation of technical measures whose relevance the land users do not understand or do not have the resources to maintain.

Where and when should subsidies be used?

One of the most difficult issues to resolve is where and when incentives should be used.

Some argue that, where land users stand to benefit directly from any particular conservation practice, he or she does not require any additional incentive. Conversely, where the land user does not stand to benefit directly, but society in general does, the use of incentives is justified. In fact, some writers, e.g. Huszar (1999), argue that under these circumstances there is justification for the incentives to be provided on a continuing basis and not just as a short-term measure.

Sanders and Cahill (1999) argue that the effects of land degradation can be broken down into two broad categories: on-site (or on-farm) and off-site (or off-farm). These can be broken down again into four categories, depending on whether the measures needed are perceived by those involved to be cost effective ("economic") or not cost effective ("uneconomic"). This is shown in Table 1 below:

	On-site	Off-site
Economic	1	2
Uneconomic	3	4

Of these categories, it is suggested that:

1. Where the problem is on-site and the treatment is economic, i.e. it is perceived by the land users to more than pay for itself, the task is primarily one of extension and provision to the land users of the correct type of information and no other incentive should be needed. For example, it may be feasible to change over from growing low value annual crops to high value perennial crops, which provide year-round soil cover.
2. Where the problem is off-site and the treatment is economic, the task is again one of extension to either, or both, the off-site and on-site land users, and again no other incentive should be needed. Here, for example, it may be possible to solve the problem by encouraging the on-site land user to change his farming practice from, say, clean cultivation to minimum tillage. If the off-site problem is on another farmer's land, it may be possible to safely divert unwanted flows of runoff.
3. Where the problem is on-site and uneconomic, i.e. not considered worthwhile treating by the land user, (e.g. an expensive terrace system may be needed if cultivation is to continue without erosion), three possibilities arise:
   - the land user treats the problem for the public good but contrary to his own economic advantage;
   - the land user is forced to carry out the required measures (regulation);
   - the land user is subsidized to do what is required through one or more incentives.
4. Where the problem manifests itself off-site and the on-site treatment is uneconomic for the land user to implement, the most difficult situation arises, one where compulsion may appear unjust and where the use of incentives assumes major importance. An example of this would be where erosion and runoff from a large, cultivated catchment area is damaging a water supply some distance away. Here it may be unreasonable or impractical to expect a large number of farmers to stop cultivating if the alternatives are not economically viable. Under these conditions, it may be fair for the community to subsidize the cost of extensive erosion control works on the farmers' fields or pay the farmers to use their lands in another way. In such cases, it may be necessary to pay subsidies on a continuing basis.

The justification for using incentives

Recent work by Sanders et al. (1999) indicates how complex this subject is. Few farmers are able to adopt new technologies, let alone whole packages of conservation measures, easily and without having to make adjustments to their farming and livelihood strategies. Even when land users perceive new practices to be profitable, they may still need some additional incentive before they are prepared to make the change. This means that incentives systems need to be developed to influence the behavior of land users in such a way that they will adopt and then continue to use soil conservation measures. There is no single, simple way in which this can be done but an understanding has emerged that the use of incentives is contextual and different conditions require different answers.

Essentially, incentives are needed when the adoption of conservation measures is not profitable to the land user. If conservation measures are profitable to the land user, then they are usually able to finance the necessary changes. If they cannot, it may be necessary to provide enabling incentives, such as adjustments to the credit system or removal of price depressing structures such as government regulations. Low income should not be used as an excuse for providing incentives for irrational behavior. But incentives may be necessary to overcome barriers to the adoption of profitable conservation measures and they are definitely justified when these measures yield external benefits.

Recognition that incentives are ultimately justified in terms of removing external costs or producing external benefits leads to two additional observations. First, incentives may need to be provided on a sustained or continuing basis. Numerous examples exist of projects failing after incentives are terminated. Obviously, the land users did not find the conservation practices profitable without the incentives. But if society derives benefits from the conservation activities of the land users, then it is necessary to pay for these benefits by continuing to provide the incentives. It may not only be necessary, but it is also fair, that those who benefit pay the costs.

Second, conservation activities may not always be profitable and incentives for such activities may not necessarily be designed to stimulate activities, which ultimately pay for themselves. But when we consider the whole of society, including the land users as well as those

affected by the land users' activities, non-profit maximizing conservation activities may be in the best interests of society as a whole.

Challenges in the use of incentives

Probably the biggest challenge is the removal of incentives for land degradation. In many countries, existing government policies to overcome other problems, such as inadequate food production and low farm incomes, may unintentionally contribute to land degradation. Before soil conservation programs can become effective, it may first be necessary to remove, or at least, correct, these disincentives to conservation. A problem is that governments, and in fact, society in general, may view food production and the welfare of the farmer to be of more importance than the conservation of the land. A major challenge facing the soil conservation movement is to reconcile the multiple objectives of society. Simply to argue for soil conservation at any price is not enough.

Secondly, there is a challenge to design sustainable incentives. There are numerous examples of where incentives have been used in soil conservation projects as a temporary measure. Often, when the incentive is withdrawn the land users cease to use the soil conservation practices and conditions revert to what they were before the project began. For the maintenance and the long running continuation of soil conservation activities incentives must be developed and used which can be built into the social and economic system. In many cases, the use of incentives can be avoided or greatly reduced by the promotion of profitable conservation practices. However, this is not always possible and where conservation practices are needed which are not profitable to the land user, but are of benefit to society, it is reasonable that society should contribute to the cost and on a continuing basis.

Finally, the effectiveness of using incentives for soil conservation is always constrained by the institutions within which they are applied. Social, political and economic institutions are all factors to be considered in selecting and administering incentives. The challenge facing the soil conservation organizations is to devise and select incentives that will function effectively within the prevailing institutional structure. There is no single incentive appropriate to every problem.

CONCLUSIONS

In spite of the impressive work that has been done in recent years, there are still many places where little progress is being made and the problems of land degradation are spreading. The causes are largely social, economic and political and little progress is likely to be made until these problems are tackled through the development and implementation of appropriate government policies, supported by the necessary legislation and institutions. However, to develop these depends on a clear understanding of the basic causes of the problems.

Strong soil conservation extension services are needed to implement government programs, but to be effective they require well trained staff with a sound appreciation of the social, economic and political environment in which the land users operate. They also need the skills to be able to encourage and help land users to take control of their own programs. The extension services need to be backed by research workers who also have a broad understanding of the socio-economic restraints affecting land users.

Incentives play an important part in all soil conservation programs. While it may be possible to develop practices, which are profitable enough to be incentives in themselves, there are many circumstances under which additional incentives are needed if land users are to adopt and continue to practice more conservation effective ways of land use. Such incentives may need to be long-term or permanent. There is justification for the use of such incentives if society in general is to benefit.

REFERENCES

Campbell, A., 1994. Landcare - communities shaping the land and the future. Southwood Press. Pty. Ltd. Sydney. ISBN 1 86373 555 0

Cornwell, A, I. Guijt and A Weston, 1994. Acknowledging processes: methodological challenges for agricultural research and extension in Beyond the Farmer First, Eds. I. Scones and J. Thompson. Intermediate Technology Publications. ISBN 1-85339-250-2.

de Graaff, J.1993. Soil Conservation and Sustainable Land Use - an Economic Approach.Royal Tropical Institute - the Netherlands. ISBN 90 6832 042 4.

FAO, 1990. The Conservation and Reclamation of African Lands - and International Scheme. The Food And Agriculture Organization of the United Nations. ARC/90/4, Rome.

Griesbach, J-C and D. W. Sanders, 1998. Soil and Water Conservation Strategies at Regional, Sub-regional and National Levels in Towards Sustainable land Use - Furthering Cooperation Between People and Institutions, Vol II. Eds. Blume, Eger, Fleischauer, Hebel, Reij and Steiner. CATENA VERLAG GMBH, 35447 Reiskirchen, Germany. ISBN 3-923381-42-5.

Hannam, I., 1999. Policy and Law for Management of Land degradation: a global view. In print.

Huszar, P. C., 1999. Justification for Using Soil Conservation Incentives. In Incentive in Soil Conservation: from Theory to Practice Eds Sanders, Huszar, Sombatpanit and Enters. Science publishers, Inc. Enfield, New Hampshire, USA.

Kerr, J. 1998. The Economics of Soil Degradation: From National Policy to Farmers' Fields in Soil Erosion at Multiple Scales: Principles and Methods for Assessing Causes and Impacts Eds. Penning de Vrie, Agus and Kerr. CABI Publishing Wallingford, Oxon OX10 8DE, UK. ISBN 0 85199 290 0.

Palmer, J.J., E. Guliban and H. Tacio. 1999.Use and success of incentives for promoting Sloping Land Technology (SALT) in the Philippines in Incentives in Soil Conservation: from Theory to Practice. Eds. Sanders, Sombatpanit, Huszar and Enters. Science Publishers, Inc., P.O. Box 699, Enfield, New Hampshire 03748, USA.

Sanders, D. W. and D. Cahill, 1999. Where Incentives fit in soil Conservation Programs. In Incentives in Soil

Conservation - from Theory to Practice. Eds. Sanders, Huszar, Sombatpanit and Enters. Science Publishers, Inc. USA.

Sanders, D.W. 1999. The Implementing of Soil Conservation Programmes. In: Rangeland Desertification. Eds. O. Arnalds and S. Archer. Kluwer, Dordrecht. In press.

Sanders, D.W., P.C. Huszar, S. Sombatpanit and T. Enters (Eds) Incentives in Soil Conservation - from Theory to Practice. Science publishers, Inc. USA.

Zobisch, M. 1997. Concepts: section Review in Soil Conservation Extension - From Concepts to Adoption. Eds. Sombatpanit, Zobisch, Sanders and Cook. Oxford & IBH Publishing co. Pvt. Ltd. New Delhi. ISBN 81-204-1189-7.