Chapter 18

RESPONSIBLE LAND USE: THE ROLE OF GOVERNMENT

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Although the Australian land mass is vast, with a total area of 768 x 10^6 ha, the proportion of this area with a reasonable agricultural potential is relatively small. Only about 77 x 10^6 ha are suitable for crop production (Nix, 1976). The misconception that productive land is unlimited in Australia has led to land use that has exceeded the long-term capability of much of the area suitable for agriculture. This has resulted in soil degradation over many years because of erosion and, more recently, salinity and soil acidification. In addition, prime agricultural land is being lost at an alarming rate through expansion of urban areas. In New South Wales alone 6 x 10^5 ha of agricultural land was alienated by hobby farming and urban encroachment between 1969 and 1979 (R.J. Smith, personal communication). Damage to public facilities such as roads and water storages by soil erosion is a further cost to the community.

The magnitude of the soil-erosion problem in Australia is enormous. In 1978, the Commonwealth Department of Primary Industry estimated that just over 50% of the land used for agriculture in Australia was in such a degraded condition that it required treatment (Figures 18.1 and 18.2). The Standing Committee on Soil Conservation (1983) indicated that the area affected was 3 x 10^6 km^2 or 61% of the total agricultural land. About two-thirds of this could be treated by changed management practices.

Before the 1930s much of the soil degradation that took place was supported inadvertently by the governments of the day. They encouraged farming in the marginal areas and introduced the soldier settlement schemes, while the recommendation of bare fallowing on easily erodible lands by farm advisers also made its damaging contribution (see Chapter 1). It was only in the late 1930s when the disastrous consequences of the severe erosion became a political issue that State governments responded with soil conservation legislation. Further legislation was enacted in the 1940s. While this legislation did have some impact on arresting the process on severely eroded country it has not prevented soil degradation from continuing, nor the same practices being adopted on newly developed crop land. More recent events that provide evidence for this are the extensive wind erosion and resultant dust storms in Victoria and southern New South Wales in the drought of 1982-83, and the water erosion in northern New South Wales during heavy storms in the summer of 1984. Land degradation and its consequences constitute one of the most serious environmental problems in agriculture (Balderstone, 1982). This continued loss of soil, despite soil conservation legislation, raises several questions. Has government intervention in soil conservation been effective, particularly in terms of preventing degradation; can new policies that are more effective in promoting sound land management be devised; is there an acceptable level of soil erosion; and to what extent should degradation be corrected?

Land degradation results from the failure to use land-management systems that are consistent with long-term sustainable utilisation of the soil resource. Often, the traditional response to such degradation has been to construct earthworks while continuing with the existing damaging practices. Alternatively, land has been used, by necessity, less intensively, often resulting in

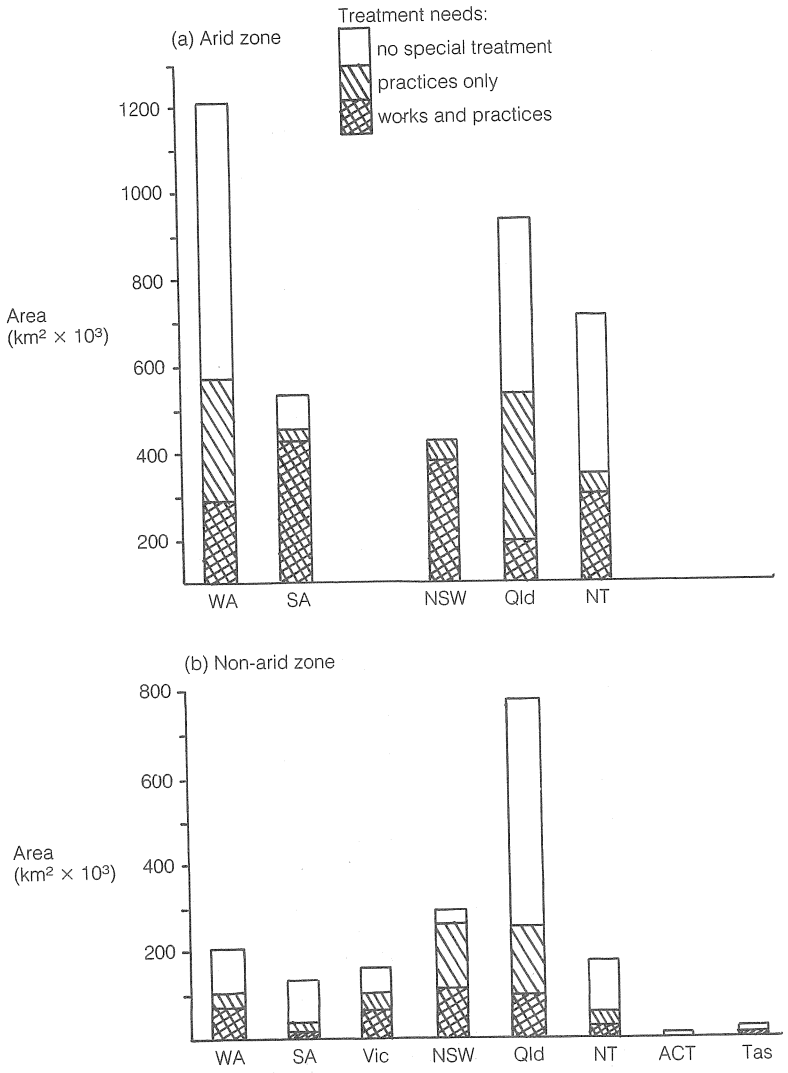

Figure 18.1 Area requiring soil-conservation treatment in the arid and non-arid zones (Commonwealth and State Government Collaborative Study, 1978)

financial disaster. Amalgamation of holdings follows until the size of properties becomes economically viable at the lower level of productivity. Previous chapters have shown that a further alternative is possible for much of arable Australia. Where inappropriate agricultural technology once caused land degradation, better technology can now allow relatively intensive, economic land use - in many cases without recourse to soil conservation earthworks. Involved is a reduction in cultivation and increased use of crop residues. What remains is for acceptance by farmers and subsequent adoption to take place. The question is raised as to what role governments can play in this process.

This chapter argues the case for direct involvement of government in soil conservation, particularly with respect to land-management practices. The development and impact of past and present policies are reviewed and the options available to government policy-makers to encourage better land use are evaluated.

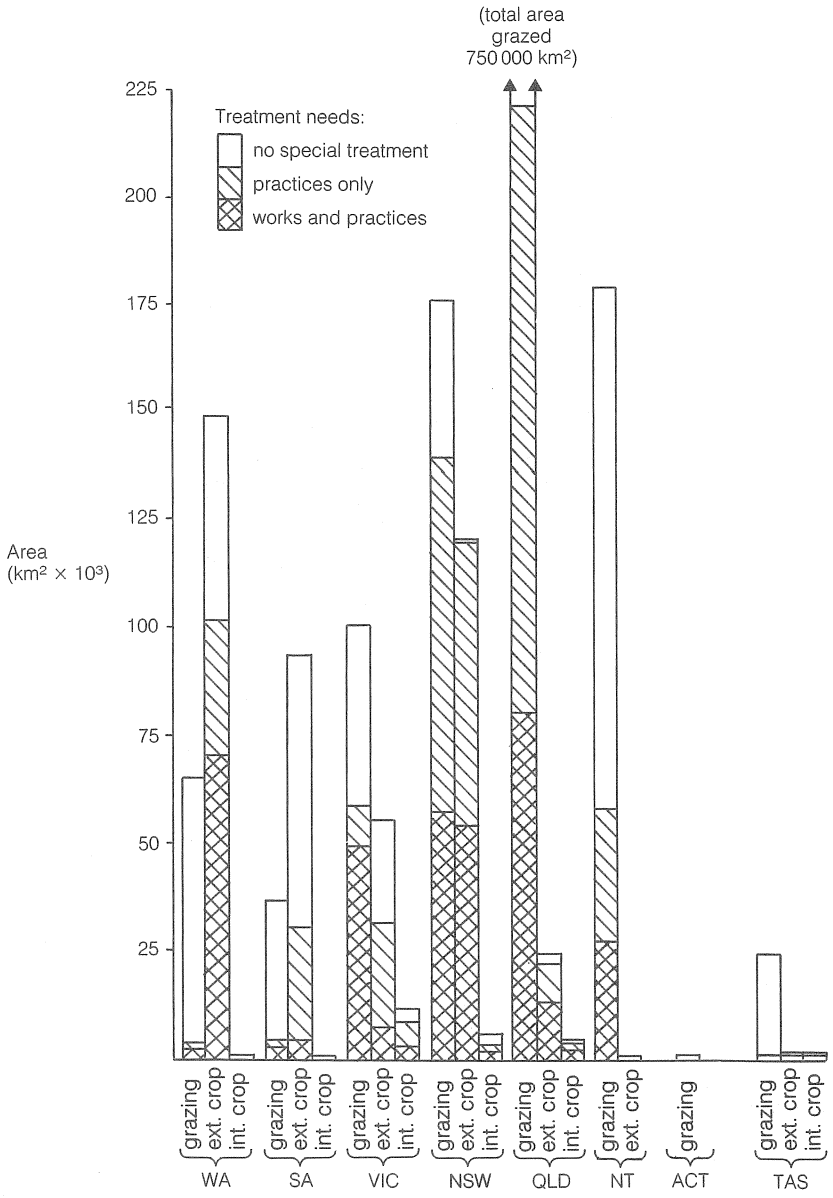

Figure 18.2 Soil-treatment needs in the non-arid zone according to the major forms of land use (Commonwealth and State Government Collaborative Study, 1978)

DEVELOPMENT AND IMPACT OF SOIL CONSERVATION POLICY AND LEGISLATION

Commonwealth Government

The Commonwealth Government has only limited constitutional powers in land-resource matters outside the Territories. Its influence over soil conservation beyond the Northern Territory and the Australian Capital Territory is confined to general agricultural policy, leadership for interstate cooperation, special-purpose financial support to the States, and financial support to landowners (e.g. through taxation policy).

In 1983 the Commonwealth Government recognised formally for the first time that soil is a national resource and its preservation should be a major responsibility for the national government, in conjunction with the States. Accordingly, Federal funding was provided for the National Soil Conservation Programme in which were identified five programme goals:

* that all lands in Australia be used within their capability;
* that land-use and management decisions be based on whole catchment or regional land-planning concepts;
* that all land users and levels of government meet their respective responsibilities in achieving soil conservation;
* that effective cooperation and coordination occur between all sectors of the community, disciplines and agencies involved in the use and management of land and water resources;
* that the whole community adopt a land-conservation ethic.

The programme was supported by a budget of $1 million in 1983-84, $4 million in 1984-85, and $4.7 million in 1985-86. Tax concessions for capital expenditure on soil reclamation also apply. Expenditure claimed in an average year is $30-40 million (L. Nothrup, personal communication) although the allowance is much less, probably no more than $10 million. These amounts are very small compared with the soil repair bill estimated in 1978 to be about $1000 million (Blyth and Kirby, 1984).

Also in 1984 the Bureau of Agricultural Economics undertook a review of the role of tax incentives in encouraging soil conservation practices (Haynes and Sutton, 1985). Although hampered by confidentiality of tax returns, this review is of great importance because tax incentives could be one of the most significant influences in the adoption of conservation farming practices. Taxation concessions for capital expenditure on soil reclamation were subsequently widened in 1986 to cover all forms of land degradation.

A much more difficult area to be considered by the Commonwealth Government is the effect of its general agricultural policies on land utilisation and degradation. Decisions concerning land use are influenced by the physical environment and State government controls that are related to that environment. Decisions are also influenced by the current and projected economic situation, which can be influenced by Commonwealth and some State policies. Blyth and Kirby (1984) argue that general agricultural policies sometimes have economic effects (on rates of land degradation) that are either unanticipated or ignored in policy formulation. They also question

the effectiveness of policies specifically directed towards alleviating land degradation. Blyth and Kirby (1984) cite input subsidies on fertilisers, water pricing, land clearing and drought assistance as all having unintentionally **increased** soil degradation. They also point to price support for agricultural commodities, citing the example of price support for wheat in the 1920s and 1930s, which led ultimately to widespread erosion (see also De Kantzow, 1981). There is a clear responsibility for the Commonwealth Government to continually review its general agricultural policies with respect to their direct and indirect effects on land use and degradation.

State governments

The major constitutional responsibility for soil conservation is vested in State governments. All States and Territories (except Tasmania) have soil conservation statutes. The purpose of the legislation in each State is to provide for the conservation and management of land resources and to prevent soil erosion. The statutes vary greatly between the States, however, because of considerable variation in the problems encountered, differences in population size, and the relative stage of development of each State when legislation was enacted. Public opinion at the time of enactment has also influenced the nature of soil conservation statutes.

The States of New South Wales and Victoria, with larger populations and more advanced stages of development, each have separate authorities of considerable size and influence to administer their soil conservation statutes. Although only a small part of their programme, these authorities place high priority on land use controls and the protection of water-supply catchments, vital for the needs of large urban populations.

The States of South Australia, Queensland and Western Australia have smaller populations and are still in a less advanced phase of development. By contrast they have, until recently, placed more emphasis on development and production than on conservation, and they maintain only small sections within their Departments of Agriculture to administer soil conservation programmes. In all States the accent is on the provision of an advisory service to interested landholders.

Unfortunately, in many of the States, high-priority problems that are often not included in the various statutes are emerging. These include land-use control and catchment protection.

In South Australia, Queensland and Western Australia there is also the problem of development and land degradation rapidly outstripping the capacity of the soil conservation organisations, and the technical research into agricultural practices suitable for new areas of production. This is particularly so in the tropical and sub-tropical agricultural areas and in the arid and semi-arid grazing areas.

The range of organisational structures that has developed, and the basic approaches to soil conservation, are summarised in Table 18.1 (based on Queensland Department of Primary Industries, unpublished). Despite legislative differences between the States, the basic approach to soil conservation is the same - extension (based on research where necessary), liaison and, in some cases, assistance with equipment and finance. Although regulatory measures are included in most of the statutes (the activities) in soil conservation are mostly based on persuasion and cooperation.

A major difficulty in assessing the need to change State soil conservation legislation is the vast difference between the powers laid down in existing legislation and those that are actually used. That is, the failure of present policies to contain soil erosion may not reflect on the basic legislation, but rather on the way in which it has been implemented.

Difficulties with current legislation and policies

Narrow focus on erosion Many of the problems of current legislation and policies relate to events at the time of enactment. All existing legislation was prompted by catastrophic erosion or by the need to protect catchments from siltation. Thus its focus is on erosion mitigation or correction, while other forms of land degradation are largely overlooked. Salinity on both dryland and irrigation country, increasing acidity, pesticide residues and soil compaction all promise to be major issues before the end of the twentieth century. Rising salt levels due to poor management of irrigation water promises to be a particularly difficult problem, not only technically and economically, but because of the need for interstate cooperation.

Fragmented legislation Soil conservation now embraces a much wider range of issues than erosion or catchment protection. It includes resource allocation between competing interests and a wide range of environmental issues (e.g. woodchipping, sand mining and industrial pollution), which are presently dealt with under diverse legislation and by a range of government departments or instrumentalities. Land management is therefore hindered by fragmented legislation and administrative complexity. This is exemplified by the number of organisations involved in the management of crown lands. Alternatively a single authority could deal with all matters of appraisal, land use and land management in the wider sense (Queensland Department of Primary Industries, unpublished; Bunker, 1984). Although soil conservation organisations can function through cooperation with other departments and by representation on committees, this can encourage the tendency to be satisfied with small achievements. It is also difficult to adopt coordinated, forward-looking goals and to assess progress towards those goals.

As agricultural technology now appears to be capable of reducing land degradation (sometimes in conjunction with earthworks), this presents a powerful argument for returning the soil conservation role of the soil conservation agencies to the Departments of Agriculture.

Little emphasis on education of farmers Narrow emphasis on soil erosion in current legislation and policies, particularly on control by earthworks, has probably hindered rather than helped community acceptance of the need to reduce soil degradation. Farmers are necessarily concerned with short-term economics (often for survival) whereas investments in soil conservation (especially earthworks) may not return an economic benefit within the lifetime of the farmer. Emphasis on costly earthworks in government policy fails to take this limitation into account. Whereas it may be difficult to show the economic benefits of earthworks, it is now clear that 'conservative' farming practices can be as economical as more traditional methods (Chapter 16). Education of farmers needs to stress this point. Where the data are lacking, economic research needs to be encouraged. Good policies will favour the adoption of 'conservative' practices.

While many farmers inadvertently cause soil degradation, most do not see themselves as wanton exploiters, but as custodians of their children's heritage. Without education about soil conservation, these farmers are unlikely to use control measures to combat a problem they do not perceive as their own and which, at best, offer only longer-term economic benefits. This is clearly shown in the survey by Chamala *et al.* (1983) in Queensland, which has some of the most erosion-prone land in Australia; they found that 60% of farmers believed that the erosion problem had been 'overstated'. Presumably farmers are even less convinced about the erosion problem in southern Australia, where rates of soil loss are low compared with those in Queensland. If farmers fail to perceive a serious problem, they are unlikely to make voluntary investments in soil conservation works. Yet soil conservation in Australia has traditionally been largely on a voluntary basis. There is a need, therefore, to educate farmers about the wider issues of soil degradation and for this to be reflected in government policies.

Table 18.1 State soil-conservation authorities within ministerial/departmental frameworks (Commonwealth and State Government Collaborative Study, 1978)

State/ Territory	Ministry/ Department	Soil-conservation component of ministerial/departmental structure[a]		Comment
NSW	Ministry of Conservation and Water Resources	*Soil Conservation Service (Commissioner)* → Catchment Areas Protection Board Water Resources Commission Forestry Commission State Fisheries	Works and Extension Research and Investigation	No formal division/branch section structure. Orangised administratively for 13 districts covering whole of State
VIC.	Ministry for Conservation	*Soil Conservation Authority (Chairman)* → Land Conservation Council Environment Protection Authority Fisheries and Wildlife Service National Parks Service Port Phillip Authority	Administration Division Field Operations Division Research and Investigation Division	Includes land-use investigation and determinations
QLD	Department of Primary Industries	Division of Land Utilisation → (One of six divisions) (Director-General of the Department is the *Soil Conservation Authority*)	*Soil Conservation Branch* — Field Services Section; Research Section Development Planning Branch Engineering Services Station Drafting Service Section Extension Section (inter-branch extension)	Activities include land resources appraisal for soil-conservation purposes Provides some engineering services to Field Services Section Provides some drafting services to Field Services Section Objectives include conservation of natural resources
SA	Department of Agriculture and Fisheries	*Soil Conservation Branch* → (One of eight branches) (Chief Soils Officer is the *Soil Conservator*)	Soil Conservation and Extension Soil Survey and Arid Zone Group Water Conservation and Irrigation Group Soil Conservation and Fertility Research Group	Activities have a high conservation content Activities of Crop Research Section have a high conservation content but those of Pasture Nutrition Section have a low conservation content

WA	Department of Agriculture	Soils Division → (One of seven divisions) (*Commissioner of Soil Conservation* is also Chief of Soils Division)	*Soil Conservation Service Branch* Rangeland Management Branch Soil Research and Survey Branch Irrigation and Drainage Branch	Activities are mainly in the semi-arid zone Activities have a very high conservation content Activities have a very high conservation content Activities have some conservation content
TAS	Department of Agriculture	Extension Division → (One of eight divisions) (Chief Extension Officer administers soil-conservation advisory services)	*Soil Conservation Officers* District Agricultural Officers	Supply specific soil-conservation advice for Extension Service. General extension and advisory service (soil conservation also carried out by Lands Dept, Mines Dept and Rivers and Water Supply Commission)
NT	Department of the Northern Territory	Forestry, Fisheries and Land Conservation Branch → (One of 19 branches in five divisions)	Land Conservation Section: • *Soil Conservation Group* • Land Resources Survey Group (One of three sections) (Principal Agronomist is the *Commissioner for Soil Conservation*)	Activities have some conservation content
ACT	Department of the Capital Territory	Conservation and Agriculture Branch → Forests Branch Land Policy Branch Land Marketing Branch Land Management Branch making up Lands Division (One of five divisions)	*Soil Conservation Section* (One of six sections) (*Minister* is statutory authority)	Activities of some other divisions and branches have some conservation content

[a] Italic indicates primary responsibility for soil conservation.

As community awareness of the importance of soil degradation seems to be increasing it may be timely to ask if landowners might now be prepared to accept a higher degree of regulatory control over land-use and management practices than in the past. Lessons may be learnt from the United States where, despite vigorous protection of individual rights, very stringent controls over land-use have been enacted in 48 of 50 States (Donahue *et al*, 1983). Hopefully education can influence public opinion to the point where necessary regulation can be accepted in Australia.

Poorly directed financial assistance A further problem with existing legislation is that assistance with finance and equipment hire for earthworks can be mis-directed. In New South Wales, for example, much of this investment has been in farm-water supplies rather than soil conservation works, although these may go together. Improved farm-water supplies in conjunction with increased stocking rates have increased the risk of erosion.

Lack of a macro-economic rationale Current efforts in soil conservation appear to lack economic rationale. Blyth and Kirby (1984) argue strongly that under an economic approach to the question of land degradation, the underlying policy objective is to maximise community welfare - not to minimise soil loss or attain some other technical target.

Musgrave and Pearse (1984) also argue that degradation should not be corrected just for its own sake but that its removal contributes to the attainment of the objectives of the landholder, tenant and society. It is likely that farmers will undertake soil conservation strategies that are profitable to them - either by reduction in costs or by increasing net land productivity and therefore the land asset. Well-informed farmers will invest in a level of conservation and consequent rate of degradation that is optimal for them as individuals. A likely result of on-farm conservation measures, especially mechanical ones such as contour banks, is that:

* net income will be lowered in the short term due to repayment of capital costs and reduced yields from the soil disturbance and reduced cropping area (at least temporarily);

* net income will be increased in the longer term due to the benefits of the measures taking effect;

* the future value of the farm will be raised provided there are ongoing benefits of improved crop yields, higher-value crops being grown and perhaps increasing intensity of production.

These effects are demonstrated in Figure 18.3.

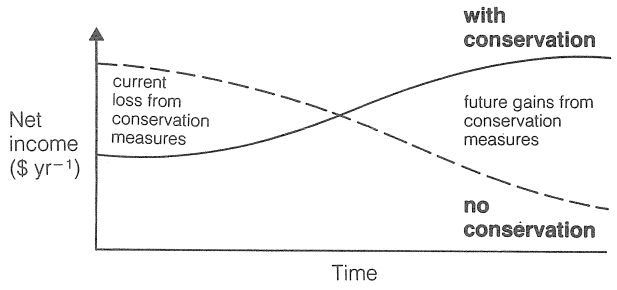

Figure 18.3 Hypothetical effects on farm income of soil-conservation measures (Musgrave and Pearce, 1984)

While the farmer's conservation efforts might be close to optimum for his purposes, it may be that these efforts may be inadequate from the viewpoint of society as a whole. The issue is raised therefore as to who pays for the difference if both the community and the farmer are to be satisfied. Socio economic research is required to clarify this issue.

Thus, soil conservation is better perceived as a possible means of achieving the underlying community objective rather than a benefit in its own right. The key to successful policy development and implementation, then, is community education and involvement of the community in the determination of soil conservation objectives. This can partly be achieved by educating school children about conservation and thereby increasing public awareness of the issues. In some States this will be achieved with the continued improvement in the number of secondary school children studying agriculture.

OPTIONS FOR GOVERNMENT

The constitutional responsibilities for soil conservation and land management rest with the States. Consequently there are considerable difficulties in achieving uniform legislation throughout the country and a consensus of land-management strategies that should be adopted. Uniformity is essential if protection of the national resource base of soil and water is to be achieved. The onus is therefore on the Commonwealth Government to use its influence to develop a national approach to this problem. The options for legislating directly for action remain largely with the States but the Commonwealth Government has influence to encourage or discourage particular farming practices through financial management.

Direct legislation

No government is likely to readily enact stronger legislation requiring landholders to adopt conservation farming methods. Most soil conservation statutes in Australia already provide for control over land use should it be required, but this is not the preferred option for State governments (Table 18.1) because it would be electorally unpopular and would tend to attract a negative response from farmers unless they were educated about the issues and closely involved in policy formulation.

As much of the appropriate legislation already exists it is necessary only to implement it. Already noted is the situation in the United States where legislative control over land use has been implemented. A precedent exists in Queensland where the Soil Conservation Authority can recommend the declaration of 'Areas of Soil Erosion Hazard', as in the case of the Darling Downs, where plans for reclamation and management are gazetted and become legally binding on all concerned (Stephens, 1982).

Probably of greatest importance in this context is the development of national land-use-capability mapping. The use of these maps, with subsequent appropriate legislation, will protect unstable areas from exploitation, unsound farming practices and other damaging activities. Some States are already well advanced in this respect, notably New South Wales and Queensland, and legislation is provided along similar lines for some of the rangelands such as the Western Division of New South Wales. Where these policies are enforced they are effective. If not enforced, however, the reverse is often true.

Campbell (1982) records that only 13% of the land in Australia has been alienated. Australia, therefore, has a high proportion of land under State ownership. The resultant leasehold arrangements often provide opportunities for land users to adopt land-use practices that accelerate land degradation. The lack of long-term security resulting from these tenure arrangements discourages long-term planning and investment and sound land-management practices. Price controls on lease disposals, such as those operating in the Western Division of New South Wales, also encourage land users to exploit the resources.

Financial incentives

An available alternative, particularly to the Commonwealth Government, is to encourage or discourage conservation farming activities by financial means. These could be low-interest loans, grants, subsidies, taxation concessions and alterations to tariff arrangements. Low-interest loans to rectify problems that farmers may have created are difficult to justify economically. Governments are unlikely to adopt schemes that cost them money unless it is electorally popular to do so, and thus the provision of subsidies and grants are particularly unlikely.

Subsidies Subsidies are unlikely to be an effective means of persuading farmers to adopt conservation farming practices. The most notable Australian farm subsidy, the superphosphate bounty, was reduced in the 1970s when it was argued that there was little tangible benefit to the nation by its retention (Bureau of Agricultural Economics, 1976). It has also been argued that it encouraged land degradation by inducing farming to take place on unsuitable marginal lands (Blyth and Kirby, 1984). Drought subsidies, such as the fodder subsidy, also contribute to land degradation by encouraging farmers to maintain excessive stocking rates during the dry periods. (Exceptions include the stock slaughter levy and the stock transport levy, which encourage farmers to move stock off drought-affected land.) In general terms, however, subsidies are difficult to justify because they support the inefficient operators and it is therefore difficult to target the assistance to where it is most appropriate.

Taxation measures These are more likely to be considered by the Commonwealth Government as incentives but such concessions are only useful if the farmer actually pays taxes. In their study Haynes and Sutton (1985) indicate that taxation concessions are likely to encourage greater soil conservation activity only when at least some of the benefits can be appropriated by the individual at a level providing returns at least comparable with other investments. They concluded that tax rebates (items of expenditure deductible from gross tax payable) were of greater benefit than tax deductions (items deductible from gross income) because the level of benefit is absolute and independent of the individual's income.

A more practical approach by a government endeavouring to encourage adoption of conservation farming through taxation measures is to remove the barriers that prevent it. For example, the controlled removal of the investment allowance on some machinery capital would discourage farmers from purchasing machinery and bring machinery costs under the influence of market forces. In addition, it would save the government money. One of the most important financial incentives for farmers to adopt reduced cultivation techniques has been the substantial increase in the costs of fuel, labour and machinery in relation to wheat prices and agricultural chemicals since 1974 (see Chapters 1 and 16). This fact alone provides evidence of the effectiveness of this option. An alternative would be to subsidise agricultural chemicals associated with conservation farming.

Farmer education

A preferred option to legislation by governments has been clearly identified as the education of landholders. One of the difficulties has been the high age of the farmer population (Farquharson, 1980) and the low attainment level of education relative to the rest of the population. Older farmers tend to be set in their ways and attitudes and are somewhat unresponsive to new programmes of management. This is confirmed in studies by Williams (1976) who found that the characteristics that positively correlated with farmer readiness to adopt soil conservation methods included younger age and higher level of education. Nevertheless a dynamic and effective extension programme aimed at improving land management must be undertaken as a matter of urgency - the process involved is reviewed by Chamala in Chapter 17.

The new generation of farmers must be encouraged to attain higher levels of education in order to have a better understanding of the processes involved in soil management. Recommendations from studies of soil degradation in Australia (Commonwealth and State Government Collaborative Study, 1978; Queensland Department of Primary Industries, 1983) have emphasised the need for tertiary colleges and universities to make soil conservation an essential part of all courses relating to agriculture. Colleges of Technical and Further Education and certificate-level colleges that specialise in farmer training clearly have important roles to play in this process of farmer education. Greater emphasis by governments on tertiary training for farmers is required.

The need for effective extension and farmer education is reinforced by the finding of the Commonwealth and State Government Collaborative Soil Conservation Study (1978), which indicated that management practices alone would be sufficient to stop soil degradation on 44% of the area assessed as requiring treatment (see Figures 18.1 and 18.2). Management practices also have an important role to play on the other 56% of the area subject to degradation in conjunction with soil conservation works as an effective integrated package of treatment measures.

Monitoring and liaison

It has been stressed that productive soil is a finite national resource. The utilisation of land according to its capability is increasing in importance nationally and the compilation of a land-resource inventory is urgent. Although the requirements for land management vary in nature and extent in each State and therefore require different solutions, it is desirable that national legislation be consistent and all-embracing, allow integration and reduce duplication. Currently there are oddments of legislation authorising different departments or statutory authorities to administer matters that could be dealt with by a single authority. The separation of soil conservation and agriculture in New South Wales and Victoria has already been questioned.

The need for consistency of legislation on soil management extends also to pesticide usage, particularly as herbicides play an essential role in conservation farming activities. Legislation controlling the use of pesticides needs to ensure that environmental and safety standards are maintained, while not unnecessarily hindering the testing, promotion and use of pesticides. Currently, pesticide usage is strictly controlled in New South Wales, resulting in much slower registration of chemicals, inflexibility in usage and, in some cases, unavailability of pesticides compared with other States. Liberal laws exist in Western Australia with minimal restriction on application and usage.

In addition to the compilation of a land-use inventory, there needs to be continued vigilance by government agencies on the development of land degradation nationally and land use generally. The facilities provided by Landsat satellite surveillance have great potential for use in this way. As Landsat relies on colour differences for its analysis, it is clearly impractical to await colour changes resulting from erosion of an area as this would result in unnecessary and very extensive damage. Once problem areas had been defined, however, Landsat could then be used to monitor changes in boundaries. The amount of cultivation and consequently the extent of fallowing could be identified as well as land use.

Due to the increased use of chemicals in agriculture, the need for uniform legislation and continual monitoring of herbicide residues and other environmental issues is of great significance. The establishment of a federally funded national residues laboratory and permanent field sites would be one way of providing a national perspective on these issues. Such information would provide an information base for education and research programmes and, where necessary, for drafting legislation.

Research

An active technical research programme is essential for the continuing improvement of conservation farming methods and to increase understanding of the underlying processes, thus providing a permanent and reliable source of information for extension. Solving the problems that arise and carrying out investigations to improve the efficiency of these methods will need continuing support.

Also urgently needed is research into the socioeconomics of soil erosion and conservation policies (Musgrave and Pearse, 1984). Areas of investigation include economics, law, sociology, administration and politics. While it is important to have the technical aspects of conservation understood it is clearly equally important to evaluate its contribution to the community and to individual farmers. Such understanding would provide a framework on which government policy could be soundly based.

CONCLUSIONS

This chapter has emphasised the need for all governments to take a more active role in the preservation of the national soil resources particularly by the encouragement of the adoption of conservation farming methods. This can be achieved by enactment and enforcement of legislation, by incentives and by education.

The options identified specifically for Commonwealth Government action include:

* continually reviewing its general agricultural policies with respect to their direct and indirect effects on land use and degradation;

* the use of fiscal measures such as taxation to provide incentives for the adoption of conservation farming;

* greater and continuing financial support for research associated with land management;

* the establishment of a national pesticide-residue laboratory.

State governments, having the constitutional responsibility for soil erosion, need to:

* recognise soil degradation and land management in its broadest sense;

* consolidate legislation, which currently is fragmented and often unenforced;

* consider the amalgamation of soil conservation authorities and Departments of Agriculture into one authority to oversee the management of land;

* urgently develop land-capability maps to ensure the long-term viability of productive lands and to minimise degradation and urban encroachment.

All governments need to ensure that substantial provision is made for:

* education of the general public and for farmers in particular;

* consistency of approach between governments in legislation for pesticide use and land management.

It is no longer appropriate to patch up disasters - the need is for prevention. Encouragement of sound land-management practices that are economically feasible and acceptable will be less costly in the long term than soil reclamation.

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