Concluding Comments

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In my concluding comments to this ACIAR workshop on the productive use of saline land I want to make a few comments regarding:

(a) the size of the salinity problem in Pakistan;

(b) the process of goal setting; and

(c) some critical factors limiting revegetation.

Size of Problem

Two interesting statistics can be used to define the salinity problem in Pakistan (Qureshi et al., these proceedings):

(a) the area of irrigated land is about 16 million hectares; and

(b) most recharge into the groundwater comes from leakage from irrigation canals. The annual recharge from these canals is 43 million acre feet (equivalent to 53.1×109 m^3).

If we divide (b), the amount of annual recharge, by (a), the area affected, we can estimate the size of the recharge problem causing salinity. This calculation shows that the amount of recharge over the irrigation area in Pakistan is about 300 mm per year. In other words, we need to develop revegetation strategies which use an additional 300 mm of water per year. It should be stressed that use of this extra water may not be a *difficult* problem, merely an extensive problem. The Australian tree species discussed by Marcar et al. (these proceedings) grow well in Pakistan. Under conditions of lower evaporative demand than found in Pakistan, native forests of these species use up to 1200 mm annually (reviewed in Schofield et al. 1989). Clearly, the widespread growth of such trees in Pakistan would have a considerable impact on recharge.

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Goal-setting

In Western Australia, the area of land subject to dryland salinity has been estimated in six surveys since 1955; during this time the area of previously productive land which has become too saline for conventional agriculture has risen fivefold [from 73 500 to 443 400 ha; cf Burvill (1956) and George (1990)]. Given a continuing of current landuse practices, a further two million hectares of agricultural land are at risk (Anon. 1988). In Australia as a whole there are now more than one million hectares affected (Table 1), although much larger areas than this are clearly at risk.

Table 1. Areas of salt-affected land in Australia and Pakistan.

Country/State	Area affected (million ha)	Reference[a]
Australia		
Western Australia	0.44	1
Victoria	0.39	2
New South Wales	[b]	3
South Australia	0.21	4
Pakistan	5.7	5

[a] References are: 1. George (1990); 2. Government of Victoria (1989); 3. Soil Conservation Service of New South Wales (1989); 4. South Australian Government (1988); 5. Sandhu and Qureshi (1986).

[b] This study estimates that 2.2% of the State is affected.

We believe that most of the salt-affected wasteland in Australia is capable of producing some forage, and to this end, the States of Australia have agreed to cooperate in a National Program on the Productive Use of Saline Land which aims to revegetate the salt-affected areas by the year 2000.

In Pakistan there is a area of 5.7 million ha of salt-affected land (Table 1). An agenda for tackling this

problem should also be set. At least some of the major players necessary to initiate and develop such a program for Pakistan have attended this workshop.

Some Critical Factors Limiting Revegetation

The goal of revegetating saltland requires the widest community action. We scientists must be prepared to be part of the community achieving that solution. Revegetation of saltland is ultimately not a task which will be performed by us, but by farmers who believe that by doing so, they will make more money or grow more food. We must develop revegetation technologies, show that they are profitable, and promote their adoption (see scheme in Fig. 1).

I believe that there are two important factors which limit our ability to revegetate saltland. The first is that we tend not to act as members of teams (composed of farmers, extension officers and scientists) dedicated to achieving revegetation (i.e. developing the 'system'). Instead we focus on smaller scientific problems of interest (components of the 'system').

The second factor which limits us is a belief that saltland revegetation cannot be done. The results of this workshop have shown that saltland revegetation in Pakistan is not only possible, but also highly productive.

Conclusion

When we look at soil degradation in Australia, Pakistan, Thailand and India, it is clear that we are observing the loss within a few decades of soils which have taken millions of years to establish. Revegetation of saltland is helping to stabilise these highly erodible soils.

In ACIAR Project 8619 there is a unique opportunity for Australians and Pakistanis to work together to develop appropriate technologies to revegetate saltland. It appears unlikely that ACIAR will fund projects in other countries on this particular topic while this project continues. It is imperative that we make good progress in overcoming the problems facing us and maximising the value of our work to other countries faced with similar problems.

During this workshop, Professor David Sen said, 'The two oldest enemies of agriculture are aridity and salinity'. In this historical context, we at this workshop have the privilege to be coworkers in an activity which could be regarded as a miracle.

References

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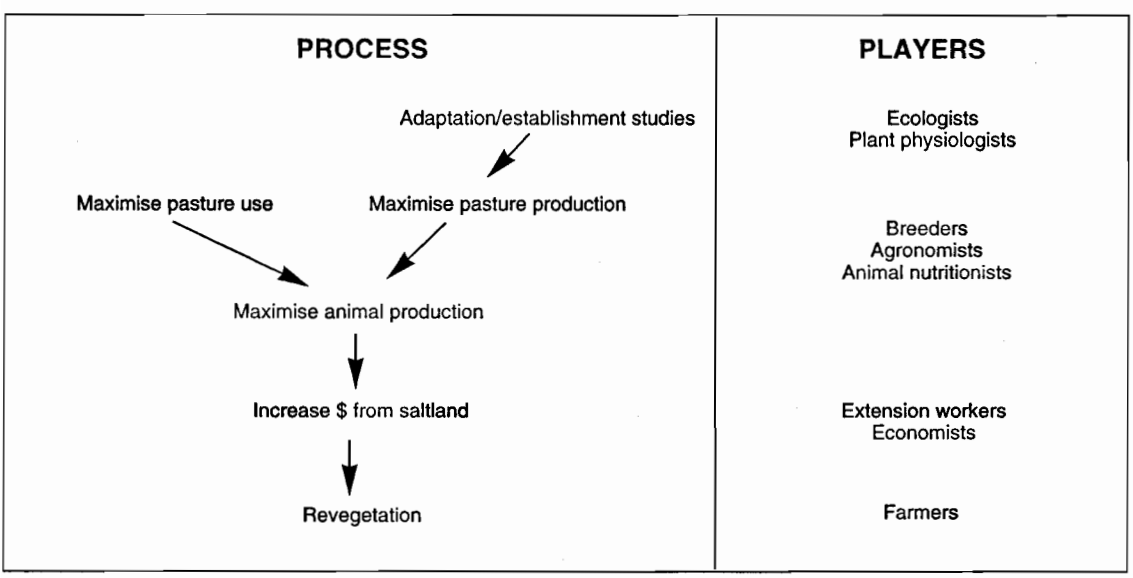

Fig. 1. Schematic diagram of the processes and people involved in developing the technology of saltland revegetation and ensuring its adoption.

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