Weed management – policy and reality

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We have heard a considerable amount today on the policy in relation to weed management. It is my belief that managing the natural system is the easy part; managing human behaviour presents the real challenge. This is the reality that I would like to draw to the attention of policy makers.

It is pleasing to see that both the Victorian Departments with a major involvement in weed management programs and the CRC for Weed Management have recently conducted research into the human aspects of weed management. There is a tendency for these studies adopt a selling viewpoint i.e. 'Here is the product why won't they buy it?' Deeper studies of human behaviour are required if we are to understand the motivation of individuals and groups and to persuade them to adopt desirable patterns of behaviour in relation to weed management. There is also a need to examine the messages and the way that they are presented. Some issues that are of vital importance to the policy maker may fail to capture the attention of the broader audience. Who is to blame?

The past 30 years have been marked by an increasing emphasis on the protection of natural systems from invasion by environmental weeds. That is, protection of the intrinsic value of native Australian vegetation. However, Victorian weed management legislation derives from the desire to protect cropping and grazing industries. Environmental and health concerns are addressed in the legislation but it continues to be implemented in an agricultural framework. A revised legislative and policy framework is required to meet the challenge of protecting both commercial and environmental assets.

The new framework should be designed to take account of the behaviour of all sections of the community including those in both rural and urban areas. This is essential if we are to achieve appropriate community behaviour in relation to weed management. The following sections outline a theoretical basis for explaining human behaviour in the environment and provide some examples the challenges that confront weed management policy makers.

Four determinants of environmental behaviour

Stern (2000) proposes four types of variable that influence the way humans respond to the environment. The first type, *attitudinal factors*, includes human environmental values and general predisposition to the environment as well as beliefs about specific components of the environment. He recognizes that there may competition between environmental and non-environmental attitudes eg, desire to take part in an environmental activity may be in competition with the need to spend time with the family. Individual behaviour will also be influenced by the perceived social and material costs and benefits of the action.

Stern lists *contextual forces* as the second group of variables with influence on human environmental behaviour. These include the material costs and rewards relating to certain behaviour, laws, regulations and policies together with the availability of suitable technology. Social influences including group membership together with advertizing are also important determinants of behaviour.

Personal individual capability includes the level of understanding of the problem and the possession of the specific knowledge and skills to act appropriately. The individual also needs the necessary financial resources to engage in the desired behaviour.

Fourthly in many cases it can be shown that established *habit and routine* is a major factor influencing human environmental behaviour**.**

I have selected below some examples to illustrate aspects of individuals and community behaviour in relation to weed management relating to each of group of variables. The paper concludes with a summary of the principles for achieving successful intervention in the changing environmental behaviour (Stern 2000).

Attitudinal factors

A good place to start is to examine the level of environmental concern in the Australian community. Surveys by the Australian Bureau of Statistics (Australian Bureau of Statistics 2001) show that adults in Australia had less concern about environmental problems in 2001 than was expressed in 1992 (Figure 1). The percentage of the population concerned about the environmental issues fell from about 75% to 62% in the decade from 1992 to 2001. Further, the major issues of concern related to energy, water and waste not weed management.

It is even more disturbing to find that the greatest decline in environmental concern to be in the youngest age group in the sample (Figure 2). Given the significant level of resources that has been devoted to various school programs over the past twenty years we need to ask is it time to investigate the effectiveness of school based environmental programs? There is also a need to determine what other factors influence the environmental disposition of the general population. The decline in community concern for broad environmental issues presents a significant challenge to the successful implementation of weed management programs.

Environmental values of rural land owners and urban residents

The human values, utilitarian, naturalistic, ecological-scientific and aesthetic values have recently been identified as being the dominant value orientations in samples of rural landowners in southeastern Australia and urban residents of the Melbourne metropolitan area (Edgar 2002). The four values derive from the Typology of Biophilia values developed by Stephen Kellert following a series of cross-cultural

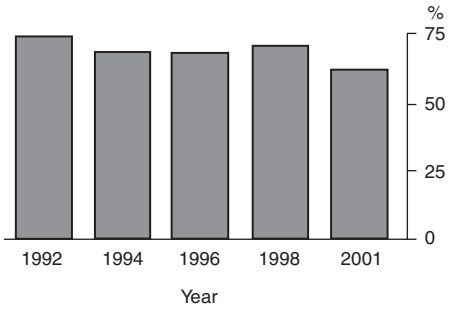

Figure 1. Adults concerned about environmental problems as a proportion of all people aged 18 years and over. Source: Environmental Issues: Peoples views and practices, March 2001 (ABS cat no. 4602.0).

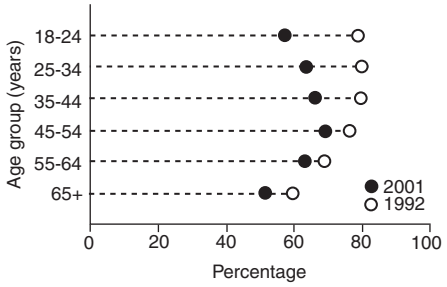

Figure 2. Environmental concern by age as a proportion of people in each age group. Source: Environmental Issues: Peoples views and practices, March 2001 (ABS cat no. 4602.0).

studies of human response to nature (Kellert and Wilson 1993). The content of each value orientation are set out in Table 1.

Major differences were found between the environmental values of rural landowners and urban residents (Table 2). This finding reinforces the need for policy makers to design programs that take account of the different environmental dispositions of rural and urban audiences. A key feature of this data is the relatively high level of expression of the utilitarian value by rural landholders (42%) in comparison to urban residents (5.7%). This difference in value orientation indicates that weed management programs with a strong utilitarian focus may be readily accepted by rural audiences but not seen to be relevant to residents of urban areas.

Rural extension workers may draw some comfort from the relatively high level of expression of the ecologistic-scientific value by rural landowners (31.5%). This indicates that values may have been modified through the participation of landowners in vegetation management programs where concepts of biodiversity protection were explained and promoted. A further explanation is that by living in rural areas landowners have had more opportunities to interact with native vegetation and have developed a better understanding of natural processes

The high frequency of expression of the aesthetic value (73.6%) and the low frequency of expression of the ecological-scientific value (7.9%) by urban residents indicates a deficiency in their knowledge and understanding of native vegetation. The question could be asked. Are they able to distinguish between the yellow flowers of boneseed and wattles as they drive down the freeway? Would it be of concern to them?

Further, given the strong utilitarian value orientation of rural landholders we can in the future expect debate within the community on the desirability of releasing new types of pasture plants that promise positive economic benefits but also have the potential to have serious effects through the invasion of natural systems. This issue has already been identified in relation to the release of new species for the control of dry land salinity (Kalisch 2004).

Table 1. Content of Biophilia Values (after Kellert 1993).

Value	**Expressed tendency**
Utilitarian	Exploitation of the natural world for material benefit to humans.
Naturalistic	Satisfaction from direct experience with the natural world.
Ecologistic-Scientific	Precise study and systematic inquiry into the natural world.
Aesthetic	Wonder at the physical appeal and beauty of the natural world.

Table 2. Expression of each value orientation, as a percentage, by rural and urban participants (n = 272).

Value orientation	Rural landowners	Urban residents
Utilitarian	42.0	5.7
Naturalistic	7.2	12.9
Ecologistic – scientific	31.5	7.9
Aesthetic	19.4	73.6
Total	100	100

Contextual forces

Weed control regulations are often made up of detailed legal, geographic and taxonomic considerations; they vary considerably between States and between regions and municipalities within States. These regulations have been framed to take account of the environmental differences across Australia and the complex taxonomy of many weeds. The net result is a large and detailed set of information that present a significant intellectual challenge to individuals and community organizations who may have a low commitment to weed management.

Further confusion results from competing uses for some declared species. For example lavender farms are found in most areas of Victoria. The declared noxious weed topped lavender is a desirable species used by some growers and has often been available for sale through retail outlets. Clear, unambiguous, enforceable regulations are necessary if a high level of compliance is to be achieved.

Figure 3. A sample of the weed flora in Mt. Eliza Creek 2005.

Personal factors

Twelve months ago I paid to visit an open garden in Mt Eliza. People were streaming in through the gate and readily paying a substantial entry fee as the profits go to support a worthwhile charity. Given that it was the middle of a severe period of drought, and the garden required 4 megalitres of water a year, I decided to take some time out to escape the crowd. While leaning on the fence I was able to identify at least 11 species of bushland weeds crowding the surface and climbing on the few surviving straggly sheoaks in the adjoining creek reserve. There was no one pulling out the weeds even though it was a sunny spring day and there was no charge to enter the creek.

Figure 4. Bathing boxes along beach at Mt. Eliza.

I returned the creek earlier this year and found the track winding down to the creek and beach to be still fringed with blackberry and other weeds. They were all growing vigorously following recent rain (Figure 3). Apart from the need to keep the blackberry off the track I doubt if the composition of the vegetation in the creek has any influence on the beach-goers level of enjoyment. The beach houses are well maintained (Figure 4). What are the factors

limiting weed management in this area? It does not appear to be material resources.

There was also some personal irony in this situation, as this creek reserve is where I attended my first community 'boneseed pulling day' in 1975. Certainly the amount of boneseed has been reduced, but the health and frequency of the native species has further declined as the invasion of invasion of the exotic species continues.

Factors relating to habit or routine

Two information sheets relating to Siratro (*Macroptilium atropurpureum*) are readily available on the Internet; one with the authority of a Government agency (State of Queensland 2003) describes the species as an environmental weed. The other sheet (Partridge 1998) promotes the plant as a desirable pasture species. Both publications carry a degree of authority for individuals who are not familiar with extension agencies and other sources of advice. Who do we believe?

However, the listing of Siratro as an environmental weed has much deeper implications. The species was developed by CSIRO and the name derives from that organization (CSIRO 1972). CSIRO staff were also involved in the introduction of tropical pasture species many have not become weedy (Lonsdale 1994). CSIRO now has a prime role in weed research and in the development of weed control strategies. This indicates that there has been a need for a major cultural change within that organization. In my experience, such changes in organizations do not take place without significant human cost. Research workers, as well as members of the broader community at large tend to maintain certain lines of thought and action.

Engaging the community

The above examples were selected to illustrate some of the challenges to be met in achieving community support for weed management programs. Stern (2000) provides a set of principles for successful intervention designed to change human environmental behaviour. These principles spell out the need to use a range of techniques to take full account of the characteristics of target audience. It is important to understand the situation from the viewpoint of the individual and not make unnecessary demands on their level of understanding of the problem. Credibility and commitment and face-to-face communication play an important role in achieving behaviour change. It is important to monitor and modify program content and design to meet changing requirements during the period of implementation of the program. Participatory decision-making is a key to effective behaviour change.

There may be a need for policy makers to compromise on the purity of environmental goals in order to achieve appropriate type and level environmental behaviour in relation to weed management. To achieve this it is vital to consider the characteristics of the individual who is expected act as well as the science of weed management.

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