

---

**Research Paper**

---

**Environment, Resource Sustainability and Sustainable Behaviour:  
Exploring Perceptions of Students in South West Victoria***Anne WALLIS\* and Laurie LAURENSEN**School of Ecology and Environment, Deakin University*

(Received: 5 January 2003; Accepted: 5 September 2003)

**Abstract**

The movement toward a sustainable future has begun in many parts of the world, as the seriousness of the environmental problems faced by the planet become more widely recognised. Waste reduction, improved efficiency of energy use, water saving devices and changes in modes of transport are the first steps in the transition to a sustainable future. The students of today will be the decision makers of tomorrow and, thus, can have a significant effect on future development and the environmental impacts of that development. If students today are to become active participants in the environmental decision-making process, education for sustainability becomes a key component in ensuring sustainable futures. There is a need to establish data describing students' attitudes toward environmental and resource sustainability issues so that challenges to implementing sustainable development policy can be better recognised. The aims of this study were to identify the perceptions of students in the south west region of Victoria regarding environment and resource sustainability, and to identify their level of participation in sustainable behaviours. A survey of students has found that global environmental issues perceived by students as being in urgent need of attention were access to freshwater, loss of tropical rainforest and exhaustion of natural resources. At the local level the most urgent issues identified were water pollution, salinization and soil degradation, and clearing of native vegetation. Students perceive that Australians are overusing natural resources. They indicated particular concern for the sustainability of fossil fuels, water, coastal environments and fisheries resources. The results of this study indicate that students are responding to concerns for the environment and resource sustainability by embracing some forms of sustainable behaviour. However, as educators we need to ensure that the link is made between environment and resource sustainability and the implementation of policies that will further encourage sustainable behaviour.

**Keywords:** *resource sustainability, sustainable development, sustainable behaviour, students and environment.*

\*Author for correspondence: Dr Anne Wallis, P.O. Box 432, Warrnambool, Vic. 3280. Australia. Tel: +61-3-5563-3150; Fax: +61-3-5563-3462; amwallis@deakin.edu.au

## Introduction

The movement toward a sustainable future has begun in many parts of the world, as the seriousness of the environmental problems faced by the planet becomes more widely recognised. Australia has developed a National Strategy for Ecologically Sustainable Development (Commonwealth of Australia, 1992). In developing this strategy, Ecologically Sustainable Development has been defined as “using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased” (Commonwealth of Australia, 1990; Harding, 1998). Empowering citizens to take responsibility for their action in their own backyard may be one way of providing a foundation for moving toward a sustainable future (Friere, 1973; Fals-Borda and Rahman, 1991; Cuthill, 2002). Another will be to ensure the decision makers of tomorrow have a broad understanding of environmental and resource sustainability issues.

It is argued that higher education students are the elite members and decision makers of society (Wong, 2001), and therefore these students will have a significant effect on future development and the environmental impacts of that development. If students today are to become active participants in the environmental decision-making process, education for sustainability becomes a key component in ensuring a sustainable future. According to Fien (1997, p. 25), sustainability education should develop the “critical thinking, reflection and action skills needed to make lifelong decisions about the nature of a better world”. There is a need to establish data describing

student attitudes toward environmental and resource sustainability issues so that challenges to implementing sustainable development policy can be better recognised.

Wong (2001) completed a study of Taiwan university students and their perceptions of environment resources sustainability and green consumerism, but to date, such a study has yet to be completed in South West Victoria. It is therefore the aim of this study to identify perceptions of students at university, TAFE (Technical and Further Education tertiary colleges) and secondary school regarding environment and resource sustainability, and to identify their level of participation in sustainable behaviours.

## Methods

This survey targeted students studying in educational institutions in Warrnambool, south west Victoria. Stratified quota sampling (Robson, 1993) was conducted with samples taken from Deakin University, SW TAFE, and Warrnambool College. A highly structured force-choice questionnaire was pre-tested and distributed to these institutions during October/November 2002. A total of 218 questionnaires were completed and respondents were stratified according to their educational institution and area of study (science or humanities) they were undertaking. Forty-eight percent of respondents were from university, 29% from TAFE and 23% were year 11 school students. One hundred and sixty-eight respondents could be identified by discipline: 64% science and 36% humanities. Data collected was entered into SPSS 11.0 for Windows (software for statistical analysis) and descriptive statistics were employed. Where comparisons were made

between different groups of students, analysis of variance (ANOVA) was used along with LSD post hoc tests to determine where the differences lay. Students were asked to respond

to three main themes: environment, resource sustainability and sustainable behaviour. The questionnaire included questions allowing students to assess the urgency of local and global

**Table 1 Perceived urgency of global environmental issues**

Environmental Issues	Urgency*	Standard deviation
Depleted access to freshwater	4.51	0.79
Loss of tropical rainforest	4.37	0.78
Exhaustion of natural resources	4.28	0.87
Ozone depletion	4.15	0.78
Loss of biodiversity	4.13	0.91
Enhanced greenhouse effect	4.09	0.84
Depletion of fish stocks	4.05	1.07
Fossil fuel depletion	3.9	1.05
Desertification	3.79	1.00
Climate change	3.75	1.03
Acid rain	3.69	1.05

\*Urgency: the degree of urgency as perceived by students on a five point Leichart scale with 1 = not at all urgent and 5 = extremely urgent.

**Table 2 Perceived urgency of local environmental issues**

Environmental Issues	Urgency*	Standard deviation
Water Pollution	4.4	0.78
Salinization and soil degradation	4.14	0.97
Clearing of native vegetation	4.1	0.99
Soil erosion	4.1	0.94
Waste disposal	4.07	0.93
Water allocation	4.07	0.95
Loss of biodiversity	3.89	0.99
Air pollution	3.73	1.16
Urban encroachment	3.65	0.95

\*Urgency: the degree of urgency as perceived by students on a five point Leichart scale with 1 = not at all urgent and 5 = extremely urgent.

environmental issues; to demonstrate what they understand sustainable development to be and what development options they think might be appropriate to achieve this goal; and to indicate their levels of participation in environmental activities and sustainable behaviours.

### **The Urgency of Environmental Issues**

The pursuit of economic development has resulted in environmental consequences at both the national and global levels. Human activity has created a diversity of problems including ozone depletion, loss of forested area, resource depletion, loss of species, increasing levels of carbon dioxide and pollution of our waterways. In this study students were asked to consider 11 global and 9 local environmental issues and to assess the urgency with which they felt each needed to be addressed. The urgency of these issues as perceived by the students is presented in Tables 1 and 2. Overall, the students indicated a sense of urgency for all of the issues presented.

Students involved in this study identified depleted access to freshwater, loss of tropical rainforest and exhaustion of natural resources as the most urgent environmental issues that need to be addressed at the global level. Eighty-nine percent of students identified depleted access to fresh water as very urgent, 87% identified loss of rainforest as very urgent, and 83% identified exhaustion of natural resources as very urgent.

Water pollution, salinization and soil degradation, and the clearing of native vegetation were identified as the three most urgent environmental issues that need to be addressed at the local level. Eighty-nine percent of students identified water pollution as very urgent,

79% identified salinization and soil degradation as very urgent, and 76% identified clearing of native vegetation as very urgent.

The south west region of Victoria has suffered extensively from agricultural development resulting in a number of easily identifiable environmental problems. High quality freshwater is an important natural asset, which in south west Victoria is being threatened by pollution, run-off from agricultural activities, erosion and overuse. Students recognize the importance of good water resource management as vital to the local region. Australian soils are generally infertile and salinization of the soil is one of Australia's major land degradation problems (Conacher and Conacher, 2000). In southwest Victoria salinity is impacting heavily on agricultural production, as well as environmental, heritage and infrastructure assets (Glenelg Hopkins Catchment Management Authority, 2002). The Australian Dryland Salinity Assessment 2000 indicates the south west is a high hazard risk area for dryland salinity (National Land and Water Resources Audit, 2001). It is therefore not surprising that students perceive this as a local issue that urgently needs to be addressed.

Rapid and extensive landscape modification has occurred in Australia since Europeans arrived 200 years ago (Hobbs and Hopkins, 1990). This is particularly so in western Victoria where the removal and fragmentation of native vegetation has led to major reductions in wildlife habitat, erosion and salinization (Glenelg Hopkins Catchment Management Authority, 2002). This is an issue recognized not only by students as needing to be addressed but by government agencies, landholders and the general community who are embracing revegetation projects in rural communities.

The results shown in Tables 1 and 2 demonstrate that students in the south west are concerned about environmental issues at both the local and global level. Most interesting was their concern for water:

- 89% of students identified depleted access to freshwater as very urgent;
- 89% of students identified water pollution as very urgent; and
- 72% identified water allocation.

These results reflect the problems we are facing in Australia with regard to water allocation and this no doubt is being reinforced by the current drought conditions being experienced.

### Understanding 'Sustainable Development'

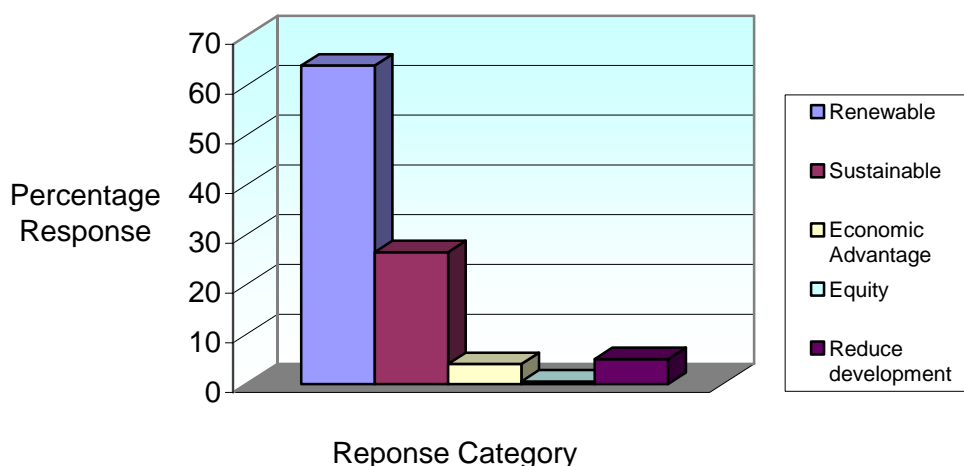
In Australia, the National Strategy for Ecologically Sustainable Development, 1992 provides the framework for encouraging sustainable development. The principles and core objectives of Ecologically Sustainable Development are cited in Australian govern-

ment policies, industry guidelines, community strategies and legislation (Harding, 1998). However, no such strategy can be completely successful without public support. This requires informed citizens, be they politicians, administrators, members of the private sector, people in the street or students studying in schools and tertiary institutions.

The questionnaire asked students to demonstrate their understanding of resource sustainability by selecting, from five alternative statements (Table 3), the one that they felt best described sustainable development. As can be seen in Figure 1 the majority of students selected alternative A. This demonstrates that their understanding of sustainable development equated with that of renewable resource replacement (the old idea of sustainable yield), rather than the more complex idea of using resources without compromising resource availability for future generations (alternative B). Lack of familiarity with and/or misunderstanding of sustainable development can act as a barrier to the implementation of Ecologi-

**Table 3 The five alternative descriptions of sustainable resource use presented to students for determining their understanding of sustainable development**

<p>Which of the following statements best describes your understanding of sustainable development.</p> <p>A. Resources should be used at such a rate that there is time for them to be naturally replenished. (<i>renewable</i>)</p> <p>B. Resource use should be such that future generations' use of resources is least compromised. (<i>sustainable</i>)</p> <p>C. Resources are used to gain maximum economic advantage. (<i>development</i>)</p> <p>D. Resource use is equitable between different social groups. (<i>socialist</i>)</p> <p>E. Resources should be reduced even if this means there is no economic development.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



**Figure 1 Students understanding of sustainable development as shown by their selection of alternative descriptions presented**

cally Sustainable Development.

It is not surprising that students demonstrate some confusion interpreting the term sustainable development, as there are a plethora of definitions and perspectives that can be found in the literature. Although there are a variety of approaches to understanding sustainable development, it is generally agreed that it should ensure that development pursued will ‘meet the needs of the present without

compromising the ability of future generations to meet their own needs’ (Brundtland, 1987). One of the challenges for educators will be to take account of the varying perspectives and provide an interdisciplinary approach to sustainable education.

**Strategies for Sustainable Development**

There is a growing concern that human

**Table 4 Student support for future development options**

Strategies for Sustainable Futures	Agree	Unsure	Disagree
Australians are overusing resources	<b>64%</b>	25%	11%
● Economic growth despite the environmental and social costs	24%	17%	<b>59%</b>
● More environmental protection policies above economic growth	<b>58%</b>	27%	15%
● Investment in environmental protection above social welfare	32%	<b>46%</b>	22%
● Encourage lifestyle change	<b>66%</b>	19%	15%
Australian students are prepared to change their lifestyle to ensure resource sustainability	<b>42%</b>	34%	23%

economic activity has resulted in environmental problems across the globe, however, there is a reluctance to modify activities that are causing these problems (Beder, 1993) and to develop the strategies required to address them. Economic growth is still central to government policy in Australia. Yet Ecologically Sustainable Development will require that the economy be managed without compromising social well-being or the environment's ability to support biodiversity and to maintain ecological life support services.

In this study, as shown in Table 4, 64% of students indicated that they considered Australians are overusing resources. This is driven by the materialistic nature of the Australian society in which unnecessary consumption is driven by advertising (Harding, 1998) and by the idea that economic growth is good. To ensure a sustainable future, compromise will be required between the development options available, for example, economic growth, equity, and environmental protection.

According to student responses, economic programs should not be given priority over social and environmental programs. Fifty-nine percent of students did not agree that economic growth should be sought despite social and environmental costs. In fact they indicated that environmental programs should have priority over economic growth, but they were less certain about balancing social and environmental options. Two third of the students supported individuals being encouraged to change their lifestyle and yet they were not so certain about student preparedness to make such lifestyle changes.

Students seem to believe that a reorientation of development strategies away from economic growth and toward environmental

and social well-being is required to ensure sustainable development. Students are willing to compromise economic options in favour of environmental programs, but they are uncertain about where the social options fit in.

### **Taking Action and Behaving Sustainably**

Concern for the environment and resource sustainability can be addressed through citizens taking individual action. The results of this study indicate that students have developed positive attitudes toward the environment, and this is reinforced by their level of participation in actions that protect or enhance environmental quality.

As can be seen in Figure 2, the environmental activity in which students in southwest Victoria are most likely to have participated is tree planting. This type of activity is often encouraged in Victorian schools and hence it can be anticipated that students who have attended schools in Victoria may have had the opportunity to be involved in such environmental action.

Landcare Australia, a volunteer organization, also provides easy opportunities for the community to become involved in tree planting programs. Students also show high participation rate in volunteering for environmental management activities. There are numerous such activities that are accessible to students through groups such as Landcare, Coastcare and Junior Naturalist Clubs. The actions in which students are least likely to have been involved in are contributing to an environmental newsletter or becoming a member of an environmental group.

When comparing the action of students from different institutions it was found that

TAFE students were significantly more likely than university and secondary school students to have been a member of an environmental group ( $p=0.041$  and  $p=0.003$  respectively) and to have made a contribution to an environ-

mental newsletter ( $p=0.012$  and  $p=0.008$  respectively). TAFE students are significantly less likely than university students to have been involved in tree planting ( $p=0.042$ ) but significantly more likely than school students

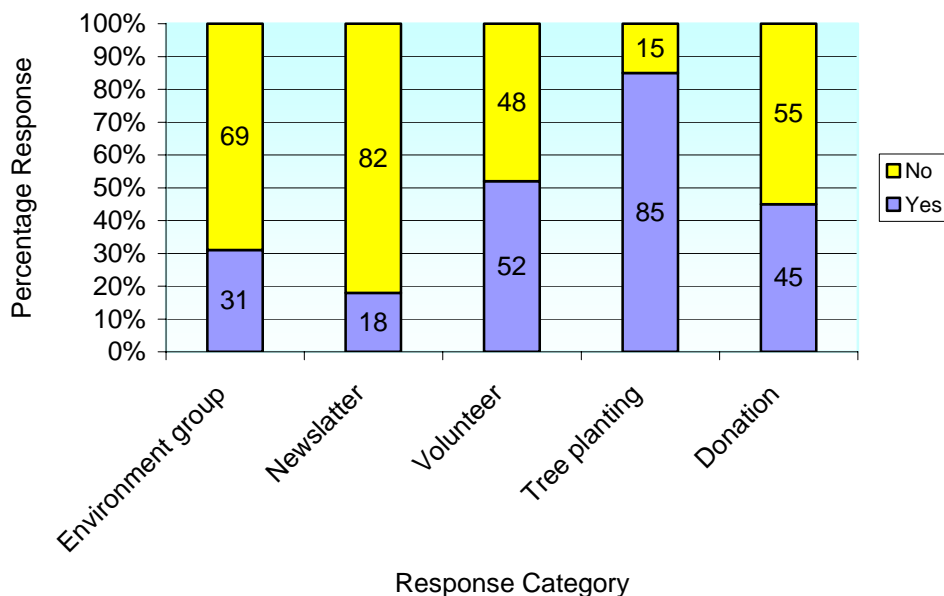


Figure 2 Student participation in environmental action

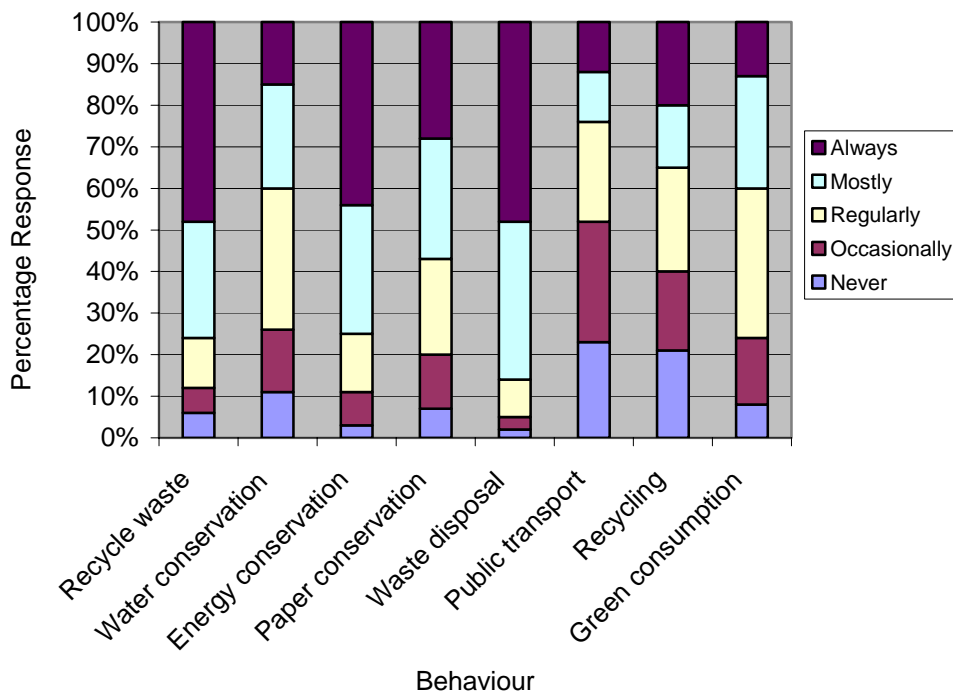


Figure 3 Student patterns of sustainable behaviour



to have made a donation to an environmental group ( $p=0.011$ ). This reflects that differences do occur between the different cohorts of students at the different institutions.

One of the challenges facing our society is the adoption of behaviours that will foster sustainable development. This will require changes in lifestyle so that we do not outstrip the earth's ability to cope with the demands of humanity. In a number of ways students in south west Victoria are demonstrating changes in behaviour that will foster sustainable development. The majority of the students dispose of their litter appropriately, separate waste for recycling and display energy conservation by turning off lights when vacating a room (Figure 3). This indicates that students have some knowledge of behaviours that reduce their environmental impacts and resource use and perceive the benefits of such behaviours. Students are least likely to use public transport. This most likely reflects the barriers to using such transport, particularly in the south west region. Where we can reduce the barriers to sustainable behaviour (lack of knowledge, access difficulties, etc.) then it is more likely that sustainable behaviours will be adopted (McKenzie-Mohr and Smith, 1999).

No significant difference in the behaviour patterns declared by students was found between the different educational institutions.

## Conclusion

The Australian Government's discussion paper on Ecologically Sustainable Development (Commonwealth of Australia, 1990) recognises community concern that "in pursuing material welfare, insufficient value has often been placed on the environmental factors that

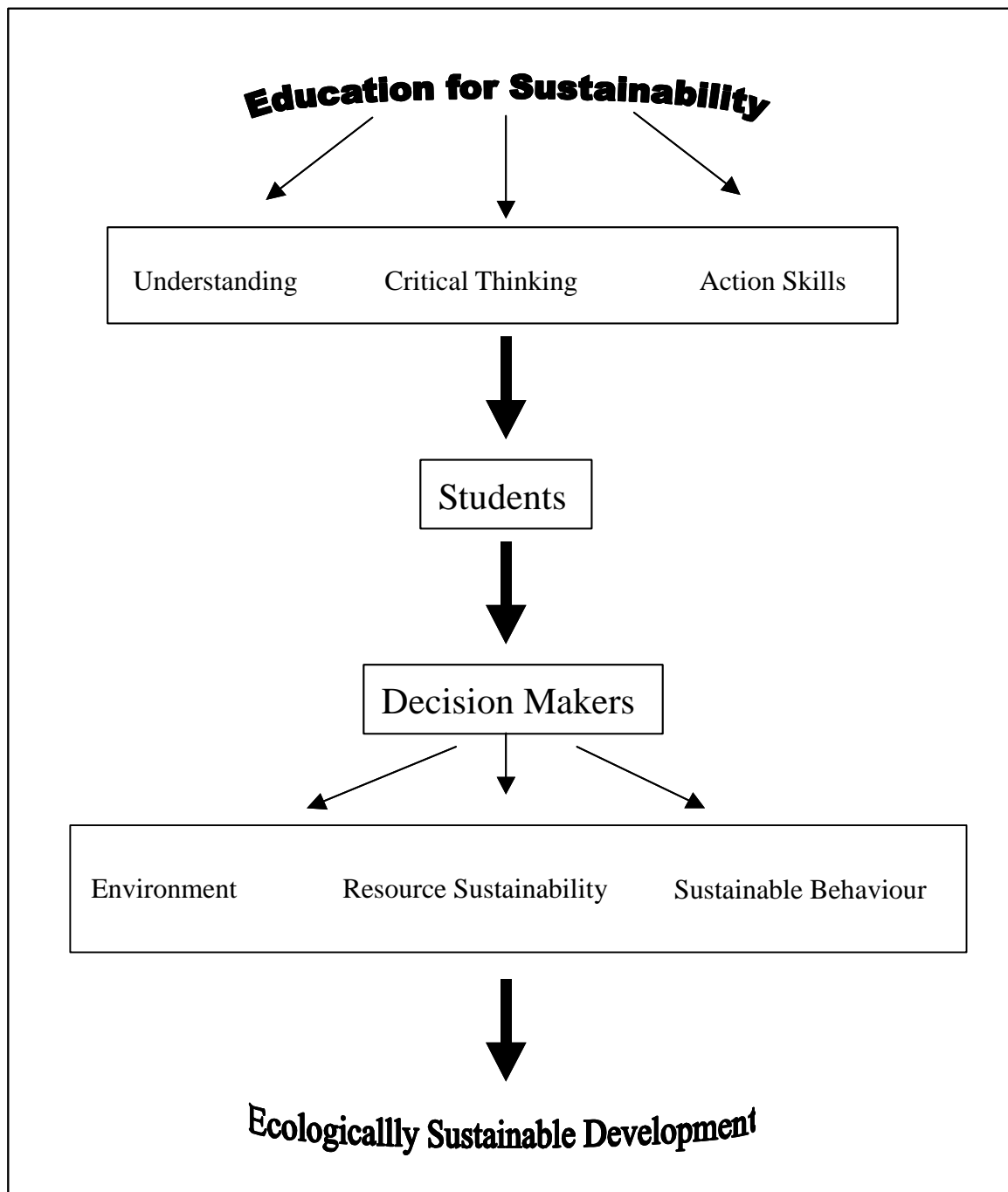
also contribute to our standard of living." In moving toward ESD, a reorientation of policies and practices will be required to address the environmental degradation problems being experienced. It is generally agreed that this will only be achieved if the managers and policy makers of the future have a breadth of knowledge, understanding and multidisciplinary skills to cope with the challenges of sustainable development (Hailey, 1998; Wong, 2001).

This study demonstrated that students attending south west Victorian educational institutions are concerned about global and local environmental issues and consider that there is an urgent need to address these. They recognise the need to reorient strategies from an economic emphasis toward environmental protection and the need for Australians to accept changes in their lifestyle in order to ensure sustainable resource use. These results are comparable with the results found for students in Taiwan by Wong (2001). Although the global and local issues identified by students in the different countries differed, both cohorts of students expressed an urgency about these issues, they indicated a need for a fundamental shift in development strategies and declared that they are backing up this concern with action that includes adopting more sustainable behaviours.

Educators can be encouraged by student attitudes toward environment and resource sustainability. However, attention needs to be given to ensuring students have a clear understanding of sustainable development such that they can analyse environmental and resource sustainability issues and assess the appropriateness of development strategies. Within each discipline area, education for sustainable

development will require openness to new ideas, taking on an interdisciplinary approach and recognition of the importance of non-exploitive values and ethical norms. As summarised in Figure 4, education for sustainable development should ensure students

are provided with the understanding, are encouraged to critically analyse a changing environment, and are armed with action skills that in the future will allow decision makers to be environmentally responsible, select development options that use resources sustainably,



**Figure 4 Education for sustainability must equip students with the skills to make future decisions that will foster sustainable development**

and encourage sustainable lifestyles.

## References

- Beder, S. (1993) *The Nature of Sustainable Development*. Scribe Publications, Newham, Victoria, Australia.
- Brundtland, G. H. (1987) *Our Common Future*. Oxford University Press, Oxford.
- Commonwealth of Australia (1990) *Ecologically Sustainable Development: A Commonwealth Discussion Paper*. Australian Government Printing Service, Canberra.
- Commonwealth of Australia (1992) *National Strategy for Ecologically Sustainable Development*. Australian Government Printing Service, Canberra.
- Conacher, A. and Conacher, J. (2000) *Environmental Planning and Management in Australia*. Oxford University Press, South Melbourne, Victoria.
- Cuthill, M. (2002) Exploratory Research: citizen participation, local government and sustainable development in Australia. *Sustainable Development* **10**, 79-89.
- Fals-Borda, O. and Rahman, M. A. (1991) *Action and Knowledge: Breaking the monopoly with participatory action research*. Apex, New York.
- Fien, J. (1997) Stand up, stand up and be counted: Undermining myths of environmental education. *Australian Journal of Environmental Education*, **13**, 21-26.
- Friere, P. (1973) *Education for Critical Consciousness*. Seabury, New York.
- Glenelg Hopkins Catchment Management Authority (2002) *Regional Catchment Strategy*. Glenelg Hopkins Catchment Management Authority, Hamilton, Victoria.
- Hailey, J. (1998) Management education for sustainable development. *Sustainable Development* **6**, 40-48.
- Harding, R. (1998) *Environmental Decision Making: The Roles of Scientists, Engineers and the Public*. The Federation Press, Annandale, NSW.
- Hobbs, R. J. and Hopkins, A. J. M. (1990). From Frontiers to Fragments: European impact on Australia's vegetation. *Proceedings from the Ecological Society of Australia*, **16**, 93-114.
- McKenzie-Mohr, D. and Smith, W. (1999) *Fostering Sustainable Behaviour: An Introduction to Community-based Social Marketing*. New Society Publishers, Gabriola Island B.C., Canada.
- National Land and Water Resources Audit (2001) *Australian Dryland Salinity Assessment 2000: Extent, Impacts, Processes, Monitoring and Management Options*. National Land & Water Resources Audit, Turner, ACT.
- Robson, C. (1993) *Real World Research: A Resource for Social Scientists and Practitioner-researchers*. Blackwell Publishers, Oxford.
- Wong, K. K. (2001) Taiwan's environment, resource sustainability and green consumerism: perceptions of university students. *Sustainable Development* **9**, 222-223.